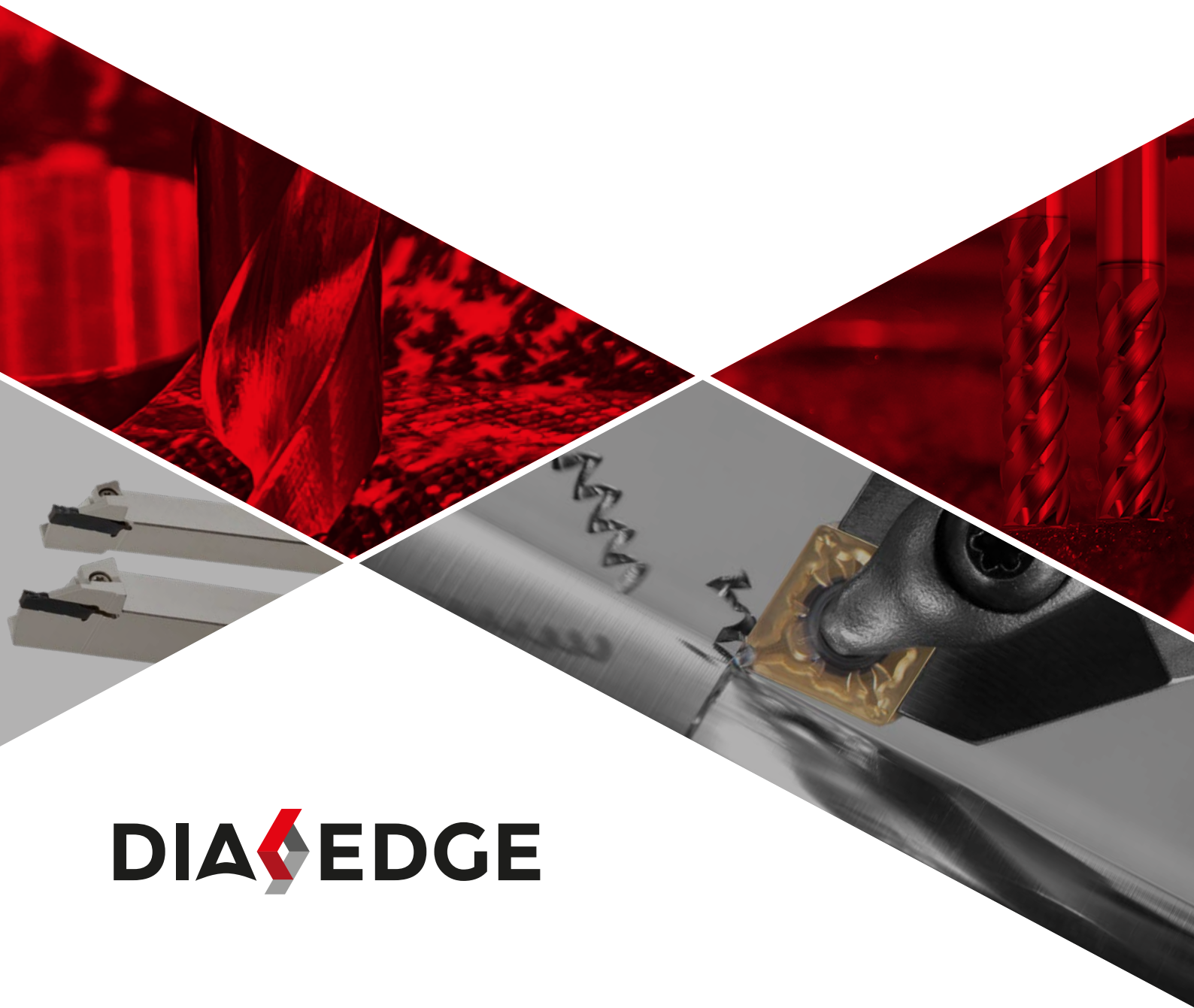
MITSUBISHI MATERIALS

PRODUCT NEWS 2022-2



DIA EDGE

NEW

PRODUCT NEWS 2022-2

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 of the tooling brand DIAEDGE for turning, milling and drilling applications.

CURRENT, INNOVATIVE, COMPETITIVE

NOTE: The product news catalogue 2022-2 (N032) complements the general catalogue C009 and contains all new products and series expansions that have been launched after the release of the current general catalogue. Therefore, this edited news publication replaces the news catalogue 2022-1 (N031).

DIA EDGE

BETTER. TOGETHER.

MITSUBISHI MATERIALS

INDEX

TURNING TOOLS

NEW 2022-2 **GY** 6
1.2 mm GY insert and monoblock holder for small parts precision machining.
1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm GY inserts with 8° & 15° lead angles.

NEW 2022-2 **MS7025** 25
PVD grade for high precision and small parts machining of stainless steels.

NEW 2022-1 **BC8220** 38
BC8220 – PCBN grade for general turning of hardened steels.
New BR Breaker for excellent chip control when finishing, removing carburized layers, high load machining and hard-soft machining up to 1 mm depth of cut.

NEW 2022-1 **MP/MT9000** 69
ISO turning insert for difficult-to-cut materials.
MP9025 PVD grade, 7° positive insert expansion for ISO-S turning.

NEW 2022-1 **GW MONOBLOCK HOLDER** 75
GW system expansion with monoblock holder and 2.39 mm width inserts.
Different chipbreakers with 5° and 8° leads now available.

SOLID MILLING TOOLS

NEW 2022-2 2022-1 **VQ SERIES** 96
VQJCS / VQLCS - New end mill with chipbreaker and irregular pitch flute geometry.
VQN4 / 6MVRB – Corner radius end mills to machine Ni-based alloys.

NEW 2022-2 **iMX** 107
iMX-C6HV-C - Corner radius type with central coolant hole, 6 flute, irregular helix.

NEW 2022-1 **VFR** 112
Expansion of VFR2XLB – Ideal for finishing deep pocket applications.

INDEXABLE MILLING TOOLS

NEW 2022-2 2022-1 **WSF406W** 121
New M-Breaker and Wiper.
Double sided insert with positive geometry for low cutting resistance.
High efficiency cutting of cast iron.

NEW 2022-1 **AJX** 132
New arbor type with ultra fine pitch.
Expansion of the multi-functional milling range.

DRILLING TOOLS

NEW 2022-2 **DSAS** 155
New sizes added to the solid carbide drill series with internal coolant holes for HRSA materials.

NEW 2022-2 **MINI DVAS** 169
Solid carbide TRISTAR drill series.
Fast, reliable and accurate.

GY GROOVING SERIES

A WIDE SELECTION OF HOLDERS AND INSERTS AVAILABLE FOR DIVERSE GROOVING APPLICATIONS

Interested in more...

B140

www.mhg-mediastore.net

DIA EDGE

GY GROOVING SERIES

A WIDE SELECTION OF INSERTS

CUTTING OFF

GU Chipbreaker
(For mild steel)

GS Chipbreaker
(Low feeds)

GM Chipbreaker
(Medium feeds)

R/L05-GM Breaker
(Medium feeds)

R08-GS Breaker
(Low feeds)

R15-GS Breaker
(Low feeds)

GL Breaker
(For aluminium alloys)

GROOVING

GU Chipbreaker
(For mild steel)

GS Chipbreaker
(Low feeds)

GM Chipbreaker
(Medium feeds)

GFGS
(For hardened materials)

GL Breaker
(For aluminium alloys)

FOR MULTIFUNCTIONAL GROOVING

MF Chipbreaker
(G class)

MS Chipbreaker
(Low feeds)

MM Chipbreaker
(Medium feeds)

COPYING / RECESSING

BM Chipbreaker
(Medium feeds)

Breaker	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	NEW MP9015	NEW MP9025
GU Breaker			✓	✓		✓			
GS Breaker	✓	✓	✓	✓		✓			
GM Breaker			✓	✓	✓	✓		✓	✓
GL Breaker	✓								
MF Breaker	✓		✓	✓		✓			
MS Breaker			✓	✓	✓	✓			
MM Breaker			✓	✓	✓	✓		✓	✓
BM Breaker			✓	✓	✓	✓		✓	✓
Blank Insert	✓	✓				✓			
GFGS Honing (PCBN)							✓		

GY GROOVING SERIES

A WIDE SELECTION OF HOLDERS AND INSERTS AVAILABLE FOR DIVERSE GROOVING APPLICATIONS

EXTERNAL • FACE HOLDERS

Corresponding blades to a variety of modular holders with different shank sizes.

⌀ 10 mm
⌀ 12 mm
⌀ 16 mm

⌀ 20 mm
⌀ 25 mm
⌀ 25 x 32 mm
⌀ 32 mm

⌀ 16 mm

⌀ 20 mm

⌀ 25 mm

⌀ 25 x 32 mm, ⌀ 32 mm

Monoblock type

Modular type

Various depths of groove possible with a single tool using different modular blades.

External grooving

Face grooving

Various sizes of face grooves from a wide array of modular blades.

INTERNAL HOLDERS

A wide range of holders available from minimum diameter of ø25 mm.

Monoblock type

Min.cutting diameter ø25, ø32

Modular type

Min.cutting diameter ø40, ø50, ø60, ø70

Short shank types are stock standard.

Monoblock type

Short

Standard

Modular type

Short

Standard

GY GROOVING SERIES

MONOBLOCK HOLDERS FOR EXTERNAL GROOVING AND FOR SWISSTYPE LATHE MACHINES

Monoblock holder
⧄ 20 mm × 20 mm
⧄ 25 mm × 25 mm

Strong insert seating

Stable clamping

2 corner insert
Insert width 2.0 – 8.0 mm

NEW

For Swiss type lathes

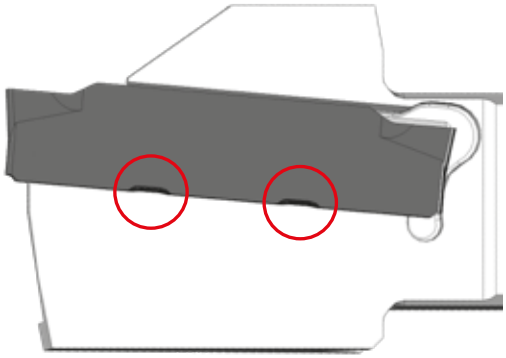
NEW

GY GROOVING SERIES

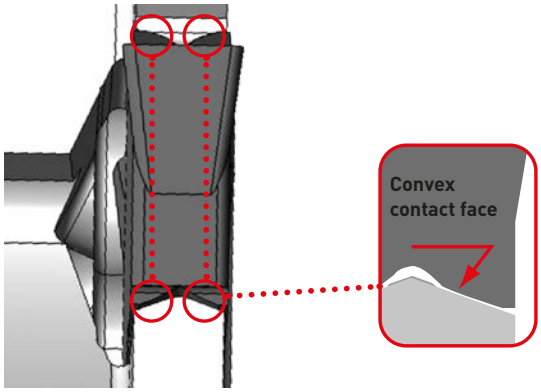
INNOVATIVE CLAMPING SYSTEM FOR SWISS TYPE LATHES ENSURES RELIABLE GROOVING

HIGHLY RELIABLE INSERT CLAMP

The safety key locks the insert and prevents movement.



The convex geometry ensures high precision clamping.

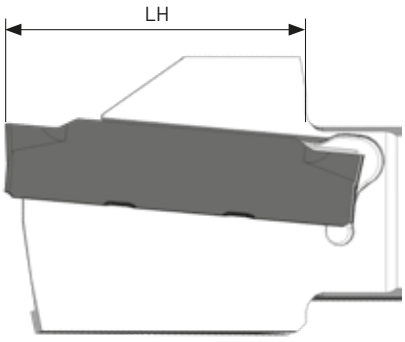


MONOBLOCK HOLDER FOR SWISS TYPE AUTOMATIC LATHES

The new geometry with greatly improved rigidity suppresses vibrations and dimensional changes thereby solves common cutting off problems.

OVERHANG LENGTH COMPATIBLE WITH SWISS TYPE AUTOMATIC LATHES

Head length corresponding to the maximum machining diameter of CNC Swiss type automatic lathes and turret machines.



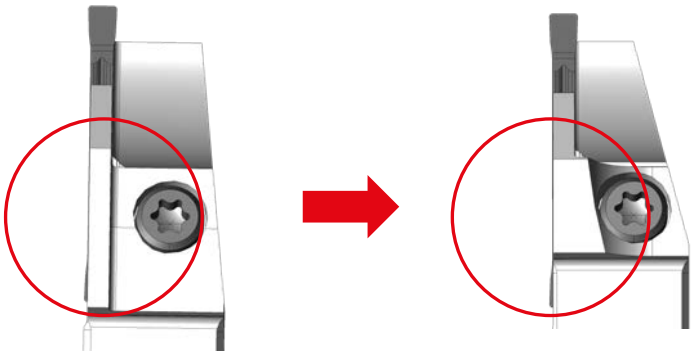
NEW

GY GROOVING SERIES

FEATURES OF THE HIGH-RIGIDITY HOLDER FOR SWISS TYPE LATHES

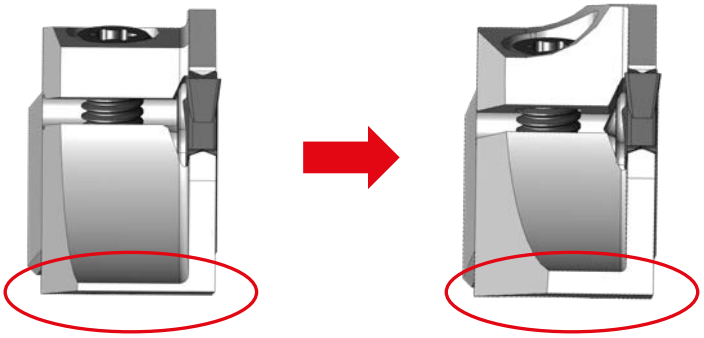
STRONG CLAMP BRIDGE

The strong design of the clamp bridge suppresses chatter and vibration.



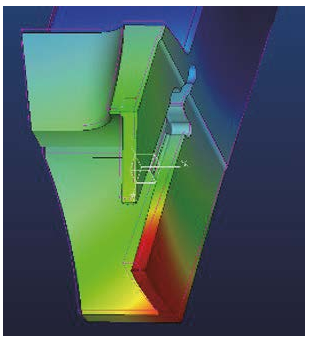
THICKER TOOL BASE

Tool deflection caused by cutting resistance is greatly reduced.



Analysis by simulation
Deflection measurement: 0.044 mm

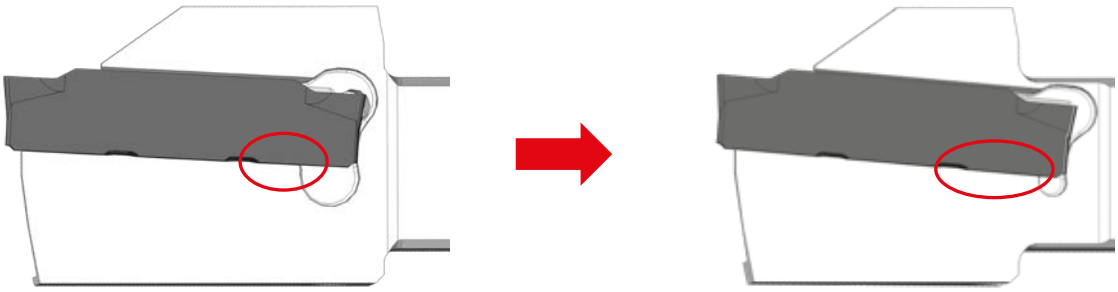
Analysis by simulation
Deflection measurement: 0.013 mm



Analysis by simulation

STRENGTHENING OF THE INSERT CLAMP

The seating face of the insert becomes wider reducing the deformation of the workpiece material.



NEW

GY GROOVING SERIES

NEW LINE-UP

LOW RESISTANCE/ LOW FEED BREAKER

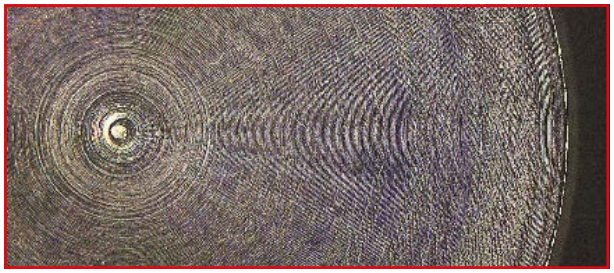
GS Breaker for lead angle 8° and 15°

By improving dimensional accuracy, the amount of remaining centre pip is reduced and good surface finishes are achieved.

CUTTING PERFORMANCE

SUS304 Comparison of cutting off and remaining material

COMPLETE CUTTING OFF



GY
GS breaker

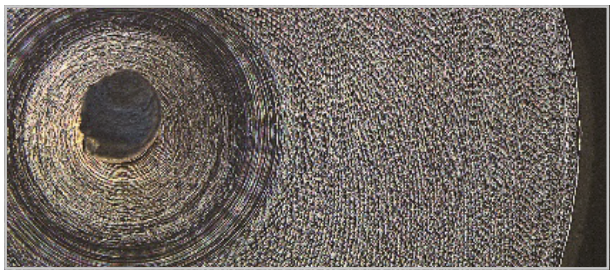
Remaining pip in the centre: ø 0.49 mm, Rz: 0.009 mm

NOT COMPLETELY CUT OFF

Conventional A

Remaining pip in the centre: ø 0.58 mm, Rz: 0.043 mm

NOT COMPLETELY CUT OFF



Conventional B

Remaining pip in the centre: ø 1.42 mm, Rz: 0.015 mm

Material	SUS304 ø16mm
Tool	CW = 2 mm Lead Angle 15°
Vc (m/min)	100
f (mm/rev)	0.03
Cutting mode	Wet cutting

NEW

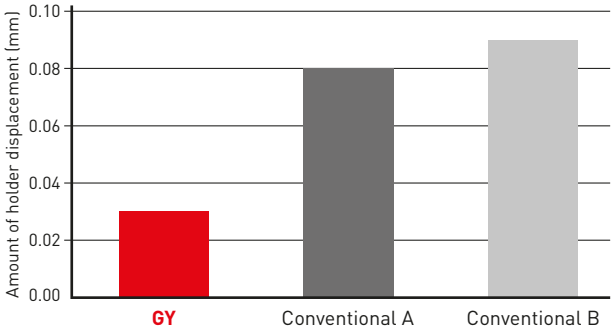
GY GROOVING SERIES

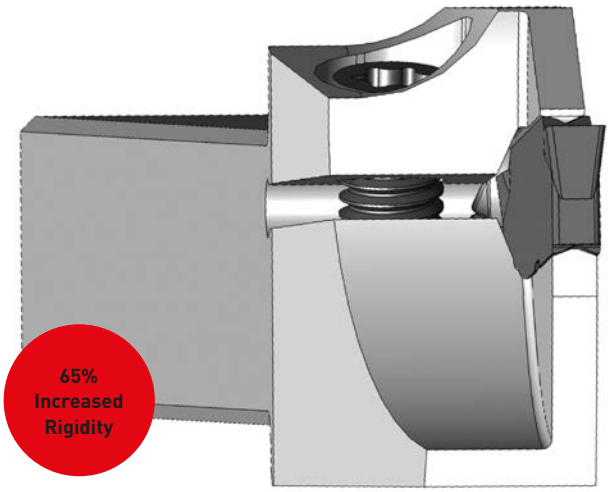
CUTTING PERFORMANCE FOR SWISS TYPE LATHES

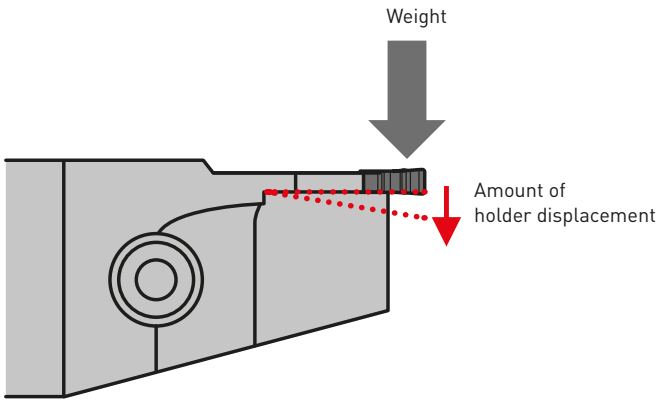
TOOL HOLDER DEFLECTION COMPARISON

The high rigidity of the tool reduces chatter and vibration thereby improving the component surface finish and also reduces the remaining pip in the centre.

GY holder







NEW

GY GROOVING SERIES

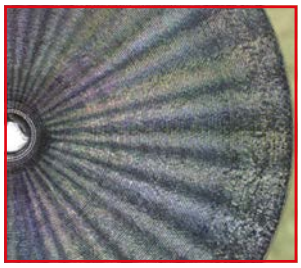
CUTTING PERFORMANCE FOR SWISS TYPE LATHES

SURFACE FINISH COMPARISON WHEN CUTTING OFF: 1.4301 X5CRNI18-9

The high-rigidity holder suppresses vibration and tool deflection, improving the finished surface.

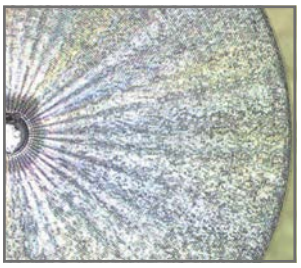
GY Holder

Rz 1.8 µm



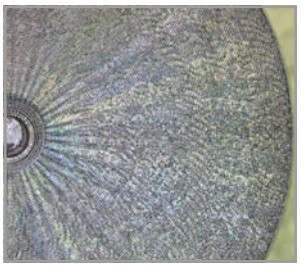
GY

Rz 5.6 µm



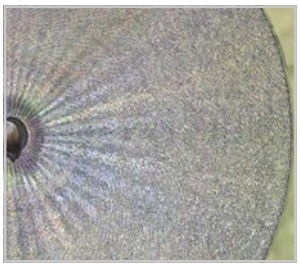
Conventional A

Rz 4.1 µm



Conventional B

Rz 5.7 µm



Conventional C

Material	1.4301 ø25mm
Tool	CW = 2 mm RE = 0.2 mm 16 x 16
Vc (m/min)	120
f (mm/rev)	0.10
Cutting mode	Wet cutting

Excellent surface finish

NEW

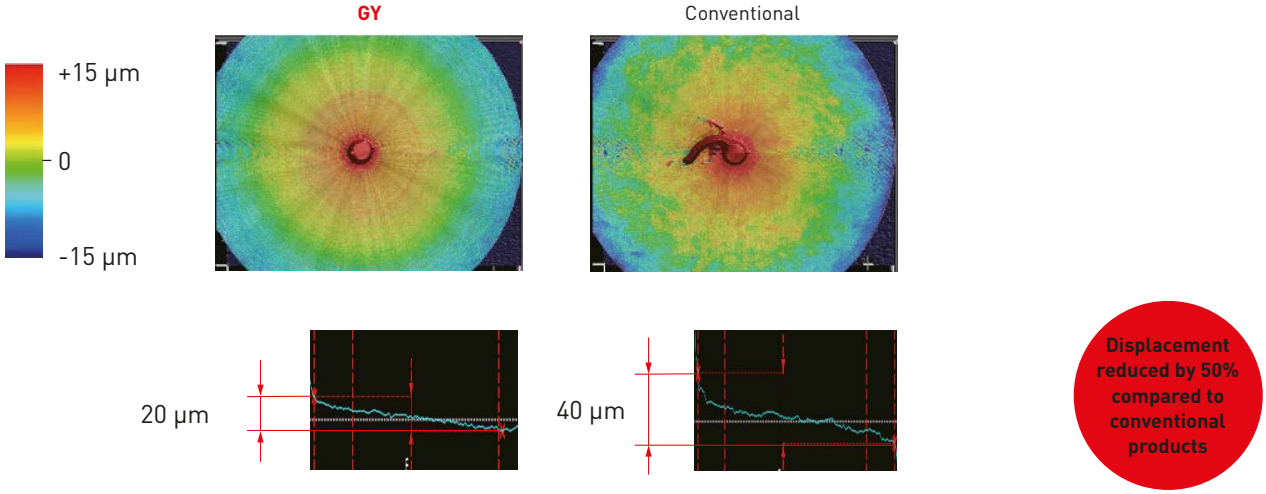
GY GROOVING SERIES

CUTTING PERFORMANCE FOR SWISS TYPE LATHES

COMPARISON OF THE ACCURACY OF THE WORKPIECE WHEN CUTTING OFF: 1.4301 X5CRNI18-9

GY Holder

Height difference colour



Displacement reduced by 50% compared to conventional products

Material	1.4301 ø25mm
Tool	CW = 2 mm RE = 0.2 mm 16 x 16
Vc (m/min)	120
f (mm/rev)	0.10
Cutting mode	Wet cutting

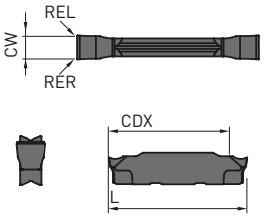
INSERTS

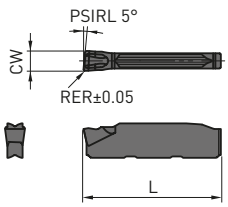
Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry
GROOVING / CUTTING OFF																
GY2M0200D020N-GU			●	●		●				D	2.00	±0.03	0.2	19.7	20.70	GU (For gummy steel)
GY2M0239E020N-GU			●	●		●				E	2.39	±0.03	0.2	19.8	20.70	
GY2M0250E020N-GU			●	●		●				E	2.50	±0.03	0.2	19.5	20.70	
GY2M0300F030N-GU			●	●		●				F	3.00	±0.03	0.3	19.3	20.70	
GY2M0318F030N-GU			●	●		●				F	3.18	±0.03	0.3	19.3	20.70	
GY2M0400G030N-GU			●	●		●				G	4.00	±0.04	0.3	24.2	25.65	
GY2M0475H040N-GU			●	●		●				H	4.75	±0.04	0.4	24.2	25.65	
GY2M0500H040N-GU			●	●		●				H	5.00	±0.04	0.4	24.2	25.65	
GY2M0600J040N-GU			●	●		●				J	6.00	±0.04	0.4	24.2	25.65	
GY2M0635J040N-GU			●	●		●				J	6.35	±0.04	0.4	24.2	25.65	
NEW GY2M0120B010N-GS			●	●						B	1.20	±0.03	0.1	12.2	14.70	GS (Low feeds)
GY2M0150C010N-GS			●	●						C	1.50	±0.03	0.1	13.4	14.70	
GY2M0200D020N-GS			●	●		●				D	2.00	±0.03	0.2	18.7	20.70	
GY2M0239E020N-GS			●	●		●				E	2.39	±0.03	0.2	18.5	20.70	
GY2M0250E020N-GS			●	●		●				E	2.50	±0.03	0.2	18.5	20.70	
GY2M0300F020N-GS			●	●		●				F	3.00	±0.03	0.2	18.5	20.70	
GY2M0318F020N-GS			●	●		●				F	3.18	±0.03	0.2	18.5	20.70	
GY2M0400G020N-GS			●	●		●				G	4.00	±0.04	0.2	23.9	25.65	
GY2M0475H030N-GS			●	●		●				H	4.75	±0.04	0.3	23.9	25.65	
GY2M0500H030N-GS			●	●		●				H	5.00	±0.04	0.3	24.0	25.65	
GY2M0600J030N-GS			●	●		●				J	6.00	±0.04	0.3	24.1	25.65	
GY2M0635J030N-GS			●	●		●				J	6.35	±0.04	0.3	24.1	25.65	
GY2M0800K030N-GS			●	●						K	8.00	±0.04	0.3	29.1	30.50	
GY1M0200D020N-GM			●	●		●		●	●	D	2.00	±0.03	0.2	–	20.70	GM (Medium feeds)
GY1M0250E020N-GM			●	●		★		●	●	E	2.50	±0.03	0.2	–	20.70	
GY1M0300F030N-GM			●	●		●		●	●	F	3.00	±0.03	0.3	–	20.70	
GY1M0400G030N-GM			●	●		●		●	●	G	4.00	±0.04	0.3	–	25.65	
GY1M0500H040N-GM			●	●		●		●	●	H	5.00	±0.04	0.4	–	25.65	
GY2M0150C020N-GM			●	●		●		●	●	C	1.50	±0.03	0.2	13.9	14.70	GM (Medium feeds)
GY2M0200D020N-GM			●	●	●	●		●	●	D	2.00	±0.03	0.2	19.4	20.70	
GY2M0239E020N-GM			●	●	●	●		●	●	E	2.39	±0.03	0.2	19.4	20.70	
GY2M0250E020N-GM			●	●	●	●		●	●	E	2.50	±0.03	0.2	19.4	20.70	
GY2M0300F030N-GM			●	●	●	●		●	●	F	3.00	±0.03	0.3	19.4	20.70	
GY2M0318F030N-GM			●	●	●	●		●	●	F	3.18	±0.03	0.3	19.4	20.70	
GY2M0400G030N-GM			●	●	●	●		●	●	G	4.00	±0.04	0.3	24.4	25.65	
GY2M0475H040N-GM			●	●	●	●		●	●	H	4.75	±0.04	0.4	24.3	25.65	
GY2M0500H040N-GM			●	●	●	●		●	●	H	5.00	±0.04	0.4	24.3	25.65	
GY2M0600J040N-GM			●	●	●	●		●	●	J	6.00	±0.04	0.4	24.3	25.65	
GY2M0635J040N-GM			●	●	●	●		●	●	J	6.35	±0.04	0.4	24.3	25.65	
GY2M0800K050N-GM			●	●	●			●	●	K	8.00	±0.04	0.5	29.3	30.50	

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

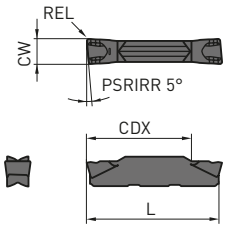
INSERTS

	Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry
GROOVING / CUTTING OFF																	
	GY2G0200D005N-GL	●									D	2.00	±0.02	0.05	19.5	21.05	GL Breaker (For aluminium alloys)
	GY2G0250E005N-GL	●									E	2.50	±0.02	0.05	19.1	21.05	
	GY2G0300F005N-GL	●									F	3.00	±0.02	0.05	18.9	21.05	
CUTTING OFF																	
	GY1M0200D020R05-GM			●	●						D	2.00	±0.03	0.2	–	20.80	R/L05-GM Breaker
	GY1M0200D020L05-GM			★	●						D	2.00	±0.03	0.2	–	20.80	
	GY1M0300F030R05-GM			●	●						F	3.00	±0.03	0.3	–	20.85	
	GY1M0300F030L05-GM			●	●						F	3.00	±0.03	0.3	–	20.85	
	GY2M0200D020R05-GM			●	●						D	2.00	±0.03	0.2	19.5	20.80	R/L05-GM Breaker
	GY2M0200D020L05-GM			●	●						D	2.00	±0.03	0.2	19.5	20.80	
	GY2M0250E020R05-GM			●	●						E	2.50	±0.03	0.2	19.5	20.825	
	GY2M0250E020L05-GM			●	●						E	2.50	±0.03	0.2	19.5	20.825	
	GY2M0300F030R05-GM			●	●						F	3.00	±0.03	0.3	19.5	20.85	
	GY2M0300F030L05-GM			●	●						F	3.00	±0.03	0.3	19.5	20.85	
	GY2M0400G030R05-GM			●	●						G	4.00	±0.04	0.3	24.5	25.85	
	GY2M0400G030L05-GM			●	●						G	4.00	±0.04	0.3	24.5	25.85	
	GY2M0500H040R05-GM			●	●						H	5.00	±0.04	0.4	24.5	25.95	
	GY2M0500H040L05-GM			●	●						H	5.00	±0.04	0.4	24.5	25.95	
NEW	GY2M0120B010R05-GS			★	★						B	1.20	±0.03	0.1	12.22	14.70	R/L05-GS Breaker (Low feeds)
NEW	GY2G0150C010R08-GS			●	●						C	1.50	±0.02	0.1	13.17	15.20	R08-GS Breaker (Low feeds)
NEW	GY2G0200D020R08-GS			●	●						D	2.00	±0.03	0.2	18.85	21.30	
NEW	GY2G0250E020R08-GS			●	●						E	2.50	±0.03	0.2	19.04	21.50	
NEW	GY2G0300F020R08-GS			●	●						F	3.00	±0.03	0.2	18.62	21.50	
NEW	GY2G0150C003R15-GS			●	●						C	1.50	±0.02	0.03	13.17	15.20	R15-GS Breaker (Low feeds)
NEW	GY2G0150C010R15-GS			●	●						C	1.50	±0.02	0.1	13.17	15.20	
NEW	GY2G0200D003R15-GS			●	●						D	2.00	±0.03	0.03	18.85	21.30	
NEW	GY2G0200D010R15-GS			●	●						D	2.00	±0.03	0.1	18.85	21.30	
NEW	GY2G0250E003R15-GS			●	●						E	2.50	±0.03	0.03	19.04	21.50	
NEW	GY2G0250E020R15-GS			●	●						E	2.50	±0.03	0.2	19.04	21.50	
NEW	GY2G0300F003R15-GS			●	●						F	3.00	±0.03	0.03	18.62	21.50	
NEW	GY2G0300F020R15-GS			●	●						F	3.00	±0.03	0.2	18.62	21.50	

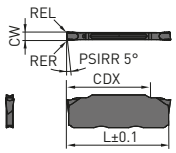


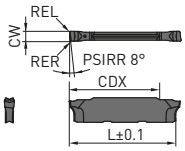


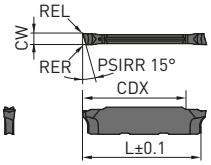
Left hand insert shown.



Right hand insert shown.







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

INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	LE	Geometry
GROOVING																	
GY1G0200D020N-GFGS							●			D	2.00	±0.03	0.2	—	20.70	2.7	(For hardened material)
GY1G0239E020N-GFGS							●			E	2.39	±0.03	0.2	—	20.70	2.7	
GY1G0250E020N-GFGS							●			E	2.50	±0.03	0.2	—	20.70	2.7	
GY1G0300F020N-GFGS							●			F	3.00	±0.03	0.2	—	20.70	2.7	
GY1G0318F020N-GFGS							●			F	3.18	±0.03	0.2	—	20.70	2.7	
GY1G0400G020N-GFGS							●			G	4.00	±0.03	0.2	—	25.65	2.7	
GY1G0475H020N-GFGS							●			H	4.75	±0.03	0.2	—	25.65	2.7	
GY1G0500H020N-GFGS							●			H	5.00	±0.03	0.2	—	25.65	2.7	
GY1G0600J020N-GFGS							●			J	6.00	±0.03	0.2	—	25.65	2.7	
MULTIFUNCTIONAL GROOVING																	
GY2G0200D020N-MF	●		●	●		●				D	2.00	±0.02	0.2	19.5	21.05	—	MF (Finishing)
GY2G0224D015N-MF*[1]	●		●	●		●				D	2.24	±0.02	0.15	19.8	21.05	—	
GY2G0239E020N-MF	★		★	★		★				E	2.39	±0.02	0.2	19.2	21.05	—	
GY2G0250E020N-MF	●		●	●		●				E	2.50	±0.02	0.2	19.4	21.05	—	
GY2G0274E020N-MF*[1]	●		●	●		●				E	2.74	±0.02	0.2	19.7	21.05	—	
GY2G0300F020N-MF	●		●	●		●				F	3.00	±0.02	0.2	19.5	21.05	—	
GY2G0300F040N-MF	●		●	●		●				F	3.00	±0.02	0.4	19.3	21.05	—	
GY2G0318F020N-MF	★		★	★		★				F	3.18	±0.02	0.2	19.5	21.05	—	
GY2G0318F040N-MF	★		★	★		★				F	3.18	±0.02	0.4	19.3	21.05	—	
GY2G0324F020N-MF*[1]	●		●	●		●				F	3.24	±0.02	0.2	19.5	21.05	—	
GY2G0400G020N-MF	●		●	●		●				G	4.00	±0.02	0.2	24.9	25.95	—	
GY2G0400G040N-MF	●		●	●		●				G	4.00	±0.02	0.4	24.7	25.95	—	
GY2G0400G080N-MF	●		●	●		●				G	4.00	±0.02	0.8	24.3	25.95	—	
GY2G0424G020N-MF*[1]	●		●	●		●				G	4.24	±0.02	0.2	24.9	25.95	—	
GY2G0475H020N-MF	★		★	★		★				H	4.75	±0.02	0.2	24.4	25.95	—	
GY2G0475H040N-MF	★		★	★		★				H	4.75	±0.02	0.4	24.2	25.95	—	
GY2G0475H080N-MF	★		★	★		★				H	4.75	±0.02	0.8	23.8	25.95	—	
GY2G0500H020N-MF	●		●	●		●				H	5.00	±0.02	0.2	24.4	25.95	—	
GY2G0500H040N-MF	●		●	●		●				H	5.00	±0.02	0.4	24.2	25.95	—	
GY2G0500H080N-MF	●		●	●		●				H	5.00	±0.02	0.8	23.8	25.95	—	
GY2G0524H020N-MF*[1]	●		●	●		●				H	5.24	±0.02	0.2	24.4	25.95	—	
GY2G0600J020N-MF	●		●	●		●				J	6.00	±0.02	0.2	24.4	25.95	—	
GY2G0600J040N-MF	●		●	●		●				J	6.00	±0.02	0.4	24.2	25.95	—	
GY2G0600J080N-MF	●		●	●		●				J	6.00	±0.02	0.8	23.8	25.95	—	
GY2G0631J020N-MF*[1]	●		●	●		●				J	6.31	±0.02	0.2	24.4	25.95	—	
GY2G0635J020N-MF	★		★	★		★				J	6.35	±0.02	0.2	24.4	25.95	—	
GY2G0635J040N-MF	★		★	★		★				J	6.35	±0.02	0.4	24.2	25.95	—	
GY2G0635J080N-MF	★		★	★		★				J	6.35	±0.02	0.8	23.8	25.95	—	
GY2M0200D020N-MS			●	●	●	●				D	2.00	±0.03	0.2	19.1	20.70	—	MS (Low feeds)
GY2M0250E020N-MS			●	●	●	●				E	2.50	±0.03	0.2	19.1	20.70	—	
GY2M0300F020N-MS			●	●	●	●				F	3.00	±0.03	0.2	19.2	20.70	—	
GY2M0300F040N-MS			●	●	●	●				F	3.00	±0.03	0.4	18.9	20.70	—	
GY2M0400G020N-MS			●	●	●	●				G	4.00	±0.04	0.2	24.2	25.65	—	
GY2M0400G040N-MS			●	●	●	●				G	4.00	±0.04	0.4	23.9	25.65	—	
GY2M0500H040N-MS			●	●	●	●				H	5.00	±0.04	0.4	23.9	25.65	—	
GY2M0500H080N-MS			●	●	●	●				H	5.00	±0.04	0.8	23.5	25.65	—	
GY2M0600J040N-MS			●	●	●	●				J	6.00	±0.04	0.4	23.9	25.65	—	
GY2M0600J080N-MS			●	●	●	●				J	6.00	±0.04	0.8	23.5	25.65	—	
GY2M0800K080N-MS			●	●	●					K	8.00	±0.04	0.8	28.5	30.50	—	

*[1] Groove width corresponding to the circlip.

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

INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry
MULTIFUNCTIONAL GROOVING																
GY2M0200D020N-MM			●	●	●	●		●	●	D	2.00	±0.03	0.2	19.1	20.70	MM Breaker (Medium feeds)
GY2M0250E020N-MM			●	●	●	●		●	●	E	2.50	±0.03	0.2	19.1	20.70	
GY2M0300F020N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.2	19.1	20.70	
GY2M0300F040N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.4	18.9	20.70	
GY2M0300F080N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.8	18.5	20.70	
GY2M0400G020N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.2	24.1	25.65	
GY2M0400G040N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.4	23.9	25.65	
GY2M0400G080N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.8	23.5	25.65	
GY2M0500H040N-MM			●	●	●	●		●	●	H	5.00	±0.04	0.4	23.9	25.65	
GY2M0500H080N-MM			●	●	●	●		●	●	H	5.00	±0.04	0.8	23.5	25.65	
GY2M0600J040N-MM			●	●	●	●		●	●	J	6.00	±0.04	0.4	23.9	25.65	
GY2M0600J080N-MM			●	●	●	●		●	●	J	6.00	±0.04	0.8	23.5	25.65	
GY2M0800K080N-MM			●	●	●	●		●	●	K	8.00	±0.04	0.8	28.5	30.50	
GY2M0800K120N-MM			●	●	●			●	●	K	8.00	±0.04	1.2	28.1	30.50	
COPYING / FOR RECESSING																
GY2M0200D100N-BM			●	●	●	●		●	●	D	2.00	±0.03	1.00	19.5	20.90	BM Breaker
GY2M0250E125N-BM			●	●	●	●		●	●	E	2.50	±0.03	1.25	19.3	20.90	
GY2M0300F150N-BM			●	●	●	●		●	●	F	3.00	±0.03	1.50	19.0	20.90	
GY2M0318F159N-BM			●	●	●	●		●	●	F	3.18	±0.03	1.59	18.9	20.90	
GY2M0400G200N-BM			●	●	●	●		●	●	G	4.00	±0.04	2.00	23.4	25.80	
GY2M0475H238N-BM			●	●	●	●		●	●	H	4.75	±0.04	2.38	22.9	25.80	
GY2M0500H250N-BM			●	●	●	●		●	●	H	5.00	±0.04	2.50	22.8	25.80	
GY2M0600J300N-BM			●	●	●	●		●	●	J	6.00	±0.04	3.00	22.5	25.90	
GY2M0635J318N-BM			●	●	●	●		●	●	J	6.35	±0.04	3.18	22.3	25.90	
GY2M0800K400N-BM			●	●	●			●	●	K	8.00	±0.04	4.00	26.5	30.80	
BLANK																
GY2B0220D020N	●	●				●				D	2.20	±0.10	0.2	—	21.05	Flat top
GY2B0250D020N	●	●				●				D	2.55	±0.10	0.2	—	21.28	
GY2B0270E020N	●	●				●				E	2.70	±0.10	0.2	—	21.05	
GY2B0300E020N	●	●				●				E	3.05	±0.10	0.2	—	21.28	
GY2B0340F020N	●	●				●				F	3.40	±0.10	0.2	—	21.05	
GY2B0360F020N	●	●				●				F	3.65	±0.10	0.2	—	21.28	
GY2B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	26.00	2 Edge type
GY2B0460G020N	●	●				●				G	4.65	±0.10	0.2	—	26.18	
GY2B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	26.00	
GY2B0560H020N	●	●				●				H	5.65	±0.10	0.2	—	26.18	
GY2B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	26.00	
GY2B0680J020N	●	●				●				J	6.85	±0.10	0.2	—	26.18	
GY2B0880K020N	●	●				●				K	8.85	±0.10	0.2	—	30.88	
GY1B0220D020N	●	●				●				D	2.20	±0.10	0.2	—	21.07	1 Edge type
GY1B0270E020N	●	●				●				E	2.70	±0.10	0.2	—	21.10	
GY1B0340F020N	●	●				●				F	3.40	±0.10	0.2	—	21.00	
GY1B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	25.86	
GY1B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	25.90	
GY1B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	25.90	

*2 Blank inserts to be ground by the customer.

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

NEW

GY GROOVING SERIES

EXTERNAL FOR SWISS TYPE LATHES

INSERT SELECTION

Seat size	Insert type
B	GY○○0120B○○○○–Breaker shown below
C	GY○○0150C○○○○–Breaker shown below
D	GY○○0200/0224D○○○○–Breaker shown below
E	GY○○0239/0250/0274E○○○○–Breaker shown below
F	GY○○0300/0318/0324F○○○○–Breaker shown below

For multifunctional grooving breaker

Seat size	CW	MF (Finish)	MS (Low)	MM (Medium)	BM (Copying)
					Ball shape
D	2.00	●	●	●	●
	2.24	●			
E	2.39	●			
	2.50	●	●	●	●
	2.74	●			
F	3.00				●
	RE 0.2	●	●	●	
	RE 0.4	●	●	●	
	RE 0.8			●	
	3.18				●
	RE 0.2	●			
	RE 0.4	●			
	3.24	●			

For cutting off breaker

Seat size	CW	05-GS (Low)	08-GS (Low)	15-GS (Low)	05-GM (Medium)
		R	R	R	R/L
B	1.20	★			
C	1.50		●	●	
D	2.00		●	●	
E	2.39		●	●	●
	2.50				
F	3.00		●	●	●
	3.18		●	●	●

For grooving/cutting off breaker

Seat size	CW	GU (For gummy steel)	GS (Low)	GM (Medium)	GL (Aluminium)	GFGS (Hardened steel)
		Neutral	Neutral	Neutral	Neutral	Neutral
B	1.20		●			
C	1.50		●	●		
D	2.00	●	●	●	●	●
E	2.39	●	●	●		●
	2.50	●	●	●	●	●
F	3.00	●	●	●	●	●
	3.18	●	●	●		●

CORRECT USE OF GY SERIES GS BREAKER

First recommendation

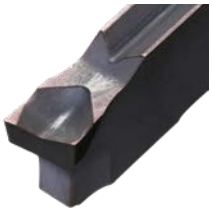
Reduction of cutting resistance

Lead angle PSIRR = 0° ⇄ **Lead angle PSIRR = 8°** ⇄ **Lead angle PSIRR = 15°**

Reduction of burrs and core residue

Improved fracture resistance

Improved fracture resistance

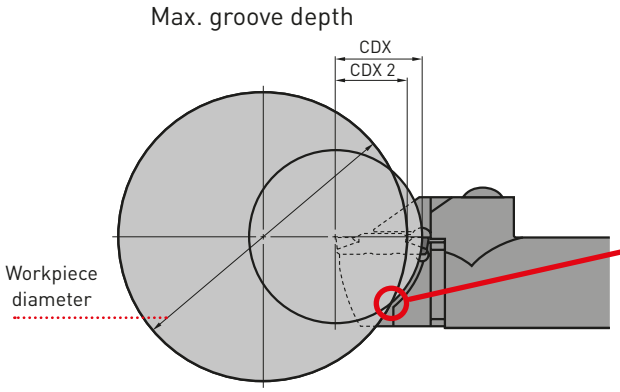


NEW

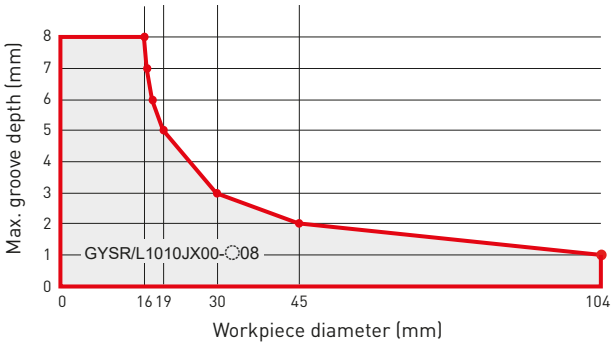
GY GROOVING SERIES

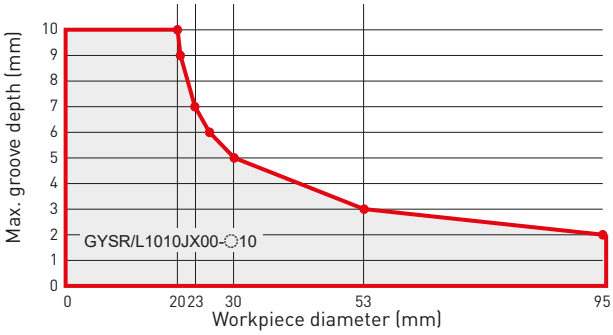
LIMITATION OF THE MAXIMUM GROOVE DEPTH FOR EXTERNAL SWISS TYPE LATHES

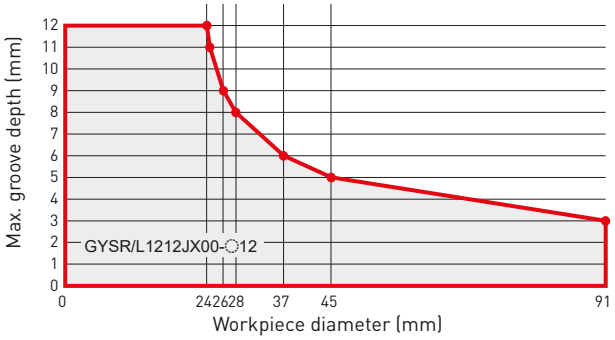
In the case of monoblock type holder for Swiss type lathes.
The maximum groove depth is limited by the workpiece diameter.

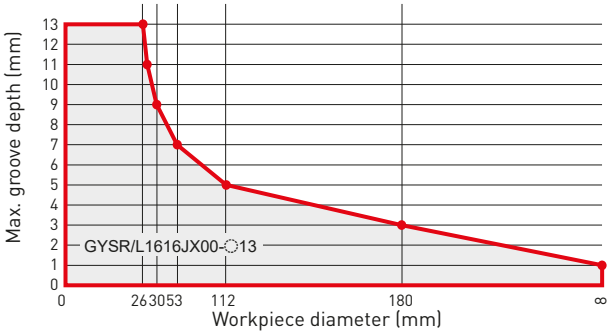


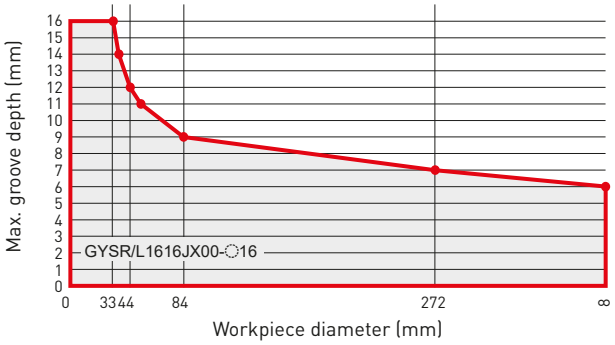
Due to interference, the maximum groove depth is limited by the workpiece diameter.











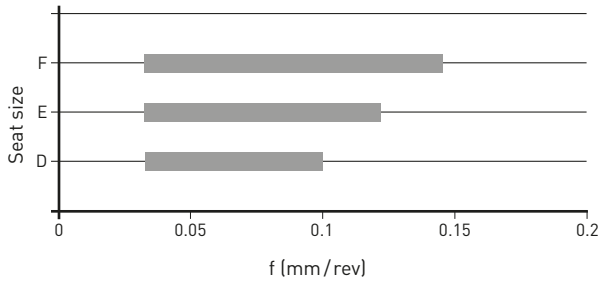
NEW

GY GROOVING SERIES

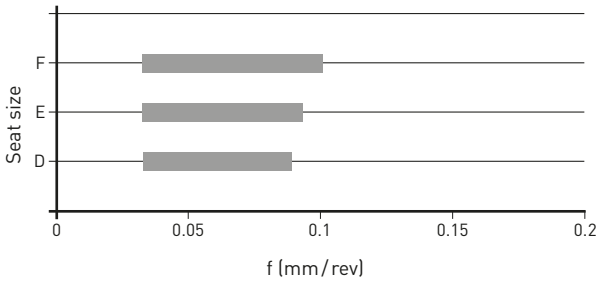
CUTTING OFF
FEED PER REVOLUTION

GROOVING, CUTTING OFF

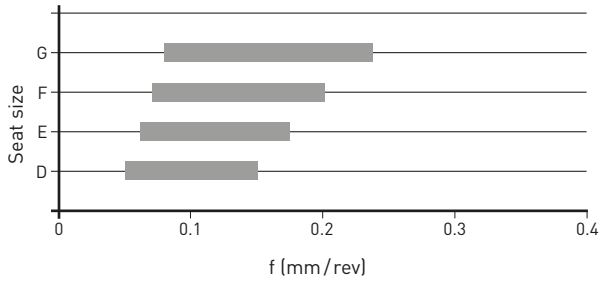
R05-GS Breaker



R08-GS Breaker



R/L05-GM Breaker

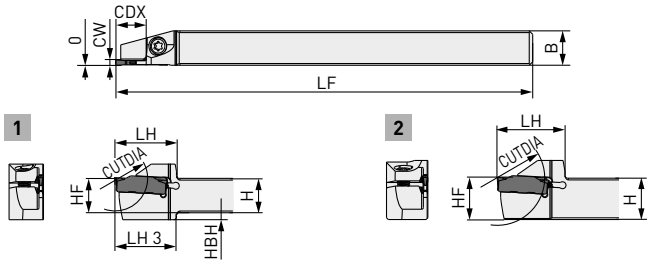


Chipbreaker	PSIPR	Hand	f (mm/rev)			
			Seat size D	Seat size E	Seat size F	Seat size G
R05-GS	5°	R	0.03–0.10	0.03–0.12	0.03–0.14	—
R08-GS	8°	R	0.03–0.08	0.03–0.09	0.03–0.10	—
R05-GM	5°	R/L	0.05–0.15	0.06–0.17	0.07–0.20	0.08–0.23

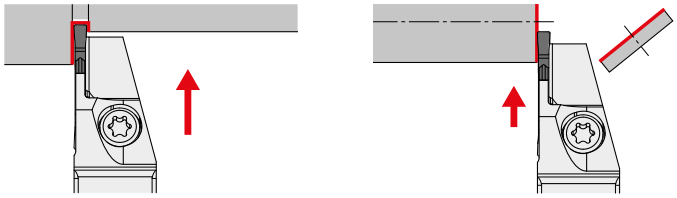
NEW

GY GROOVING SERIES

EXTERNAL FOR SWISS TYPE LATHES



Right hand tool holder shown.



	Order number	Seat size	CW	CDX	CUTDIA	Hand	Stock	H	B	LF	LH	LH3	HF	HBH	Fig.
NEW	GYSR1010JX00-B08	B	1.20	8	16	R	●	10	10	120	17.5	17.5	10	2	1
NEW	GYSL1010JX00-B08					L	●	10	10	120	17.5	17.5	10	2	1
NEW	GYSR1212JX00-B08					R	●	12	12	120	19.5	—	12	—	2
NEW	GYSL1212JX00-B08					L	●	12	12	120	19.5	—	12	—	2
NEW	GYSR1212JX00-B12			12	24	R	●	12	12	120	19.5	19.5	12	2	1
NEW	GYSL1212JX00-B12					L	●	12	12	120	19.5	19.5	12	2	1
NEW	GYSR1616JX00-B08			8	16	R	●	16	16	120	25.0	—	16	—	2
NEW	GYSL1616JX00-B08					L	●	16	16	120	25.0	—	16	—	2
NEW	GYSR1616JX00-B13			13	26	R	★	16	16	120	25.0	—	16	—	2
NEW	GYSL1616JX00-B13					L	★	16	16	120	25.0	—	16	—	2

24 Vc

NEW

GY GROOVING SERIES FOR EXTERNAL SWISS TYPE LATHES

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED (FOR EXTERNAL GROOVING AND CUTTING OFF)

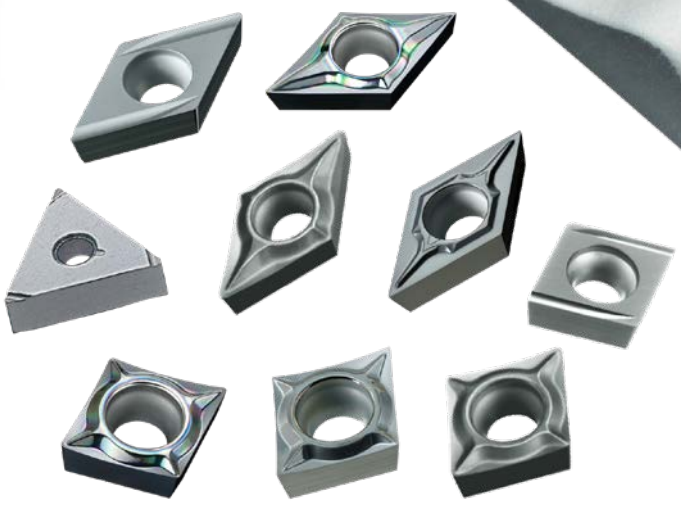
	Material	Hardness	Grade	Vc
P	Mild steel	<160HB	VP20RT	155 (100–220)
			VP10RT	170 (110–230)
			NX2525	150 (90–210)
	Carbon steel Alloy steel	160–280HB	VP20RT	120 (80–180)
			VP10RT	140 (90–190)
			MY5015	180 (110–250)
			NX2525	120 (70–170)
		≥280HB	VP20RT	100 (60–140)
			VP10RT	110 (70–150)
			MY5015	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	120 (80–180)
			VP10RT	140 (90–190)
			MY5015	120 (140–300)
	Ductile cast iron	Tensile strength ≤800MPa	VP20RT	100 (60–140)
			VP10RT	110 (70–150)
			MY5015	150 (90–210)
N	Aluminium alloy (A6061, 7075)	Content Si<5 %	RT9010	250 (200–500)
	Aluminium alloy (AC4B)	Content 5 %≤Si≤10 %	RT9010	250 (200–500)
	Aluminium alloy (ADC12, A390)	Content Si>10 %	RT9010	150 (100–200)
S	Heat resistant alloy Titanium alloy	—	MP9015	70 (40–100)
			MP9025	60 (30– 90)
			VP20RT	45 (30– 60)
			VP10RT	55 (40– 70)
			RT9010	55 (40– 70)
H	Hardened steel	≥50HRC	BC8110	100 (80–120)

1. For VP10RT, VP20RT, MP9015, MP9025 and MY5015, wet cutting is recommended.

NEW

MS7025

PVD COATED GRADE
FOR HIGH PRECISION AND SMALL PARTS MACHINING



Interested in more...

B275

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DIA EDGE

MS7025

TRANSFORMATION OF MACHINING ON SWISS TYPE AUTOMATIC LATHES

The first parts to be machined on Swiss type automatic lathes were watch components. The use soon expanded to machining electrical parts for home appliances, printers as well as automobile component applications such as sensors and electrification technology parts. The high precision capability of Swiss-type lathes has also lent itself to the machining of parts essential to daily life. These parts include robotic and medical implants as well as simple but essential parts for water taps. Expanding the type of workpieces is not the only modern advancement, even higher precision, productivity and quality has become necessary.

DUE TO CHANGES IN MATERIALS AND COMPONENT GEOMETRIES, VARIOUS PROBLEMS HAVE ARISEN THAT NEED SOLUTIONS:

- Complex workpiece shapes
- Ever more difficult-to-cut materials
- Tighter dimensional tolerances

MITSUBISHI MATERIALS IS COMMITTED TO PRODUCT DEVELOPMENT AND THE COMMERCIALISATION OF NEW TOOLS THAT HAVE THE CUTTING CAPABILITY AND MACHINE TOOL ADAPTABILITY THAT CUSTOMERS DESIRE AS FOLLOWS:

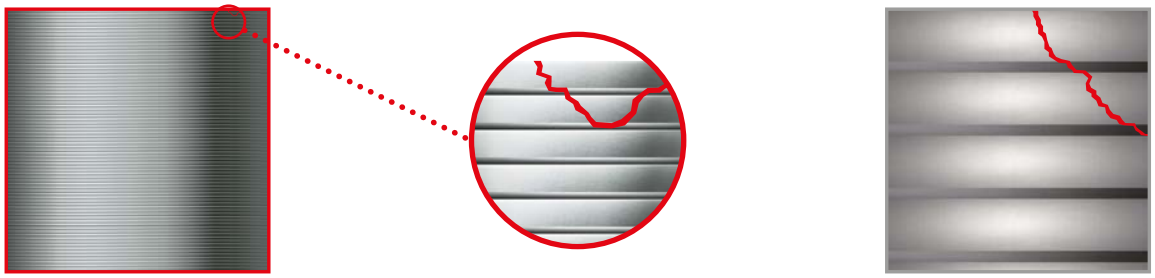
- Development of new coating adapted to workpiece materials and machining methods
- Optimisation of welding, wear and fracture resistance
- High precision machining enabled by the development of high quality cutting edge geometries

MS7025

DRAMATICALLY IMPROVED WELDING AND WEAR RESISTANCE IN LOW FEED MACHINING ENABLED BY A MORE PRECISE NANO-MULTILAYER COATING

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.

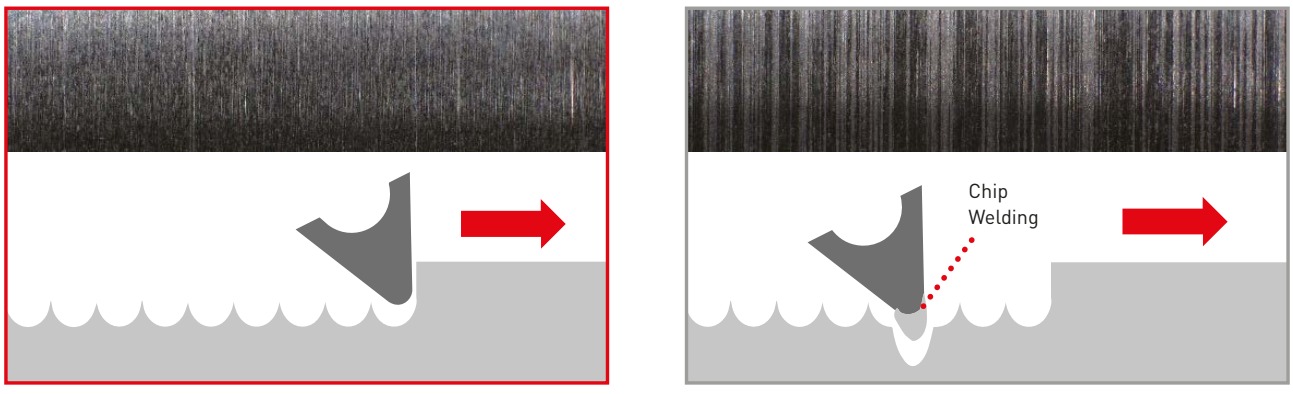


Nano-multilayer Coating | Enlarged Image | Conventional Multilayer Coating

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 and in addition reduces blemishes on the machined surface.

SURFACE FINISH



MS7025 | Conventional

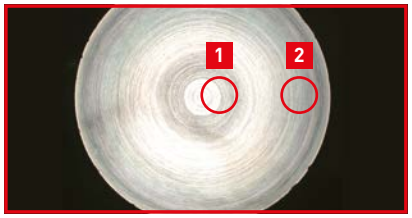
MS7025

CUTTING PERFORMANCE

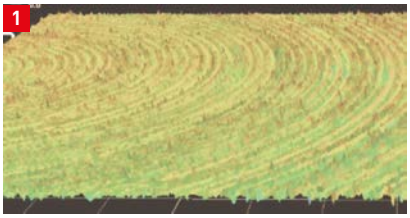
COMPARISON OF END FACE MACHINED SURFACES USING 3D ANALYSIS

Achieves stable machining even during end face machining where the cutting speed is liable to change.

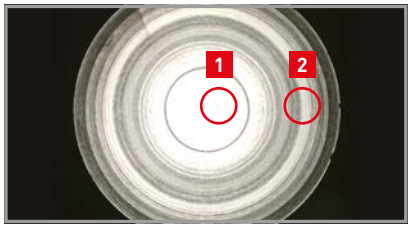
Workpiece Material: JIS S45C



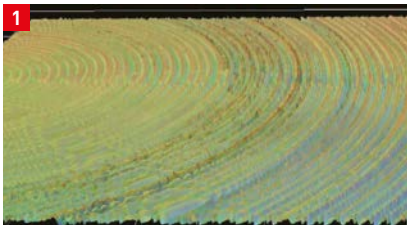
MS7025

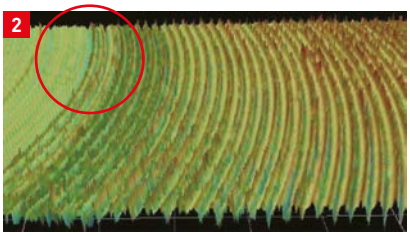


Good Surface Finish



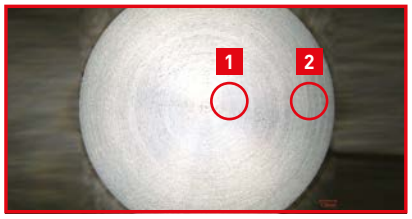
Conventional



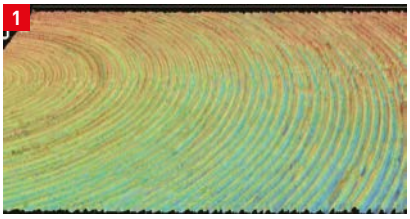


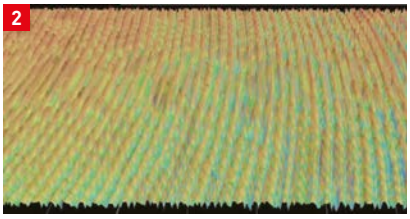
Changes in surface quality that cause machining marks

Workpiece Material: JIS SUS304

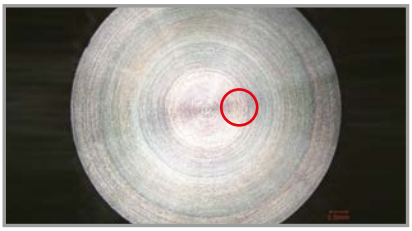


MS7025

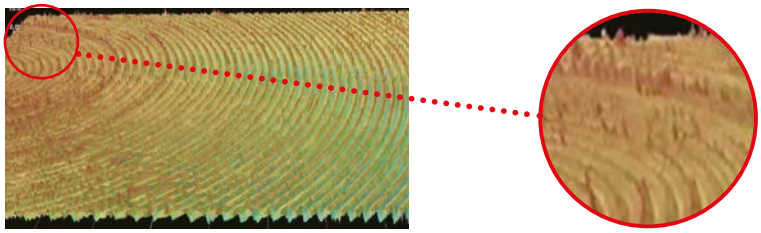




Good Surface Finish

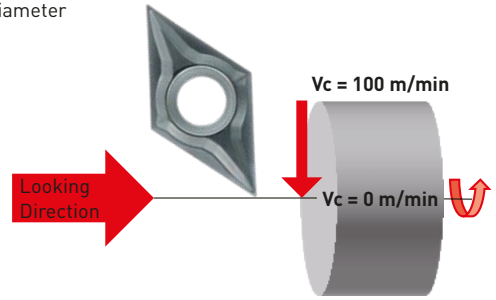


Conventional



Roughness can occur in the low speed area (near the centre)

Image of Facing
Workpiece Diameter
16 mm



Workpiece material	Notation Above
Insert	DCGT11T302
Vc max. (m/min)	100
f (mm/rev)	0.02
ap (mm)	0.2
Cutting mode	Wet cutting (Oil)

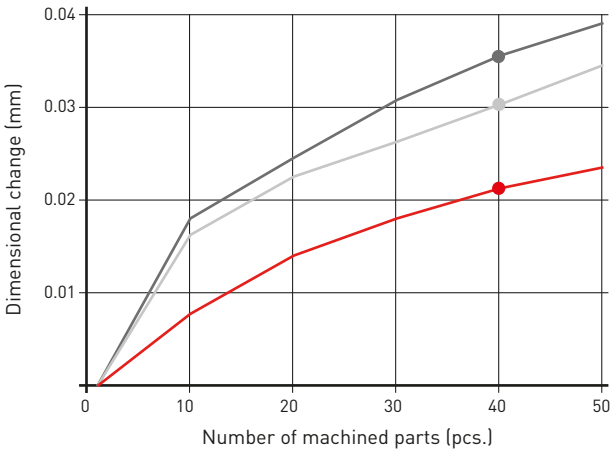
MS7025

CUTTING PERFORMANCE

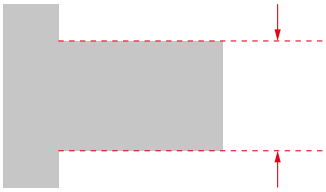
COMPARISON OF DIMENSIONAL CHANGE DURING LOW FEED MACHINING

When machining with MS7025 at low feed rate conditions, dimensional changes are reduced and the quality of the machined surface is improved.

Workpiece Material: JIS SUS440C



Dimensional Change
The measured dimensional change is based on the first machined component

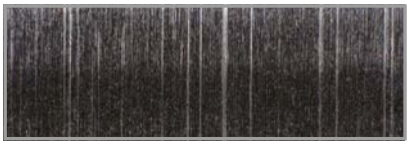


Workpiece material	X105CrMo17 (DIN 1.4125)
Insert	DCGT11T301
Vc (m/min)	70
f (mm/rev)	0.02
ap (mm)	1.5
Cutting mode	Wet cutting (Oil)

After machining 40 pieces

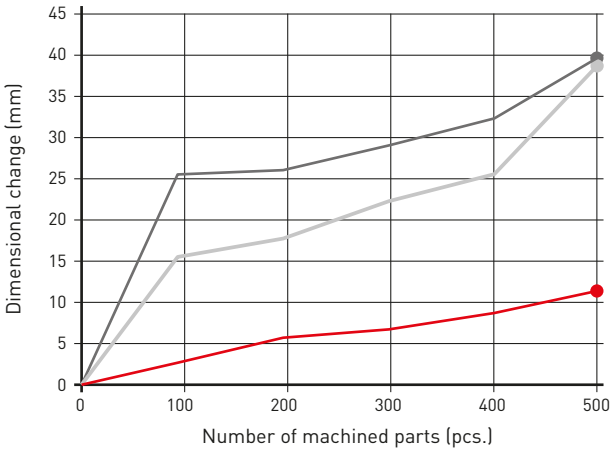
MS7025

Conventional A



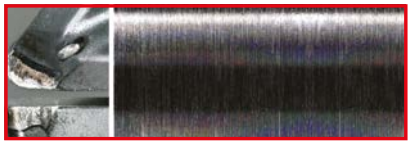
Conventional B

Workpiece Material: ELCH2S



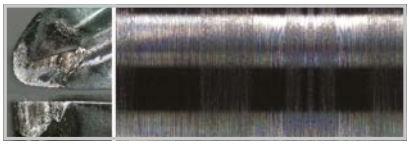
Workpiece material	ELCH2S
Insert	DCGT11T302
Vc (m/min)	240
f (mm/rev)	0.03
ap (mm)	0.3
Cutting mode	Wet cutting (Oil)

After machining 500 pieces



MS7025

Conventional A



Conventional B

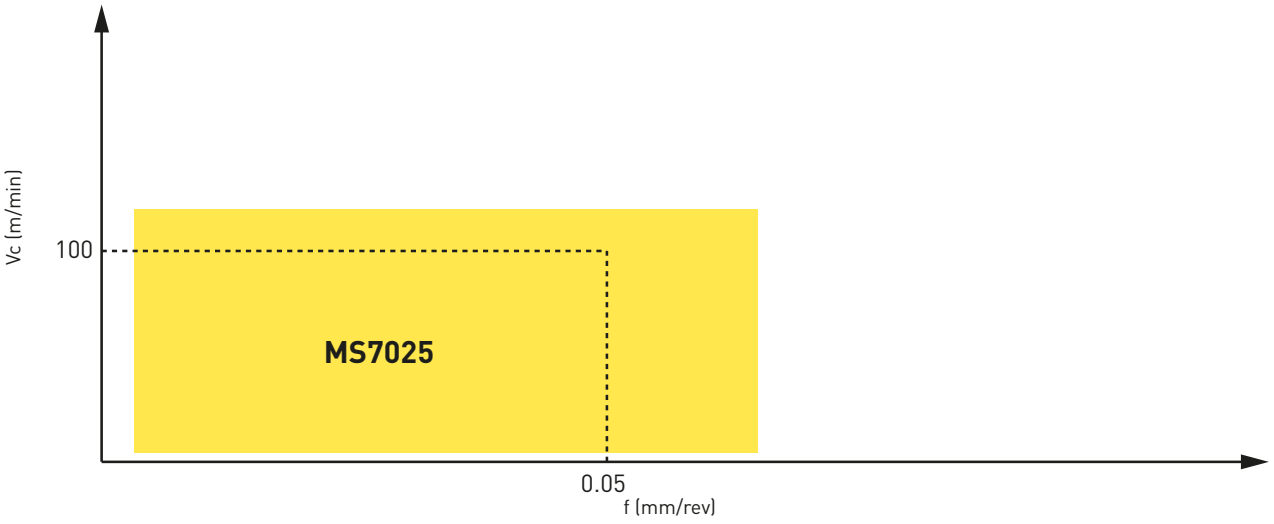
MS7025

APPLICATION RANGE

	Material	Cutting mode		Grade
M	Stainless steel	Continuous cutting	*Low*	MS7025 MS9025
		↕	*Medium*	
		Interrupted cutting	*High*	

M	PVD	
M10		
M20		
M30	MS7025	MS9025
M40		
M50		

CORRECT AREA OF USE WHEN MACHINING STAINLESS STEEL



MS7025

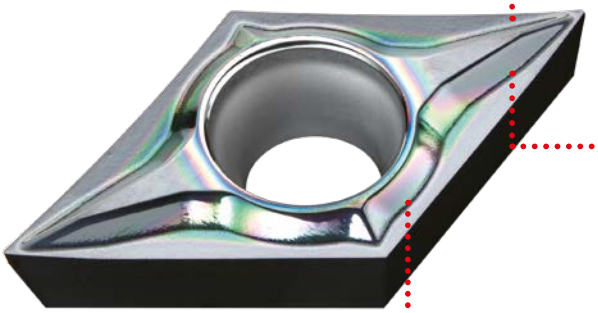
IDEAL INSERTS FOR TURNING SMALL PARTS

Set the corner radius to a minus tolerance.

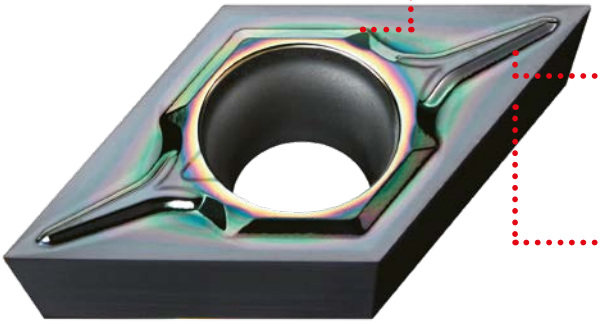
Order number	DCGT11T3**02 M** R-SN	→	02M R 0.2 mm (R 0.15 – R 0.20 mm)
	DCGT11T3**04 M** -SMG		04M R 0.4 mm (R 0.35 – R 0.40 mm)

NEW BREAKER SYSTEM FOR FRONT TURNING

FS-P Breaker
For Micro-Low Depth of Cut



LS-P Breaker
For Medium to High Depth of Cut



Curved Cutting Edge

The curved cutting edge reduces cutting resistance and enables smooth chip evacuation. It also enables good initial entry to the workpiece and resists vibration and oscillation during machining.

High Breaker Wall

The high chipbreaker wall ensures that the chips separate properly and prevents the workpiece from being damaged when chips are discharged.

Polishing (Mirror-Surface)

Welding resistance and chip evacuation are greatly improved.

Large Pocket

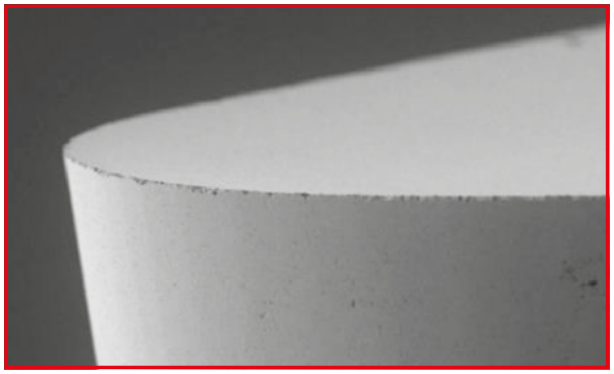
The large pocket enhances chip evacuation during high depths of cut and suppresses chip clogging.

Parallel Cutting Edge

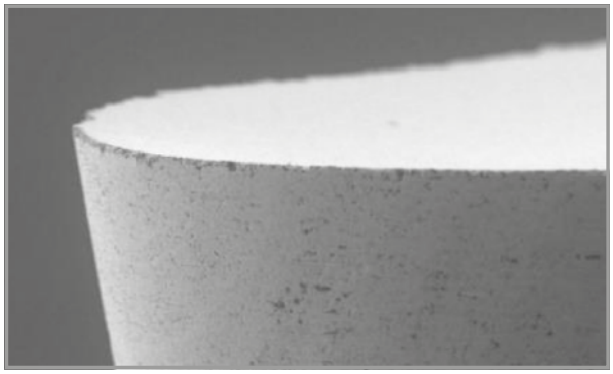
The parallel cutting edge greatly improves fracture resistance during high depths of cut.

EXTREMELY HIGH QUALITY CUTTING EDGE

Technology that provides superior dimensional stability and reduces burrs.

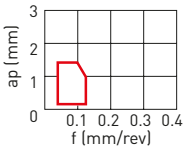
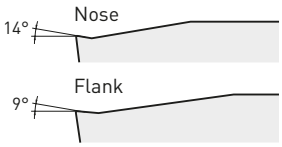
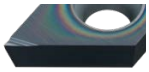
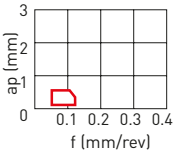
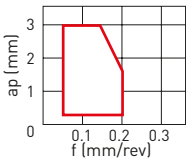
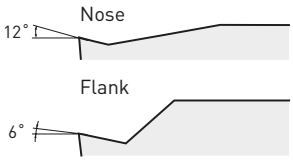
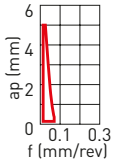


MS7025 / MS9025 Rz = 0.14 µm



Conventional Rz = 0.61 µm

BREAKER SYSTEM – POSITIVE INSERTS

Tolerance		Features		Cross section geometry
FINISH CUTTING				
G	FS-P	**FIRST RECOMMENDATION FOR FINISHING TITANIUM ALLOYS** Ideal for cobalt chromium alloy and copper alloy. The sharp edge produces a good surface finish. The curved edge allows smooth chip discharge. Lapping of the top surface gives a mirror finish for improved welding resistance.		
G	 SRF	**FINISHING** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.		
LIGHT CUTTING				
G	LS-P	**LIGHT MACHINING ON AUTOMATIC LATHES** Designed with parallel cutting edges. Achieves stable chip control over a wide range, from low to medium depths of cut. Polished (mirror-surface) finish of insert surface drastically improves welding resistance and extends tool life.		
MEDIUM CUTTING				
G	R/L-SN	**MEDIUM CUTTING OF AUTOMATIC LATHE MACHINING** A parallel chipbreaker. Excellent chip control at low to medium feed rates.		

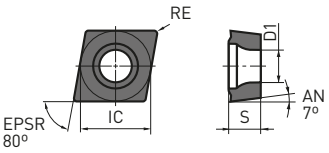
MS7025

7° POSITIVE INSERTS (WITH HOLE)

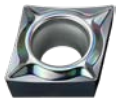
M

G Class

CCGH / CCGT



F
FS-P



Order number	F	MS7025	IC	S	RE*1	D1
CCGT060201M-FS-P	F	●	6.35	2.38	0.1	2.8
CCGT060202M-FS-P	F	●	6.35	2.38	0.2	2.8
CCGT09T301M-FS-P	F	●	9.525	3.97	0.1	4.4
CCGT09T302M-FS-P	F	●	9.525	3.97	0.2	4.4
CCGT09T304M-FS-P	F	●	9.525	3.97	0.4	4.4

*1 Nominal Value (Max.)

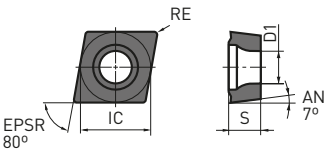
36 Vc

7° POSITIVE INSERTS (WITH HOLE)

M

G Class

CCGH / CCGT



L	M	M
LS-P	R/L-SN	SMG

Order number	L M	MS7025	IC	S	RE*1	D1
CCGT060201M-LS-P	L	●	6.35	2.38	0.1	2.8
CCGT060202M-LS-P	L	●	6.35	2.38	0.2	2.8
CCGT09T301M-LS-P	L	●	9.525	3.97	0.1	4.4
CCGT09T302M-LS-P	L	●	9.525	3.97	0.2	4.4
CCGT09T304M-LS-P	L	●	9.525	3.97	0.4	4.4
CCGT060201MR-SN	M	●	6.35	2.38	0.1	2.8
CCGT060202MR-SN	M	●	6.35	2.38	0.2	2.8
CCGT09T301MR-SN	M	●	9.525	3.97	0.1	4.4
CCGT09T302MR-SN	M	●	9.525	3.97	0.2	4.4
CCGT09T304MR-SN	M	●	9.525	3.97	0.4	4.4

*1 Nominal Value (Max.)

36 Vc

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

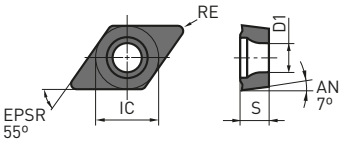
MS7025

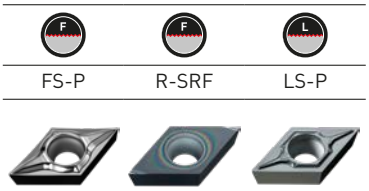
7° POSITIVE INSERTS (WITH HOLE)

M

G Class

DCGT





Order number	F L	MS7025	IC	S	RE*1	D1
DCGT070201M-FS-P	F	●	6.35	2.38	0.1	2.8
DCGT070202M-FS-P	F	●	6.35	2.38	0.2	2.8
DCGT070204M-FS-P	F	●	6.35	2.38	0.4	2.8
DCGT11T301M-FS-P	F	●	9.525	3.97	0.1	4.4
DCGT11T302M-FS-P	F	●	9.525	3.97	0.2	4.4
DCGT11T304M-FS-P	F	●	9.525	3.97	0.4	4.4
DCGT11T301MR-SRF	F	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SRF	F	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SRF	F	●	9.525	3.97	0.4	4.4
DCGT070201M-LS-P	L	●	6.35	2.38	0.1	2.8
DCGT070202M-LS-P	L	●	6.35	2.38	0.2	2.8
DCGT070204M-LS-P	L	●	6.35	2.38	0.4	2.8
DCGT11T301M-LS-P	L	●	9.525	3.97	0.1	4.4
DCGT11T302M-LS-P	L	●	9.525	3.97	0.2	4.4
DCGT11T304M-LS-P	L	●	9.525	3.97	0.4	4.4

*1 Nominal Value (Max.)

36 Vc

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

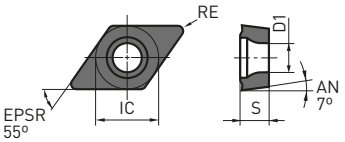
MS7025

7° POSITIVE INSERTS (WITH HOLE)

M

G Class

DCGT



R/L-SN

Order number		MS7025	IC	S	RE*1	D1
DCGT070201MR-SN	M	●	6.35	2.38	0.1	2.8
DCGT070202MR-SN	M	●	6.35	2.38	0.2	2.8
DCGT070204MR-SN	M	●	6.35	2.38	0.4	2.8
DCGT11T301MR-SN	M	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SN	M	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SN	M	●	9.525	3.97	0.4	4.4

*1 Nominal Value (Max.)

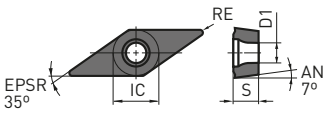
36 Vc

7° POSITIVE INSERTS (WITH HOLE)

M

G Class

VCGT



LS-P

Order number		MS7025	IC	S	RE*1	D1
VCGT110301M-LS-P	L	●	6.35	3.18	0.1	2.8
VCGT110302M-LS-P	L	●	6.35	3.18	0.2	2.8
VCGT110304M-LS-P	L	●	6.35	3.18	0.4	2.8

*1 Nominal Value (Max.)

36 Vc

MS7025

RECOMMENDED CUTTING CONDITIONS

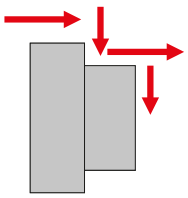
Cutting conditions: ●: Stable cutting ◐: General cutting ✱: Unstable cutting

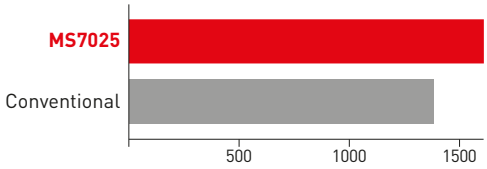
	Material	Properties	Conditions	F L M	Grade		Vc	f	ap
M	Austenitic stainless steel	—	●	F	MS7025	FS	60 (40 – 100)	0.01 – 0.08	0.2 – 0.7
			●	F	MS7025	R/L-F	60 (40 – 100)	0.01 – 0.08	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 100)	0.01 – 0.08	0.3 – 3.0
			◐	M	MS7025	R-SN	60 (40 – 100)	0.01 – 0.08	0.1 – 5.0
	Ferritic and martensitic stainless steel	—	●	F	MS7025	FS-P	60 (40 – 100)	0.01 – 0.08	0.2 – 0.7
			◐	F	MS7025	R-SRF	60 (40 – 100)	0.01 – 0.08	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 100)	0.01 – 0.08	0.3 – 3.0
			◐	L	MS7025	R-SN	60 (40 – 100)	0.01 – 0.08	0.1 – 5.0
	Electromagnetic stainless steel (DIN X105CrMo17, DIN X30Cr13 etc.)	Hardness 230HBW	●	F	MS7025	FS-P	80 (40 – 160)	0.02 – 0.08	0.2 – 1.8
			◐	F	MS7025	R-SRF	80 (40 – 160)	0.03 – 0.08	0.1 – 0.5
			◐	L	MS7025	LS-P	80 (40 – 160)	0.02 – 0.10	0.3 – 3.0
			◐	M	MS7025	R-SN	80 (40 – 160)	0.01 – 0.10	0.1 – 5.0
	Precipitation hardening stainless steel (DIN X5CrNiCuNb16-4, DIN X7CrNiAl17-7, etc.)	<450HB	●	F	MS7025	FS-P	60 (40 – 80)	0.01 – 0.10	0.1 – 1.4
			◐	F	MS7025	R-SRF	60 (40 – 80)	0.01 – 0.10	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 80)	0.04 – 0.10	0.2 – 3.0
			◐	M	MS7025	R-SN	60 (40 – 80)	0.03 – 0.10	0.3 – 3.0

MS7025

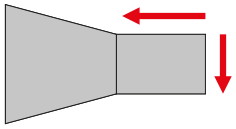
APPLICATION EXAMPLES

Material	X105CrMo17 (DIN 1.4125)
Insert	DCGT070202M-FS-P (MS7025)
Component	Valve
Application	External and face, continuous turning
Vc (m/min)	58
f (mm/rev)	0.04
ap (mm)	0.15
Cutting mode	Wet cutting (Oil)
Result	Compared to conventional products, the dimensional accuracy is stable and a high machining quality is maintained.

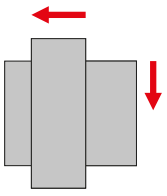




Material	X14CrMoS17 (DIN1.4104)
Insert	DCGT11T302M-FS-P (MS7025)
Component	Shaft Parts
Application	External and face, continuous turning
Vc (m/min)	130
f (mm/rev)	0.03
ap (mm)	0.56
Cutting mode	Wet cutting (Oil)
Result	Chip control has been improved and the quality of the machined surface is also excellent.



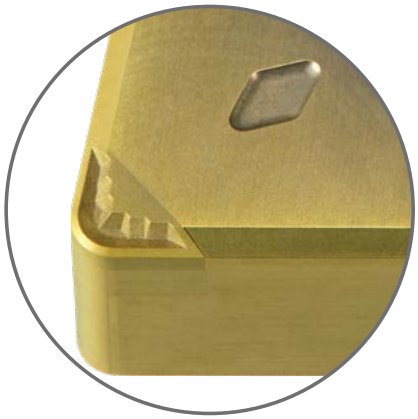
Material	X6Cr17 (DIN1.4016)
Insert	DCGT11T302M-FS-P (MS7025)
Component	Machine parts
Application	External and face, continuous turning
Vc (m/min)	100
f (mm/rev)	0.06
ap (mm)	0.25
Cutting mode	Wet cutting (Oil)
Result	By suppressing chip welding, cutting edge damage is reduced and the surface quality can be improved.

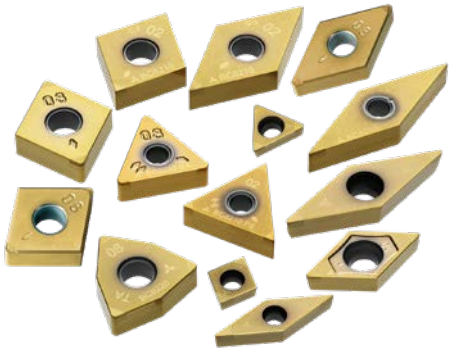


The application examples above are from customers workpieces and can therefore differ from the recommended cutting conditions.

BC8200 SERIES

THE NEXT GENERATION OF COATED PCBN GRADES FOR MACHINING HARDENED STEELS





Interested in more...

B249

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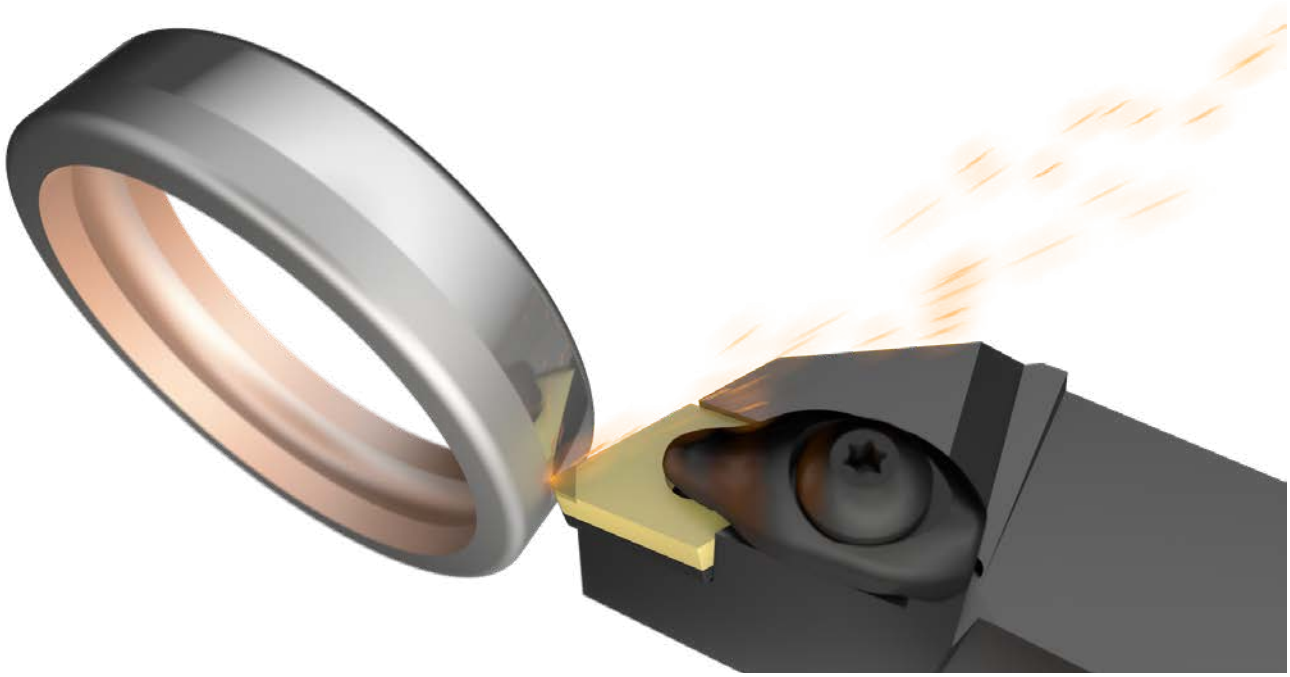
DIA EDGE

BC8200 SERIES

BC8210

FOR CONTINUOUS AND LIGHT INTERRUPTED CUTTING

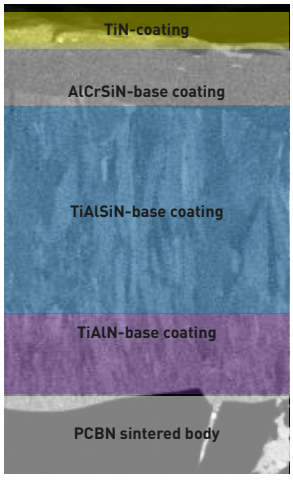


HIGH-SPEED MACHINING WITH OUTSTANDING TOOL LIFE

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.

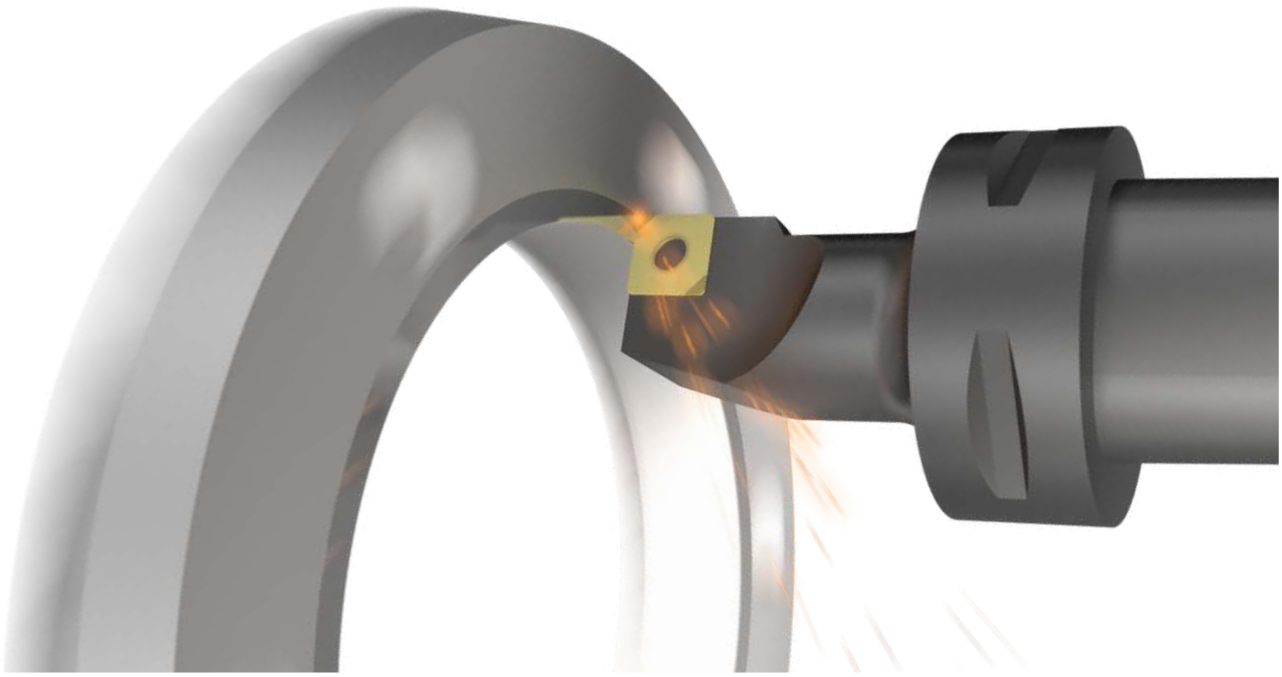


- Gold colour aids easy identification of used edges.
- Strong resistance to chipping. Absorbs impact forces.
- Excellent wear resistance and abrasion resistant layer.
- Improved strength of adhesion to the PCBN substrate prevents peeling.
- Excellent crater wear and chipping resistance. Exclusive BC8210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

BC8200 SERIES

BC8220

FOR GENERAL APPLICATIONS

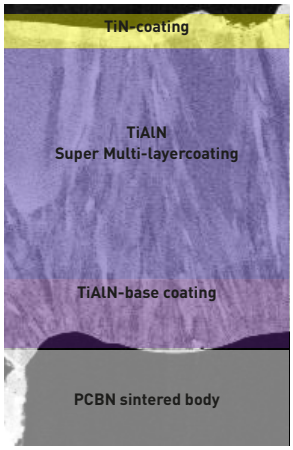


ACHIEVES IMPRESSIVE TOOL LIFE OVER A WIDE RANGE OF CUTTING CONDITIONS

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.

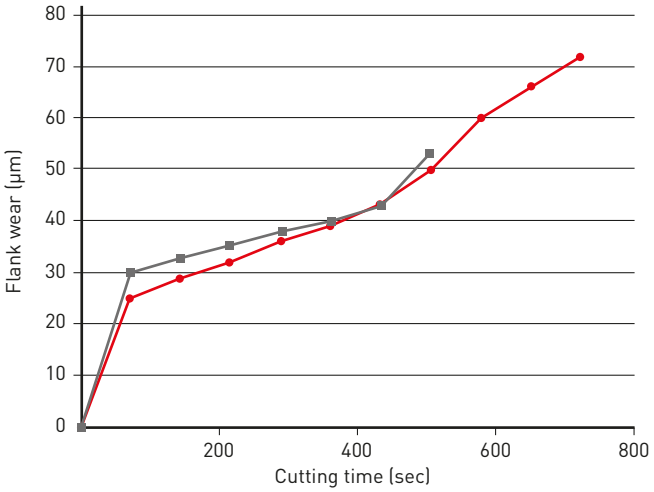
BC8210

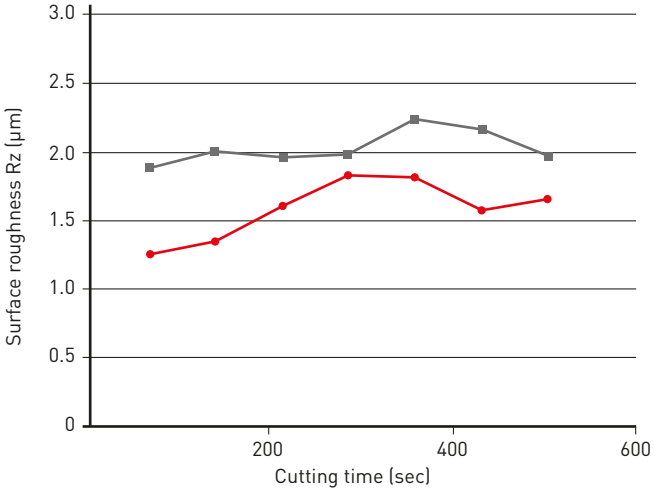
CUTTING PERFORMANCE

COMPARISON OF CONTINUOUS CUTTING

Insert	NP-CNGA120408GS2 BC8210
Workpiece material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.1
ap (mm)	0.2
Coolant	Dry cutting

BC8210 reduces flank wear and maintains good surface finishes.

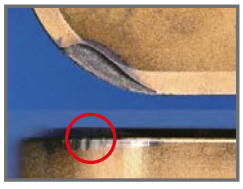




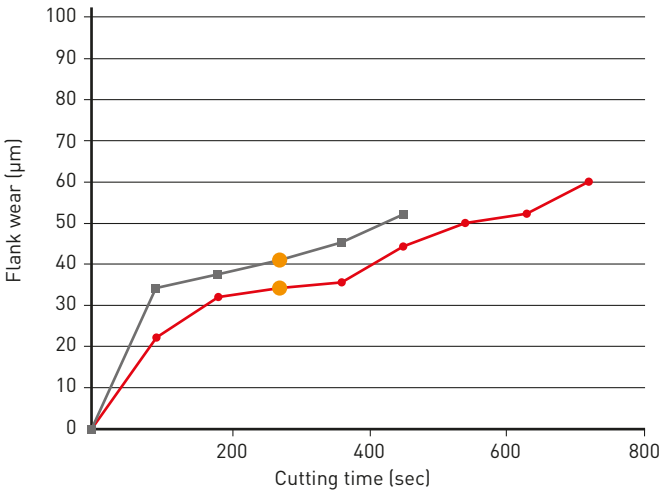
COMPARISON OF LIGHT INTERRUPTED CUTTING

Insert	NP-CNGA120408VA2 BC8210
Workpiece material	DIN 20Cr4
Vc (m/min)	160
f (mm/rev)	0.1
ap (mm)	0.2
Coolant	Dry cutting

BC8210 provides excellent chipping resistance.



Chipping after machining
360 seconds



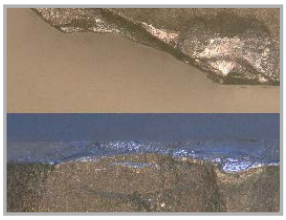
BC8220

CUTTING PERFORMANCE

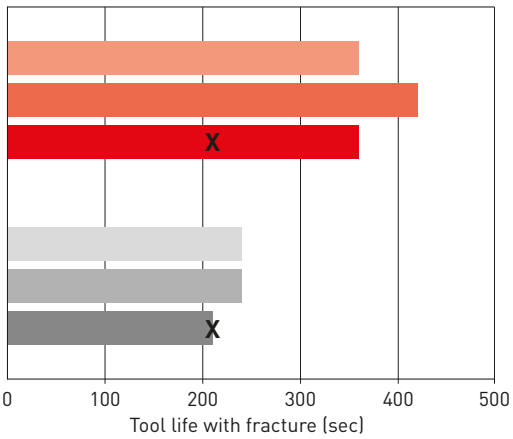
COMPARISON OF FRACTURE RESISTANCE DURING MEDIUM INTERRUPTED CUTTING

Insert	NP-CNGA120408VA2 BC8220
Workpiece material	DIN 20Cr4
Vc (m/min)	250
f (mm/rev)	0.15
ap (mm)	0.1
Coolant	Dry cutting

BC8220 has excellent chipping and fracture resistance.



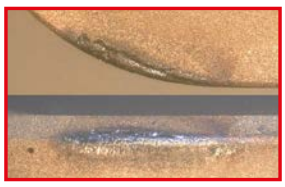
Fracture after
machining 210 seconds

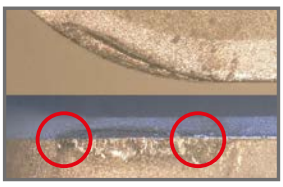


COMPARISON OF FRACTURE RESISTANCE DURING HEAVY INTERRUPTED CUTTING

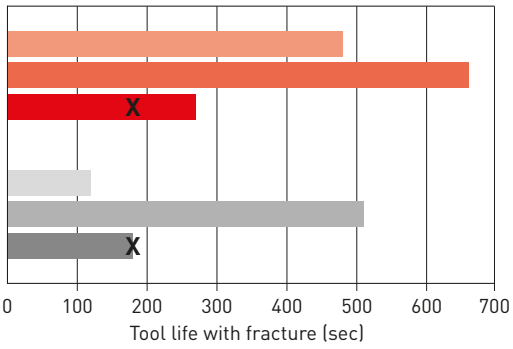
Insert	NP-CNGA120408VA2 BC8220
Workpiece material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.05
ap (mm)	0.1
Coolant	Wet cutting

BC8220 has improved chipping resistance when compared to conventional products.



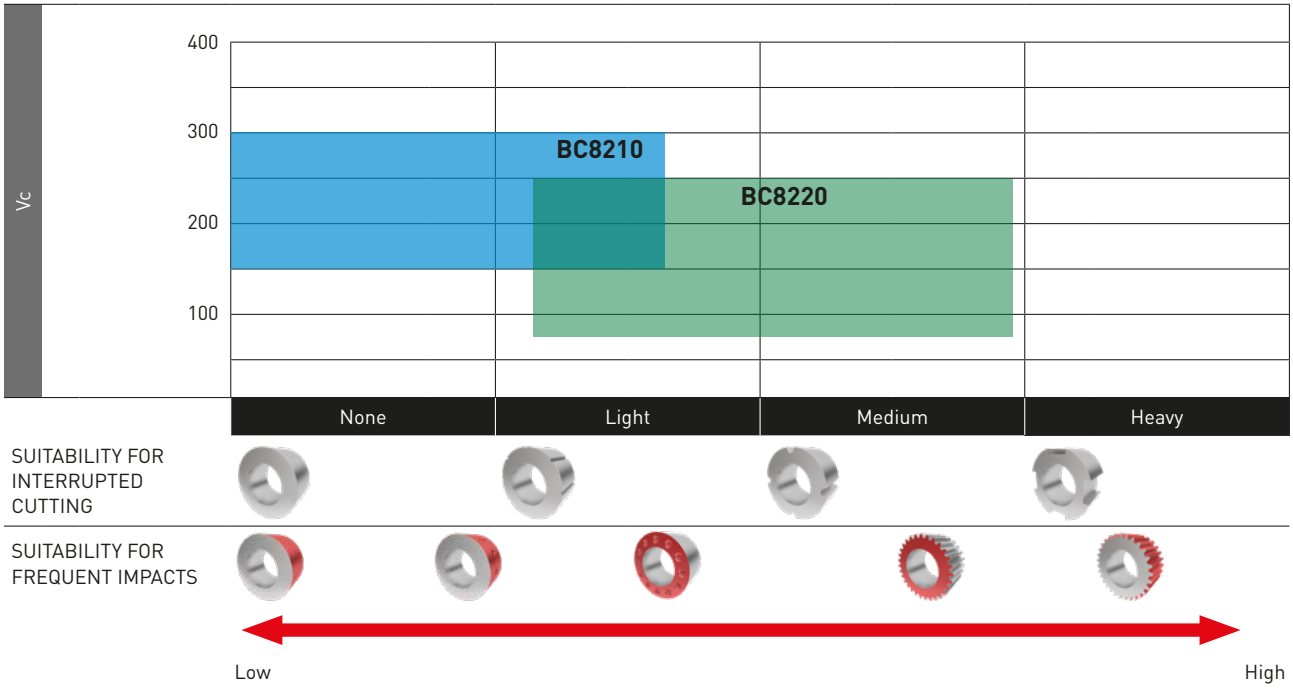


Chipping after machining
180 seconds



BC8200 SERIES

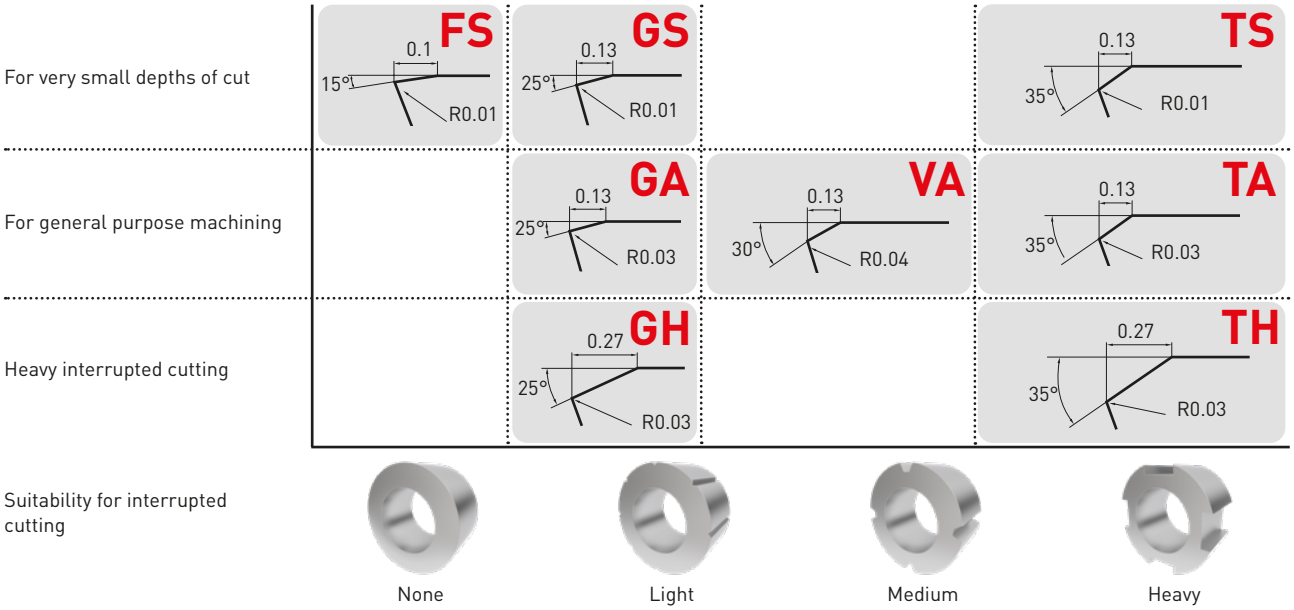
BC8200 COATED PCBN SERIES



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.



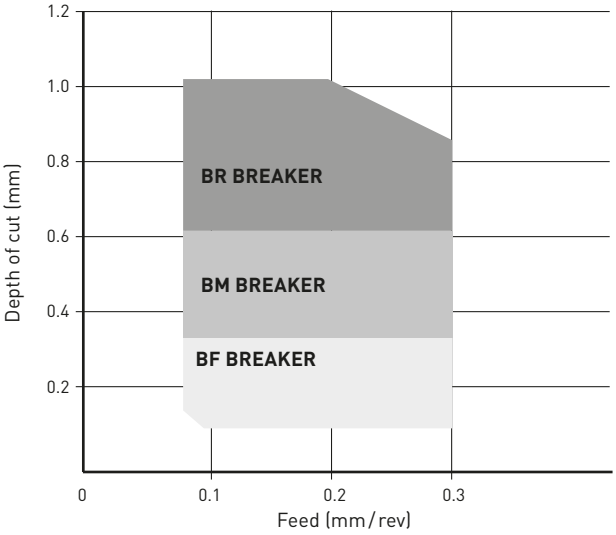
	Continuous cutting	General purpose		For fracture resistance	Interrupted cutting	
	General cutting	General cutting	High feed and depth	High speed and feed	General cutting	High feed and depth
BC8210	FS	GS	GH		TS	
BC8220		GA	GH	VA	TA	TH

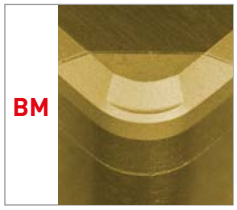
BC8200 SERIES

FEATURES OF THE INSERT

CHIPBREAKER

A BR breaker has been added to achieve better chip control at higher depths of cut.
A versatile range of chip breakers 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.

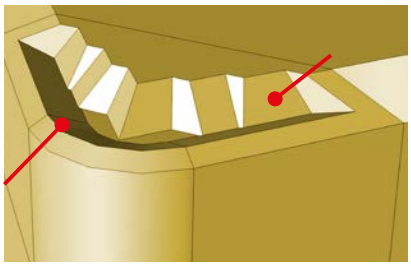
BR BREAKER (BC8220)

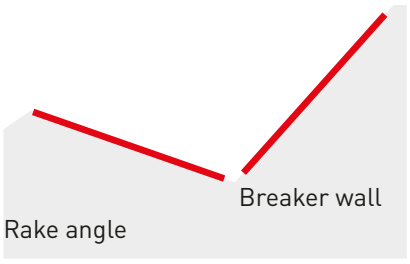
A reduced number of passes needed and improved chip control during high depths of cut.
Chips are formed with the effect from the rake angle and the multi stage breaker wall supports a wide range of cuts.

Recommended cutting conditions:

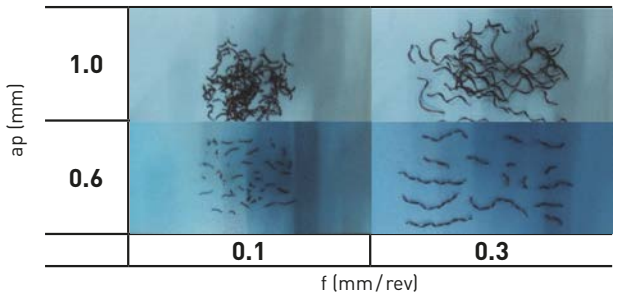
Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.6 – 1.0

Rake angle





Achieves ideal chip control even at high depths of cut.



Cutting Performance

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

BC8200 SERIES

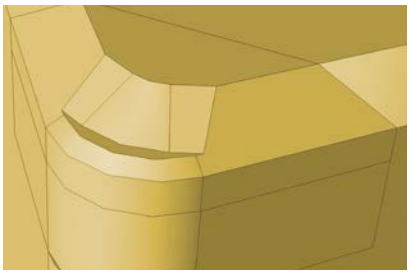
FEATURES OF THE INSERT

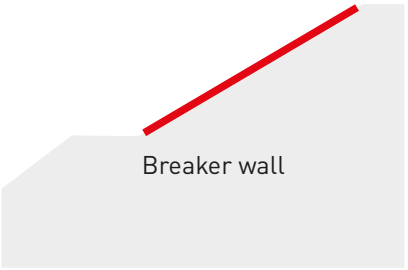
BM BREAKER (BC8220)

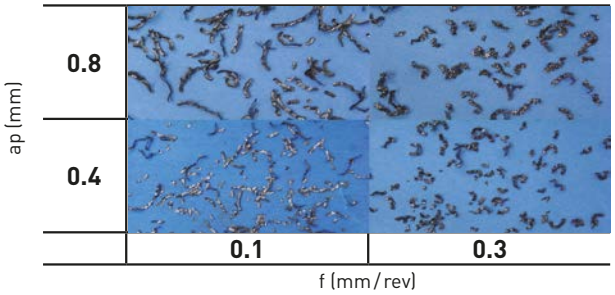
Great chip control when machining at medium depths of cut. (0.3 – 0.8 mm)

Recommended cutting conditions:

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







Cutting Performance

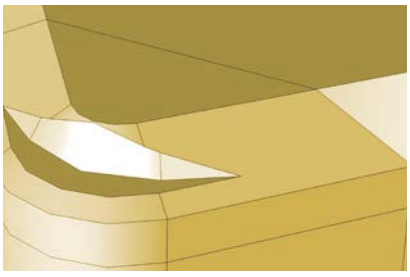
Material	DIN 15Cr3 (60 HRC)
Inserts	BM-CNGM120408TA2
Vc (m/min)	160
f (mm/rev)	0.1 / 0.3
ap (mm)	0.4 / 0.8
Cutting mode	Dry cutting

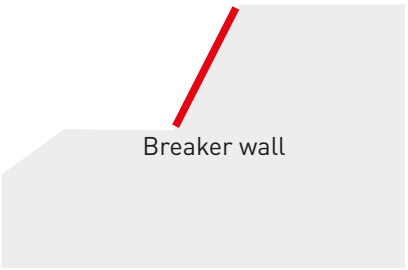
BF BREAKER (BC8210, BC8220)

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

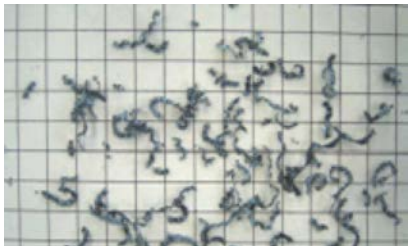
Recommended cutting conditions:

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



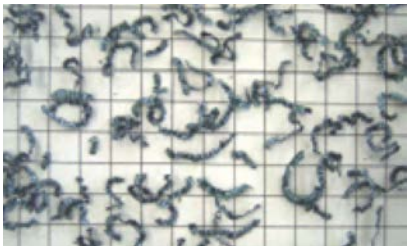


External turning



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)
Inserts	BF-CNGM120408TS2
Cutting mode	Dry cutting

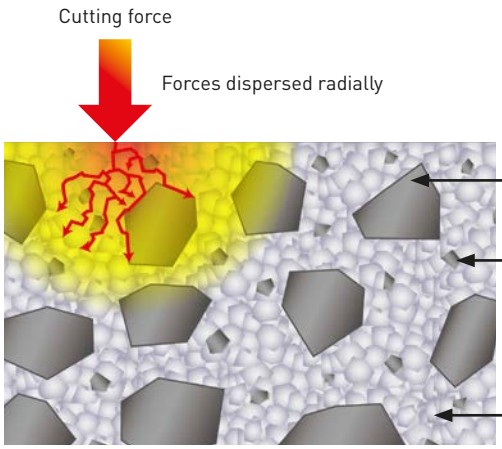
BC8200 SERIES

OPTIMISED SUBSTRATE TECHNOLOGY

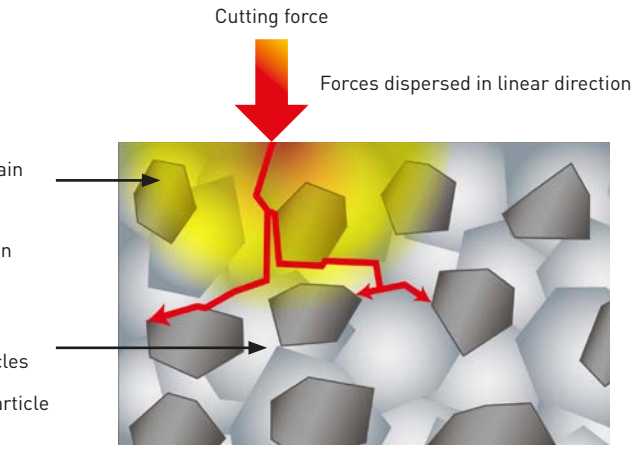
PCBN SUBSTRATE FEATURING TOUGHNESS AND CRATER WEAR RESISTANCE

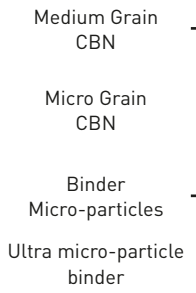
The PCBN substrate contains a ultra-fine grain, heat resistant binder.
This suppresses both chipping and crater wear and promotes longer tool life.

BC8200 / BC8100 SERIES



CONVENTIONAL



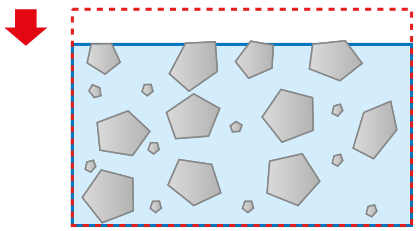


The ultra micro-particle binder for coated and uncoated PCBN inserts prevents linear crack development to avoid sudden fracturing.

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.

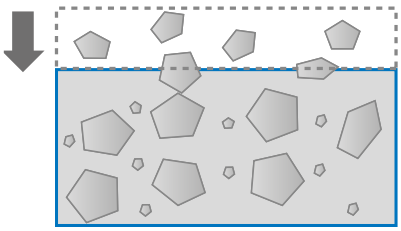
BC8200 SERIES



Reduce crater wear

Suppresses the binder wear caused by cutting heat.

CONVENTIONAL

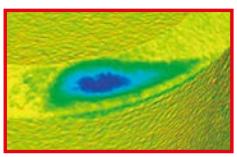


Crater wear progress

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

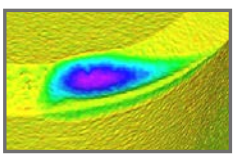
BC8200 SERIES

Small crater wear



CONVENTIONAL

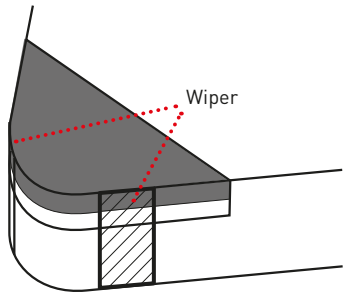
Large crater wear



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

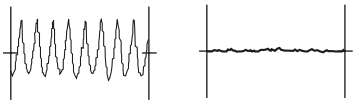
Without wiper | **With wiper**

Ry = 3.2 µm | Ry = 1.0 µm

Cutting speed: 100 m/min
Feed: 0.1 mm/rev
Depth of cut: 0.1 mm
Dry cutting

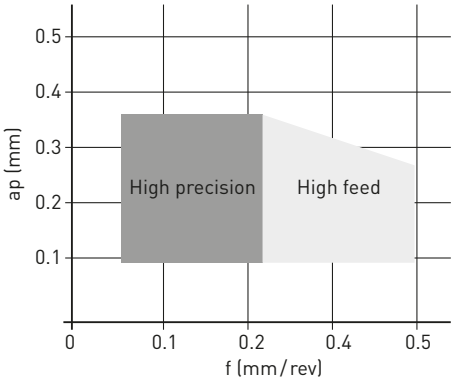
HIGH FEED MACHINING

Without wiper | **With wiper**



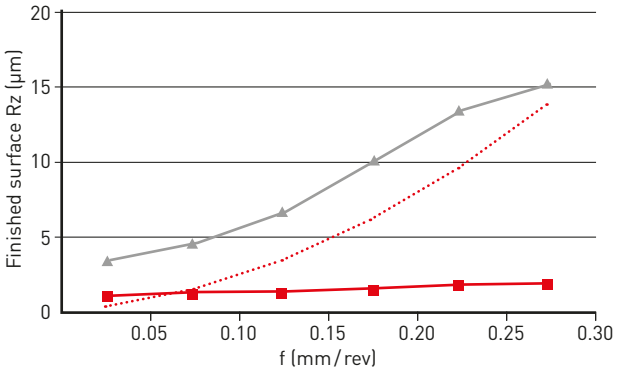
Ry = 12.2 µm | Ry = 1.2 µm

Cutting speed: 100 m/min
Feed: 0.3 mm/rev
Depth of cut: 0.1 mm
Dry cutting



CUTTING PERFORMANCE

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

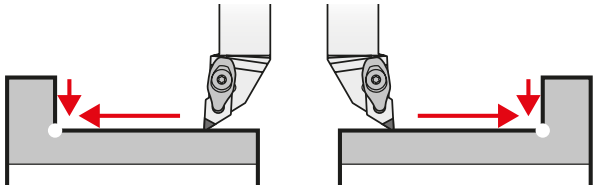


WL-Wiper
No wiper
Theoretical finished surface roughness

COMBINATION OF BF BREAKER AND WS WIPER INSERT

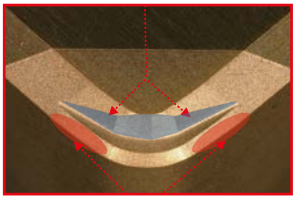
CNGM and DNGM types are now available with new inserts that combine a BF chipbreaker with a WS wiper Insert (BF-○NGM○○○○○○TAWS2). It is effective for chip control and improvement of finished surface roughness without concern about the hand of the tool even during continuous external turning or internal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

Effect of chipbreaker and wiper insert



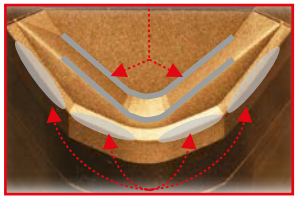
Demonstrates the effects of breaker and wiper Insert in both right handed and left handed cutting.

BF chipbreaker



WS Wiper Insert (Neutral)
BF-CNGM120408TSWS2

BF chipbreaker



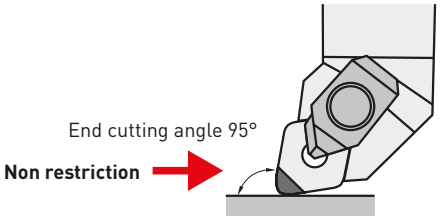
WS Wiper Insert (Neutral)
BF-DNGM150412TAWS2

NOTES FOR USE

WHEN USING A CNGM TYPE

No Restriction for Holders

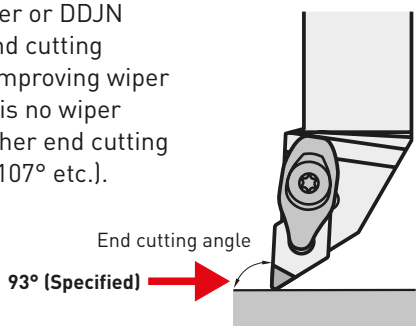
A standard holder can be used.
(*A double clamp, high rigidity tool is recommended.)



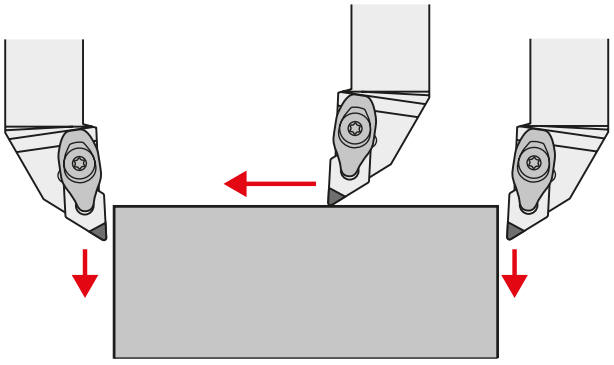
WHEN USING A DNGM TYPE

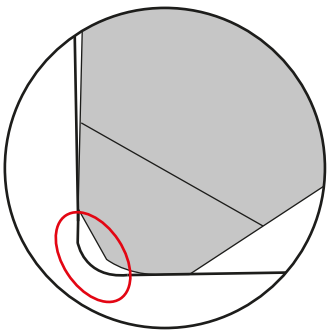
Restriction for Holders

Use a PDJN holder or DDJN holder with an end cutting angle of 93° for improving wiper efficiency. There is no wiper efficiency with other end 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	–	CNGA	120404	TA	WS	2	__
		Insert shape	Insert size			Number of cutting edges	

Insert geometry

BR	For high depth of cut chipbreaker
BM	For medium depth of cut chipbreaker
BF	For finish cutting chipbreaker
NP	New petit cut

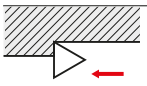
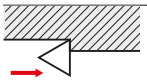
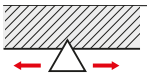
Cutting edge preparation

FS	Continuous cutting
GS GA GH	General cutting
VA	For high speed, High feed cutting
TS TA TH	Interrupted cutting

Wiper

WS	With wiper
No mark	Without wiper

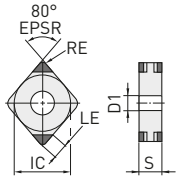
Cutting direction*

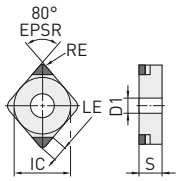
Figure	Symbol
	JR Right
	JL Left
	No mark Neutral

CNGA, CNGM

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	





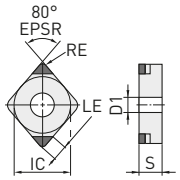
65 Vc

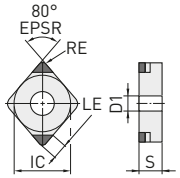
● : Inventory maintained. ★ : Inventory maintained in Japan.

CNGA, CNGM

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	
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	





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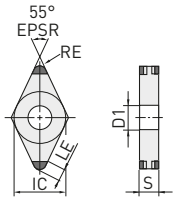
● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM

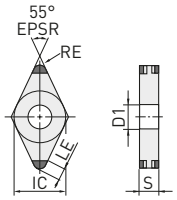
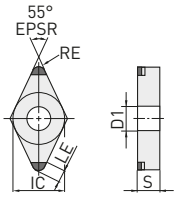
NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	



DNGA, DNGM

NEGATIVE INSERTS (WITH HOLE)

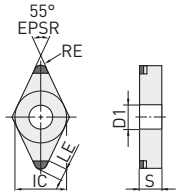
Order number	BC8210	BC8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TS4	★		4	12.7	4.76		5.16	2.1	
NP-DNGA150408TS4	★		4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TS4	★		4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TS4	★		4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TS4	★		4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TS4	★		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	

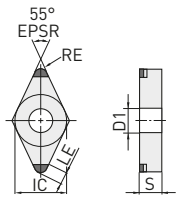
● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM

NEGATIVE INSERTS (WITH HOLE)

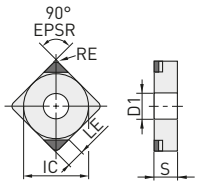
Order number	BC8210	BC8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TA2		★	2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TA2		★	2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TA2		★	2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TA2		●	2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TA2		●	2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TA2		●	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	
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	
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	





SNGA

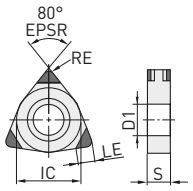
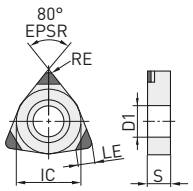
NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	

65 Vc

WNGA

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	

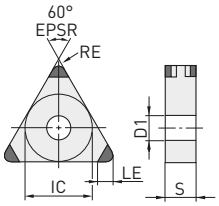
65 Vc

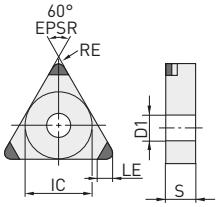
● : Inventory maintained. ★ : Inventory maintained in Japan.

TNGA

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	

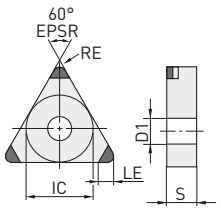




TNGA

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	



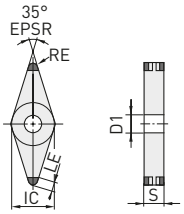
65 Vc

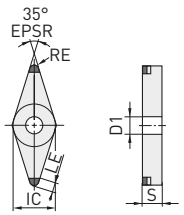
● : Inventory maintained. ★ : Inventory maintained in Japan.

VNGA

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	



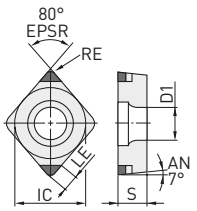


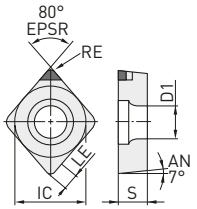
65 Vc

CCGW 7°, CCGT 7°, CPGB 11°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	
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	



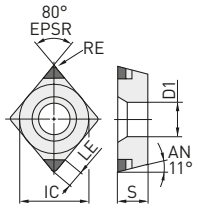


● : Inventory maintained. ★ : Inventory maintained in Japan.

CCGW 7°, CCGT 7°, CPGB 11°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	

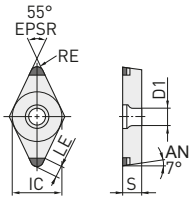


65 Vc

DCGW 7°, DCGT 7°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	
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	



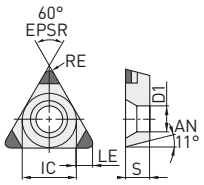
65 Vc

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

TPGB 11°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	

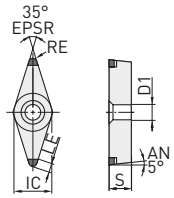


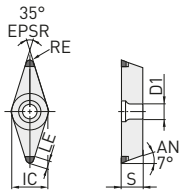
65 Vc

VBGW 5°, VCGW 7°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	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	
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	
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	





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

BC8200 SERIES

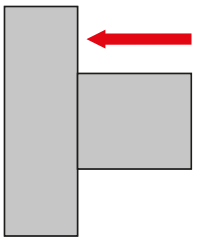
RECOMMENDED CUTTING CONDITIONS

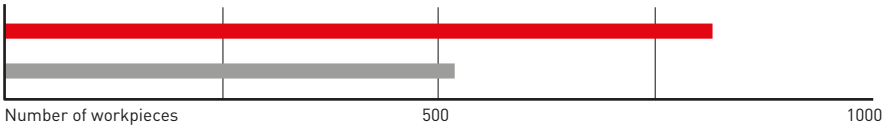
	Material	Grade	Cutting mode	Vc	f	ap	Coolant
H	Hardened steels	BC8210	Continuous cutting	150–250 (90–300)	≤0.2	≤0.35	Dry, wet
			Light interrupted cutting	100–180 (50–200)	≤0.2	≤0.35	
		BC8220	Continuous cutting	150–200 (80–250)	≤0.2	≤0.5	
			Light to medium interrupted cutting	100–180 (50–200)	≤0.2	≤0.3	

BC8200 SERIES

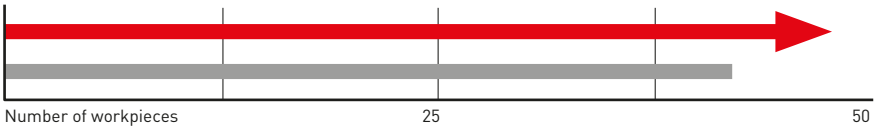
APPLICATION EXAMPLES

Insert	NP-CNGA120412GSWS2 BC8210
Workpiece material	Non-micro alloyed Steel
Cutting mode	External continuous cutting
Vc (m/min)	260
f (mm/rev)	0.20
ap (mm)	0.15
Coolant	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.

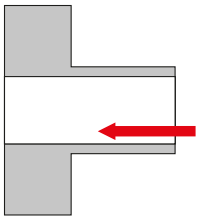


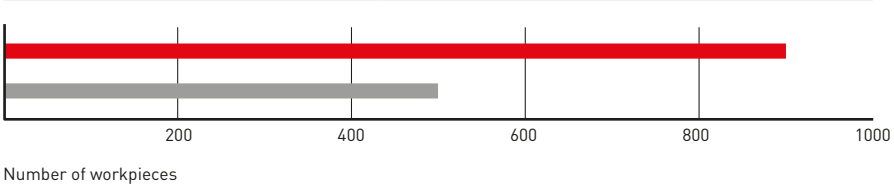


Insert	NP-DCGW11T304GS2 BC8210
Workpiece material	DIN 16MnCr5
Cutting mode	Internal continuous cutting
Vc (m/min)	240
f (mm/rev)	0.08
ap (mm)	0.20
Coolant	Dry cutting
Result	The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was also maintained.



Insert	NP-CCGW09T308GS2 BC8210
Workpiece material	DIN 16MnCr5
Component	Automobile parts
Cutting mode	Internal continuous cutting
Vc (m/min)	140
f (mm/rev)	0.07
ap (mm)	0.10
Coolant	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.



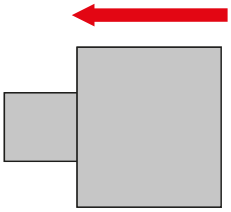


■ : Mitsubishi Materials tool ■ : Conventional tool

BC8200 SERIES

APPLICATION EXAMPLES

Insert	NP-DNGA110416GA2 BC8220
Workpiece 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
Coolant	Dry cutting

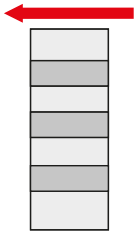


Result

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

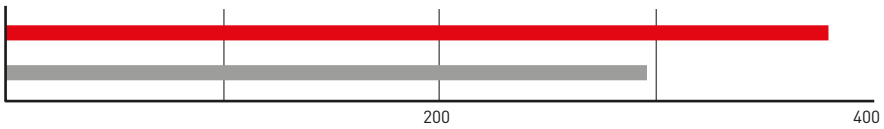
Number of workpieces

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



Result

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

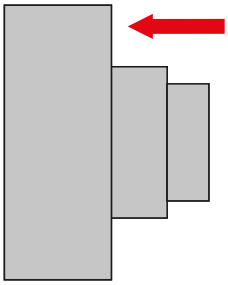


Number of workpieces

BC8200 SERIES

APPLICATION EXAMPLES

Insert	BR-CNGM120408TA2 BC8220
Workpiece 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
Coolant	Dry cutting

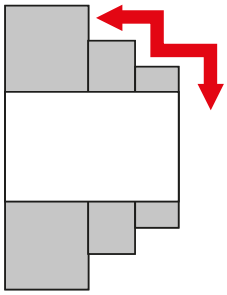


Result

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

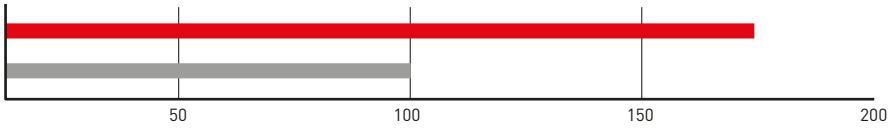
Number of workpieces

Insert	BR-DNGM150408TA2 BC8220
Workpiece 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
Coolant	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 times greater than the conventional product.



Number of workpieces

■ : Mitsubishi Materials tool ■ : Conventional tool

MP / MT9000

ISO TURNING INSERTS
FOR DIFFICULT TO CUT MATERIALS

Interested in more...

B214

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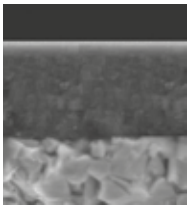
DIA EDGE

MP9005 / MP9015 / MP9025

PVD COATED CARBIDE GRADE

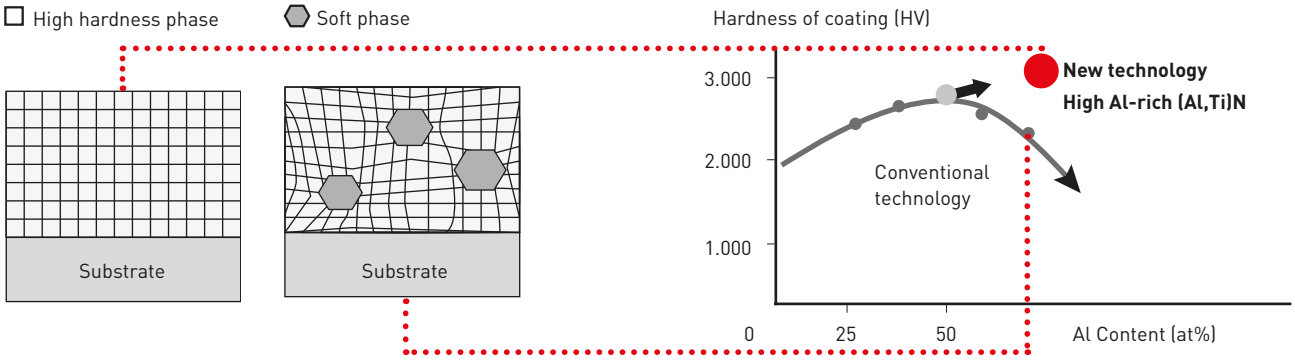


High Al-rich (Al,Ti)N single layer coating technology

Special cemented carbide substrate

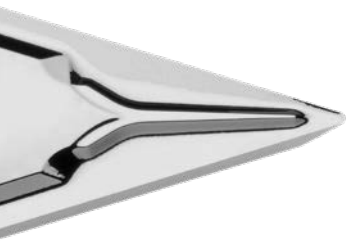
HIGH AL AND CONVENTIONAL COATING COMPARISON

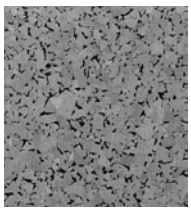
The new technology, high Al-rich (Al,Ti)N single layer coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



MT9005 / MT9015

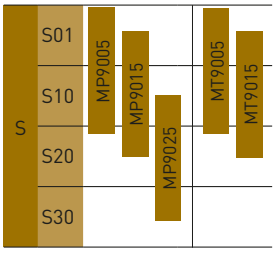
CARBIDE GRADE (NON COATED)





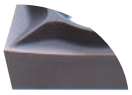
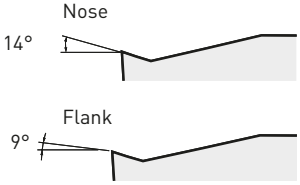
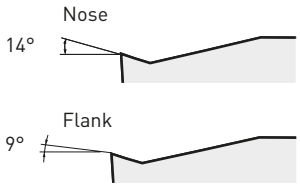
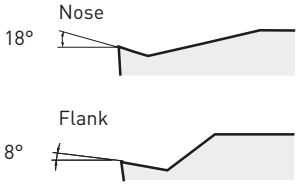
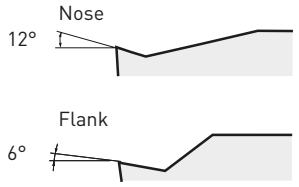
MT9015

ISO		Grade	Concept	Application
S	S05	**MP9005/ MT9005**	High quality grade focusing on wear resistance	Heat resistant alloy Finish-medium cutting
	S15	**MP9015**	First recommendation for general applications	Heat resistant alloy Medium-rough cutting
		MP9025	Prevents severe damage for increased stability	Heat resistant alloy Interrupted - Light-rough cutting
		MT9015	New cemented carbide with sharp cutting edge, excellent wear and fracture resistance	Titanium alloy General cutting

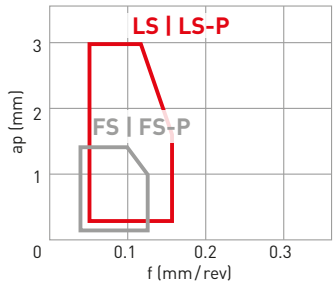


CHIPBREAKER SYSTEM

POSITIVE INSERTS / PRECISION POSITIVE INSERTS

Tolerance		Features	Cross section geometry
FINISHING			
G	**FS** 	*Positive inserts* **FIRST RECOMMENDATION FOR FINISHING DIFFICULT TO CUT MATERIALS** Ideal for heat-resistant, titanium and cobalt chromium alloys. Sharp cutting edges provide excellent surface finishes and geometric tolerance. Highly efficient chip discharge is possible due to curved cutting edges.	
G	**FS-P**	*Positive inserts* **FIRST RECOMMENDATION FOR FINISHING OF TITANIUM ALLOYS** Ideal for titanium and copper alloys. Sharp cutting edges provide excellent surface finishes and geometric tolerance. Highly efficient chip discharge is possible due to curved cutting edges. Polished, mirror finish of insert surfaces drastically improves welding resistance and extends tool life.	
LIGHT CUTTING			
M	**LS**	*Positive inserts / PRECISION positive inserts* **FIRST RECOMMENDATION FOR LIGHT CUTTING OF DIFFICULT TO CUT MATERIALS** Ideal for heat-resistant, titanium and cobalt chromium alloys. Excellent chip control at low to medium depths of cut.	
G	**LS-P**	*Positive inserts* **FIRST RECOMMENDATION FOR LIGHT CUTTING OF TITANIUM ALLOYS** Ideal for titanium and copper alloys. Excellent chip control at low to medium depths of cut. Polished, mirror finish of insert surfaces drastically improves welding resistance and extends tool life.	

CHIP CONTROL RANGE



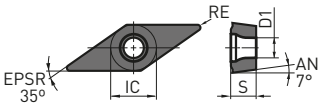
7° PRECISION POSITIVE INSERTS

MINUS TOLERANCE (WITH HOLE)

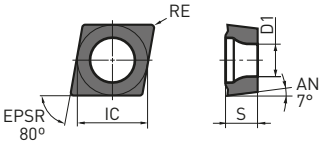
S

G Class

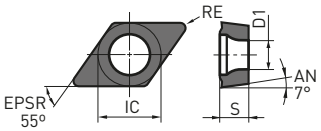
VCGT



CCGT



DCGT



CHIPBREAKER IDENTIFICATION

APPLICATION	F	L
	FS	LS

Order number	F	L	MP9005	MP9015	MP9025	IC	S	RE	D1
CCGT060201M-FS	F		●	●	●	6.35	2.38	0.08	2.8
CCGT060201M-LS		L	●	●	●	6.35	2.38	0.08	2.8
CCGT060202M-FS	F		●	●	●	6.35	2.38	0.18	2.8
CCGT060202M-LS		L	●	●	●	6.35	2.38	0.18	2.8
CCGT09T301M-FS	F		●	●	●	9.525	3.97	0.08	4.4
CCGT09T301M-LS		L	●	●	●	9.525	3.97	0.08	4.4
CCGT09T302M-FS	F		●	●	●	9.525	3.97	0.18	4.4
CCGT09T302M-LS		L	●	●	●	9.525	3.97	0.18	4.4
CCGT09T304M-FS	F		●	●	●	9.525	3.97	0.38	4.4
CCGT09T304M-LS		L	●	●	●	9.525	3.97	0.38	4.4
DCGT070201M-FS	F		●	●	●	6.35	2.38	0.08	2.8
DCGT070201M-LS		L	●	●	●	6.35	2.38	0.08	2.8
DCGT070202M-FS	F		●	●	●	6.35	2.38	0.18	2.8
DCGT070202M-LS		L	●	●	●	6.35	2.38	0.18	2.8
DCGT070204M-FS	F		●	●	●	6.35	2.38	0.38	2.8
DCGT070204M-LS		L	●	●	●	6.35	2.38	0.38	2.8
DCGT11T301M-FS	F		●	●	●	9.525	3.97	0.08	4.4
DCGT11T301M-LS		L	●	●	●	9.525	3.97	0.08	4.4
DCGT11T302M-FS	F		●	●	●	9.525	3.97	0.18	4.4
DCGT11T302M-LS		L	●	●	●	9.525	3.97	0.18	4.4
DCGT11T304M-FS	F		●	●	●	9.525	3.97	0.38	4.4
DCGT11T304M-LS		L	●	●	●	9.525	3.97	0.38	4.4
VCGT110301M-LS		L	●	●	●	6.35	3.18	0.08	2.8
VCGT110302M-LS		L	●	●	●	6.35	3.18	0.18	2.8
VCGT110304M-LS		L	●	●	●	6.35	3.18	0.38	2.8
VCGT130301M-LS		L	●	●	●	7.94	3.18	0.08	3.4
VCGT130302M-LS		L	●	●	●	7.94	3.18	0.18	3.4
VCGT130304M-LS		L	●	●	●	7.94	3.18	0.38	3.4

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

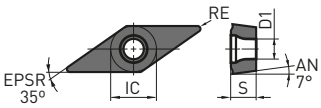
7° PRECISION POSITIVE INSERTS

MINUS TOLERANCE / POLISHED (WITH HOLE)

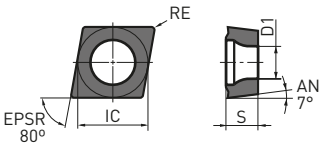
S

G Class

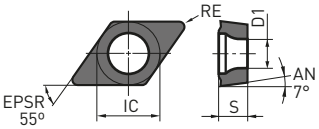
VCGT



CCGT



DCGT



CHIPBREAKER IDENTIFICATION

APPLICATION	F	L
	FS-P	LS-P

Order number	F	L	MT9005	IC	S	RE	D1
CCGT060201M-FS-P	F		●	6.35	2.38	0.08	2.8
CCGT060202M-FS-P	F		●	6.35	2.38	0.18	2.8
CCGT09T301M-FS-P	F		●	9.525	3.97	0.08	4.4
CCGT09T302M-FS-P	F		●	9.525	3.97	0.18	4.4
CCGT09T304M-FS-P	F		●	9.525	3.97	0.38	4.4
DCGT070201M-FS-P	F		●	6.35	2.38	0.08	2.8
DCGT070202M-FS-P	F		●	6.35	2.38	0.18	2.8
DCGT070204M-FS-P	F		●	6.35	2.38	0.38	2.8
DCGT11T301M-FS-P	F		●	9.525	3.97	0.08	4.4
DCGT11T302M-FS-P	F		●	9.525	3.97	0.18	4.4
DCGT11T304M-FS-P	F		●	9.525	3.97	0.38	4.4
CCGT060201M-LS-P		L	●	6.35	2.38	0.08	2.8
CCGT060202M-LS-P		L	●	6.35	2.38	0.18	2.8
CCGT09T301M-LS-P		L	●	9.525	3.97	0.08	4.4
CCGT09T302M-LS-P		L	●	9.525	3.97	0.18	4.4
CCGT09T304M-LS-P		L	●	9.525	3.97	0.38	4.4
DCGT070201M-LS-P		L	●	6.35	2.38	0.08	2.8
DCGT070202M-LS-P		L	●	6.35	2.38	0.18	2.8
DCGT070204M-LS-P		L	●	6.35	2.38	0.38	2.8
DCGT11T301M-LS-P		L	●	9.525	3.97	0.08	4.4
DCGT11T302M-LS-P		L	●	9.525	3.97	0.18	4.4
DCGT11T304M-LS-P		L	●	9.525	3.97	0.38	4.4
VCGT110301M-LS-P		L	●	6.35	3.18	0.08	2.8
VCGT110302M-LS-P		L	●	6.35	3.18	0.18	2.8
VCGT110304M-LS-P		L	●	6.35	3.18	0.38	2.8
VCGT130301M-LS-P		L	●	7.94	3.18	0.08	3.4
VCGT130302M-LS-P		L	●	7.94	3.18	0.18	3.4
VCGT130304M-LS-P		L	●	7.94	3.18	0.38	3.4

1. FS-P/LS-P: polished chipbreaker for improved chip evacuation.

MP / MT9000

RECOMMENDED CUTTING CONDITIONS

PRECISION POSITIVE INSERTS

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

	Material	Conditions	F L		Grade	Vc	f	ap
M	Precipitation hardening stainless steels (DIN X5CrNiCuNb17-4)	●	F	FS	MP9005	40 – 80	0.04 – 0.10	0.2 – 1.4
			L	LS	MP9005	40 – 80	0.04 – 0.15	0.3 – 2.0
		◐	F	FS	MP9015	40 – 80	0.04 – 0.10	0.2 – 1.4
			L	LS	MP9015	40 – 80	0.04 – 0.15	0.3 – 2.0
		✣	L	LS	MP9015	30 – 60	0.04 – 0.10	0.3 – 1.0
S	Titanium alloy (Ti-6Al-4V)	●	F	FS–P	MT9005	40 – 80	0.04 – 0.12	0.2 – 1.4
			L	LS–P	MT9005	40 – 80	0.04 – 0.20	0.3 – 3.0
		◐	F	FS–P	MT9005	40 – 80	0.04 – 0.12	0.2 – 1.4
			L	LS–P	MT9005	40 – 80	0.04 – 0.12	0.3 – 2.0
		✣	L	LS–P	MT9005	30 – 60	0.04 – 0.10	0.2 – 1.4
	Cobalt chromium alloys (Co-Cr-Mo Alloys) Precipitation hardening stainless steels (X5CrNiCuNb17-4)	●	F	FS	MP9005	40 – 80	0.04 – 0.10	0.2 – 1.4
			L	LS	MP9005	40 – 80	0.04 – 0.15	0.2 – 2.0
		◐	F	FS	MP9015	40 – 80	0.04 – 0.10	0.2 – 1.4
			L	LS	MP9015	40 – 80	0.04 – 0.15	0.3 – 2.0
		✣	L	LS	MP9015	30 – 60	0.04 – 0.10	0.3 – 1.0
	Ni-based heat-resistant slloy (Inconel®718, Hastelloy®, WASPALOY®)	●	F	FS	MP9015	25 – 95	0.04 – 0.12	0.2 – 1.4
			L	LS	MP9015	25 – 95	0.04 – 0.12	0.3 – 2.0
		◐	F	FS	MP9015	20 – 75	0.04 – 0.12	0.2 – 1.4
			L	LS	MP9015	20 – 75	0.04 – 0.12	0.3 – 2.0
		✣	L	LS	MP9015	20 – 60	0.04 – 0.10	0.3 – 1.0

1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

POSITIVE INSERTS

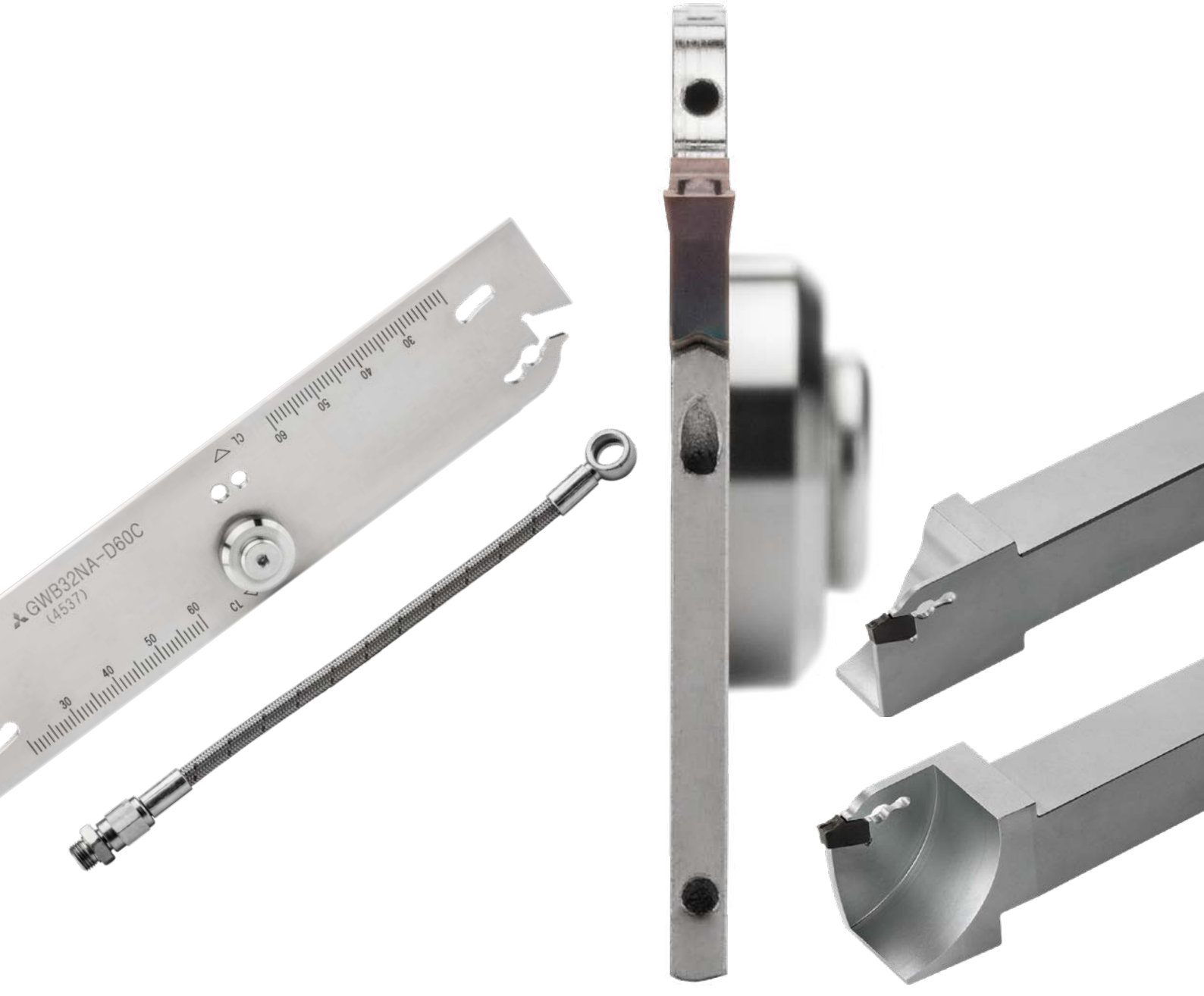
Cutting conditions : ●: Stable cutting ◐: General cutting ✣: Unstable cutting

	Material	Conditions	M L		Grade	Vc	f	ap
M	Precipitation hardening stainless steels (DIN X5CrNiCuNb17-4)	●	L	LS	MP9015	105 – 140	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9015	85 – 120	0.08 – 0.25	0.3 – 2.0
		◐	L	LS	MP9015	105 – 140	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9015	85 – 120	0.08 – 0.25	0.3 – 2.0
		✣	L	LS	MP9025	70 – 80	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9025	60 – 70	0.08 – 0.25	0.3 – 2.0
S	Titanium alloy (Ti-6Al-4V)	●	L	LS	MT9005	40 – 80	0.06 – 0.20	0.2 – 1.0
			M	MS	MT9005	35 – 65	0.08 – 0.25	0.3 – 2.0
		◐	L	LS	MT9005	40 – 80	0.06 – 0.20	0.2 – 1.0
			M	MS	MT9005	35 – 65	0.08 – 0.25	0.3 – 2.0
		✣	L	LS	MT9005	40 – 80	0.06 – 0.20	0.2 – 1.0
			M	MS	MT9005	35 – 65	0.08 – 0.25	0.3 – 2.0
	Ni-based heat-resistant alloy (Inconel®718, Hastelloy®, WASPALOY®)	●	L	LS	MP9005	25 – 95	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9005	20 – 80	0.08 – 0.25	0.3 – 0.2
		◐	L	LS	MP9015	20 – 75	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9015	20 – 75	0.06 – 0.20	0.2 – 1.0
		✣	L	LS	MP9025	15 – 25	0.06 – 0.20	0.2 – 1.0
			M	MS	MP9025	15 – 30	0.08 – 0.25	0.3 – 2.0

1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

GW

DURABLE & EASY TO USE
CUTTING OFF & GROOVING SYSTEM



Interested in more...

B225

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DIA EDGE

GW

SIMPLIFIED EFFICIENCY

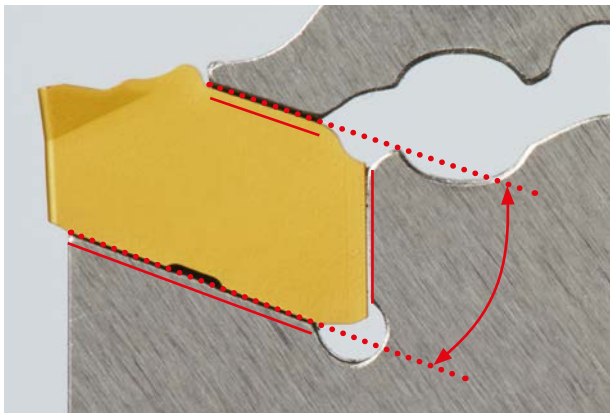
EASY CONFIGURATION THAT IMPROVES INVENTORY CONTROL

Simple & convenient. Introducing a new type of cutting off & grooving system that maximises usability whilst maintaining performance.

CLAMPING METHOD

SIMPLE INSERT CLAMPING METHOD THAT OFFERS HIGH RIGIDITY

To prevent extraction during machining, the insert features a reverse taper angle. Additionally the design also includes 3 large locating faces with the blade, offering increased cutting edge reliability. The blade itself is made from a suitable, special alloy steel. For changing the insert, a unique wrench is supplied to ensure ease of use.



Reverse taper angle

VOICE OF THE DEVELOPER

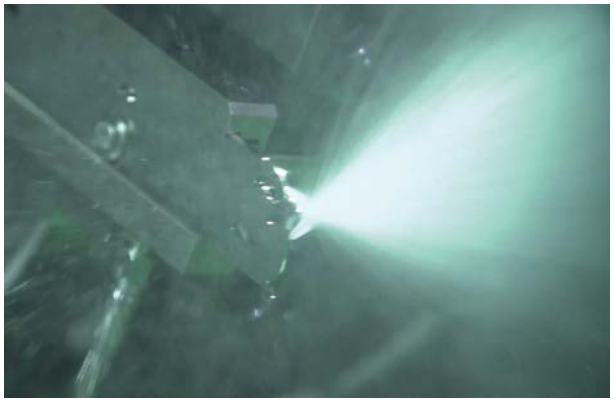
EASY INSERT SETTING

By using the unique wrench, it is possible to remove the insert with one simple action making it easier for everyday use in the workshop.

THROUGH COOLANT BLADE

INCREASED WEAR RESISTANCE DUE TO 2 THROUGH COOLANT HOLES

2 through holes supply coolant to both the rake and flank face, leading to effective cutting edge cooling and increased wear resistance. Additionally the blade can also be utilised with both low and high pressure coolant (7 MPa).



VOICE OF THE DEVELOPER

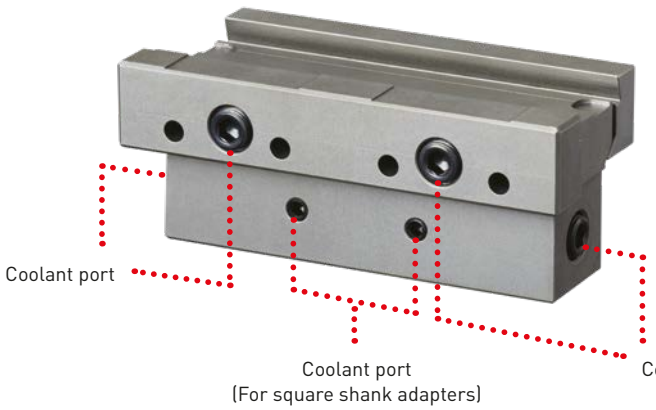
REDUCED HEAT GENERATION

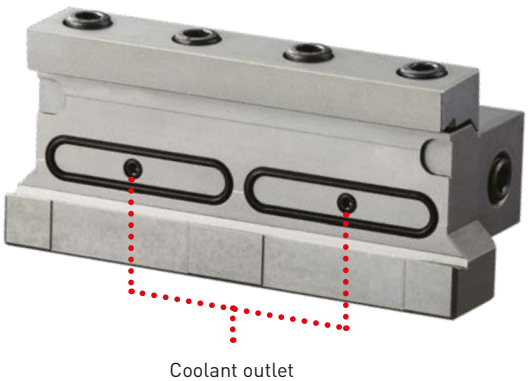
The 2 coolant holes used in the blade are capable of coping with pressures up to 7 MPa. This is achieved by using as large as possible hole diameter. The coolant holes are located close to the cutting edge to improve cutting edge cooling and increase wear resistance.

COOLANT PORTS

FLEXIBILITY WITH THE USE OF 6 COOLANT PORTS

There are 6 coolant ports designed into the tool block, making it easy to set up the block and blade to a suitable configuration. The through coolant holes improve cutting edge cooling and chip evacuation. The use of external coolant hoses is also possible.

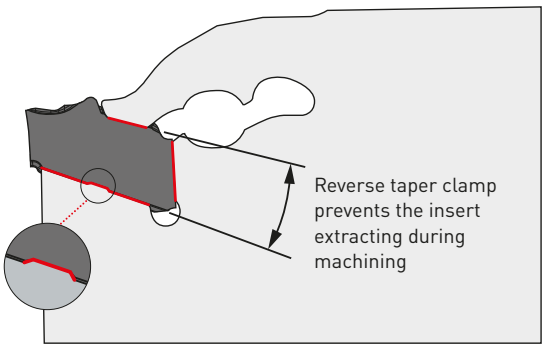


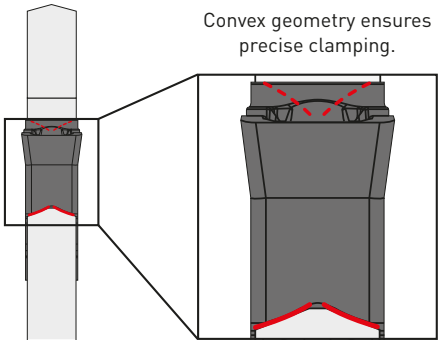


CLAMP MECHANISM

SIMPLE INSERT CLAMPING METHOD OFFERING HIGH RIGIDITY

HIGHLY RELIABLE INSERT CLAMPING

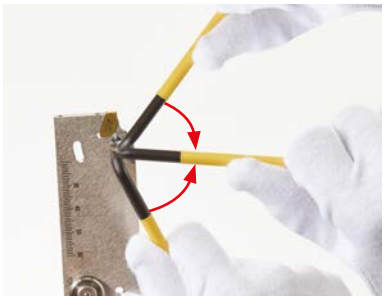


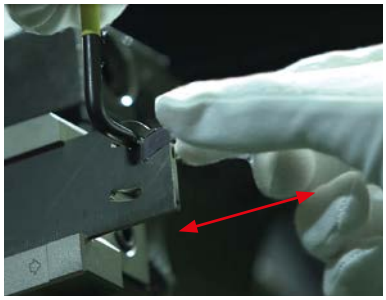


Safety key prevents insert movement.

EASY INSERT INDEXING

Inserts can be changed easily with a single movement of the wrench.

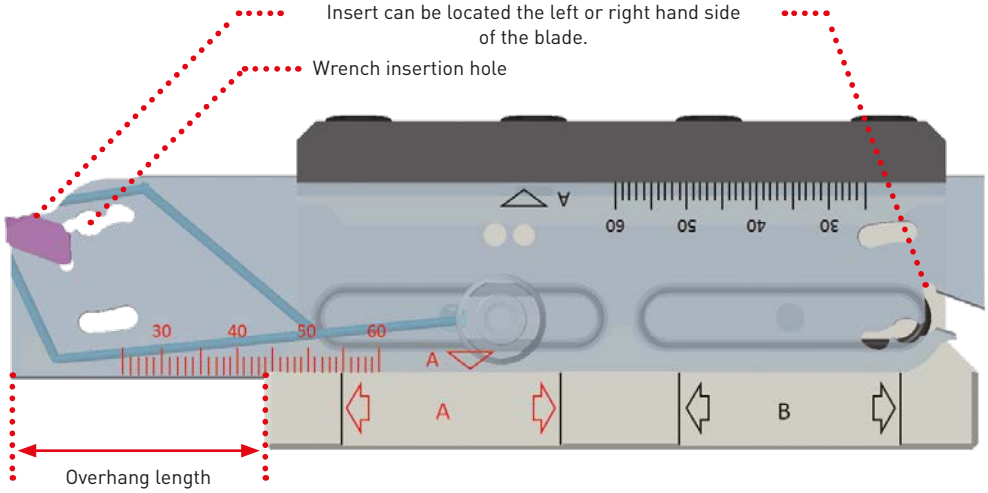




INTERNAL COOLANT

SUITABLE FOR A WIDE VARIETY OF APPLICATIONS

A scale is marked on the blade to facilitate the correct overhang length. If the arrow on the blade falls within the band marked on the tool block, through coolant is possible.
The blade can be used with both external or through coolant.

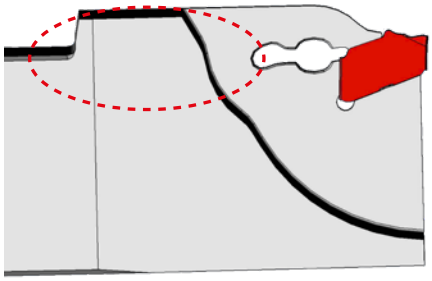


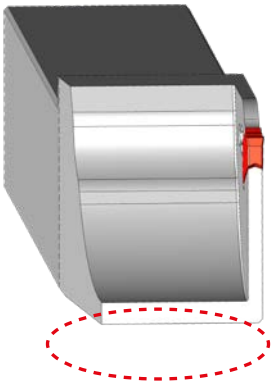
2 Through coolant holes

GW MONOBLOCK HOLDER

HIGH-RIGIDITY HOLDER

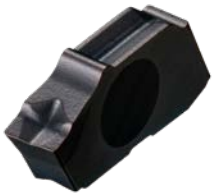
Tool deflection caused by cutting resistance and the remaining pip in the centre of the workpiece after cutting are greatly reduced.





NEW LOW RESISTANCE AND HIGH LEAD ANGLE INSERT

New inserts with a lead angle of 5° and 8° have been added to the range to reduce burrs and the size of the remaining pip in the centre of the workpiece after cutting.



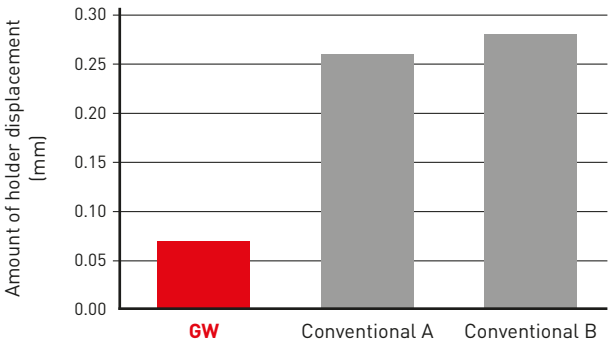
Lead angle 5°

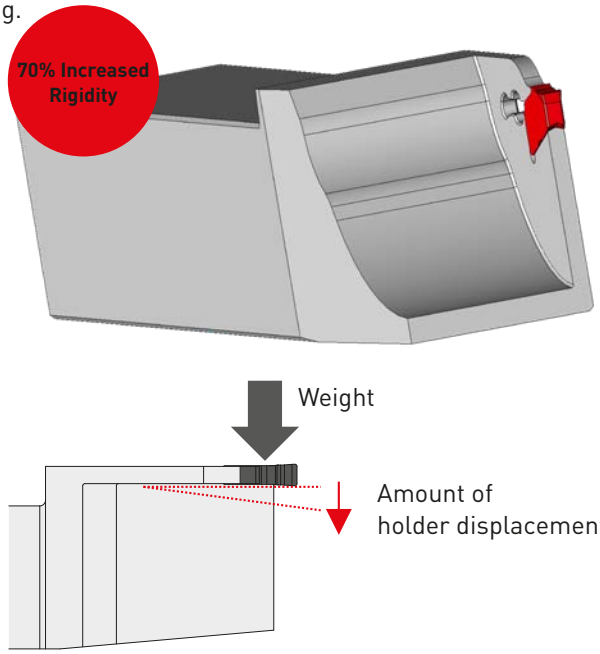
Lead angle 8°

CUTTING PERFORMANCE

TOOL HOLDER DEFLECTION COMPARISON

The high rigidity reduces chatter and vibration thereby improving component surface finishes and also reduces the size of the remaining centre pip of the workpiece after cutting.





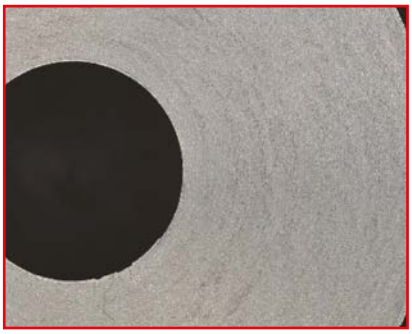
GW MONOBLOCK HOLDER

CUTTING PERFORMANCE

HIGH LEAD ANGLE EFFECT WHEN CUTTING OFF: JIS SUS304

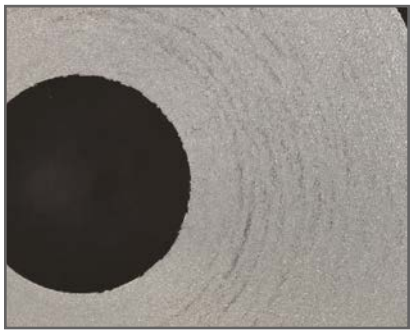
The high-rigidity holder suppresses chatter, vibration and tool deflection, thereby improving the finished surface.

GW



Lead angle 8° – Rz 7.9 µm

CONVENTIONAL



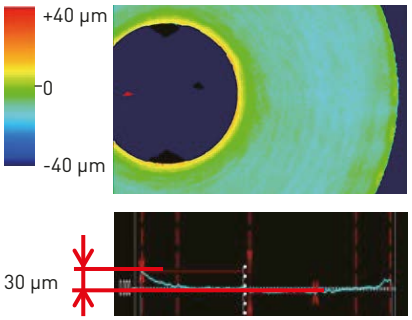
Lead angle 6° – Rz 11.3 µm

Cutting performance

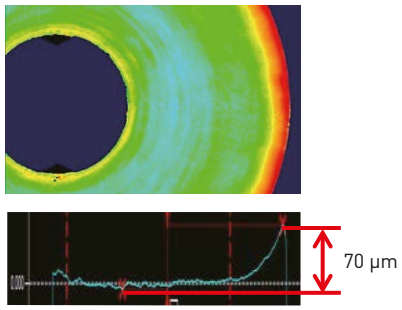
Material	SUS304 ø 38 mm
CW (mm)	2
Vc (m/min)	120
f (mm/rev)	0.11
Coolant	Wet cutting

HIGH ACCURACY WITH THE SAME LEAD ANGLE WHEN CUTTING OFF: JIS SUS304

GW



Conventional

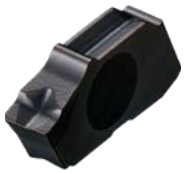


Cutting performance

Material	SUS304 ø 38 mm
CW (mm)	2
Vc (m/min)	120
f (mm/rev)	0.11
Coolant	Wet cutting

CHIPBREAKER

BREAKER SYSTEM OFFERING
EXCELLENT CHIP DISPOSAL PROPERTIES

GS Breaker			GM Breaker		
Low feeds			Medium feeds		
					
Neutral	Right hand 5°	Right hand 8°	Neutral	Right hand 5° / Left hand 5°	Blank insert for special profile by customer

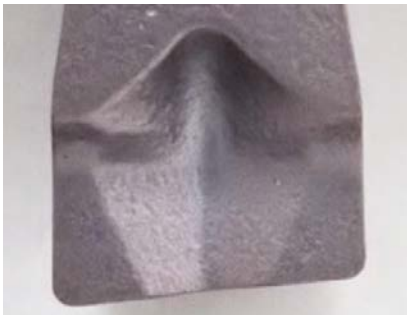
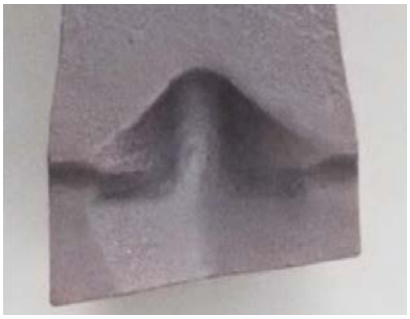
INSERT GRADES

Cutting conditions: ●: Stable cutting ◕: General cutting ✲: Unstable cutting

P		M		K		S	
MY5015	●	VP10RT RT9010	●	MY5015	●	VP10RT RT9010	●
VP10RT RT9010				VP10RT RT9010	◕	VP20RT RT9020	◕
VP20RT RT9020	◕	VP20RT RT9020	◕	VP20RT RT9020			
VP30RT	✲	VP30RT	✲		✲		✲

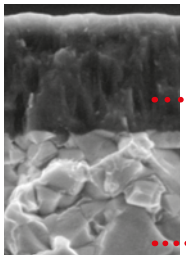
PROPER USE OF GW SERIES RIGHT HAND INSERTS

1st Recommendation

GM	GS	GS
PSIRR = 5°, RE = 0.20	PSIRR = 5°, RE = 0.20	PSIRR = 8°, RE = 0.03
		

INSERT GRADES

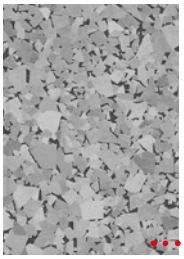
VP10RT



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)

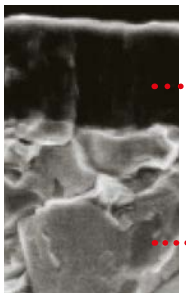
RT9010



Cemented carbide substrate harder than RT9020 and is ideal for longer tool life on stable cutting applications.

Carbide substrate (HRA92.0)

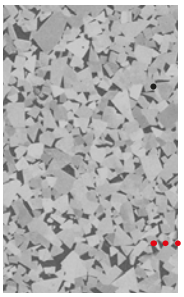
VP20RT (1st Recommendation)



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)

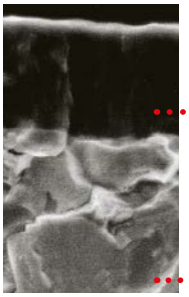
RT9020



Cemented carbide substrate suitable for a wide range of applications. Having an excellent balance of wear and fracture resistance.

Carbide substrate (HRA90.5)

VP30RT



A combination of a tough, special cemented carbide substrate and MIRACLE coating. Ideal for heavy interrupted cutting of stainless and general steels.

MIRACLE coating (Al,Ti)N
Carbide substrate

MY5015

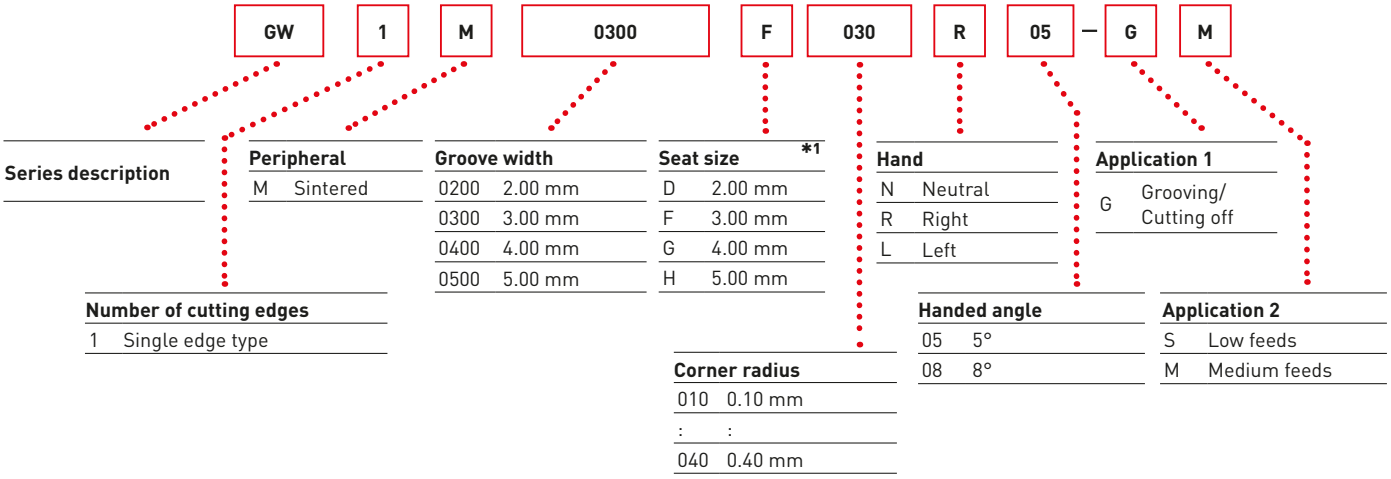
CVD coated grade with excellent wear resistance even at high temperatures. Providing longer tool life when machining cast and ductile cast irons.
Also suitable for high speed continuous cutting of steels.

CVD coating
Carbide substrate

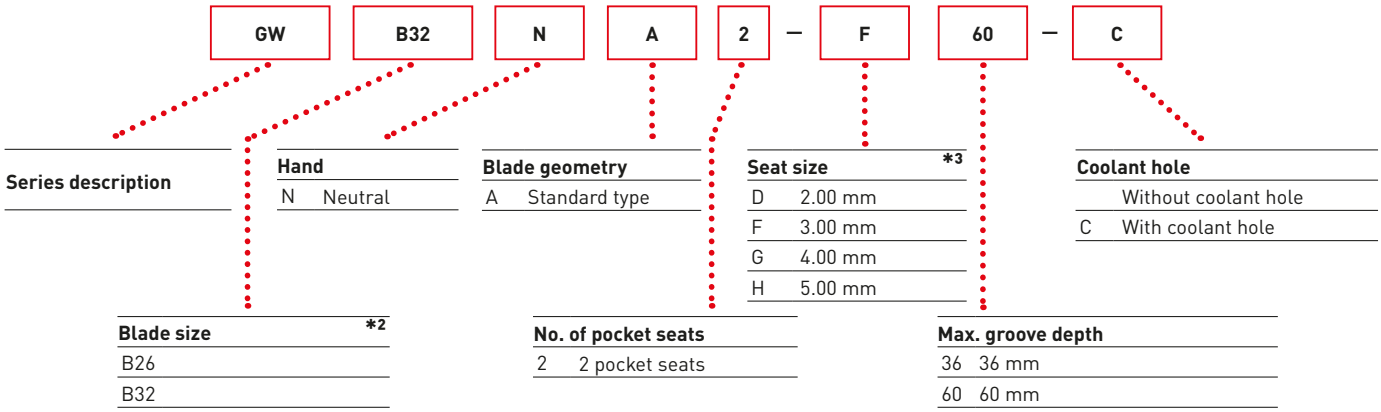
IDENTIFICATION

INSERT / BLADE / TOOL BLOCK

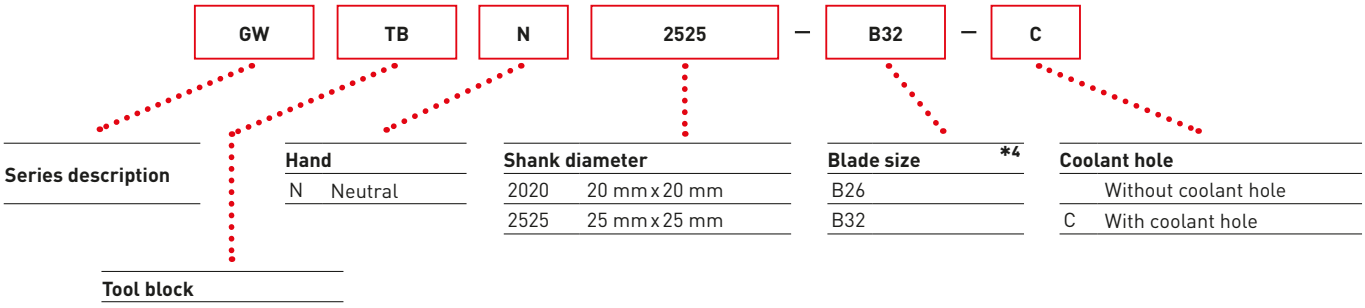
INSERT



BLADE



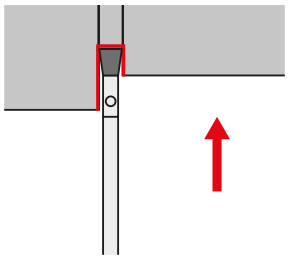
TOOL BLOCK



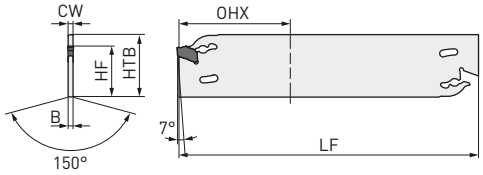
*1 Select seat size with the same symbol as the blade.
*2 Select blade size with the same symbol as the tool block.
*3 Select seat size with the same symbol as the insert.
*4 Select blade size with the same symbol as the blade.

GW BLADE

FOR EXTERNAL CUTTING OFF / GROOVING



1



Simple insert clamping method offering high rigidity.
Possible to use with both external or through coolant.
Groove depth CW 2.0 – 5.0 mm.

WITHOUT COOLANT HOLE

Order number	Seat size	CW	CUTDIA*1	Stock	OHN*2	OHX*3	B	LF	HTB	HF	Fig.	Insert type	Wrench	Tool block type
GWB26NA2-D36	D	2.00	72	●	16	36	1.55	110	26	21.4	1	GW1M0200D	GWY39L	GWTBN-B26
GWB32NA2-D60			120	●	16	60	1.55	150	32	25	1	GW1M0200D	GWY39L	GWTBN-B32
GWB26NA2-D36	D	3.24	72	●								GW1B0320D020N	GWY39L	GWTBN-B26
GWB32NA2-D60			120	●								GW1B0320D020N	GWY39L	GWTBN-B32
GWB26NA2-F36	F	3.00	72	●	16	36	2.45	110	26	21.4	1	GW1M0300F	GWY39L	GWTBN-B26
GWB32NA2-F60			120	●	16	60	2.45	150	32	25	1	GW1M0300F	GWY39L	GWTBN-B32
GWB26NA2-F36	F	4.44	72	●								GW1B0440F020N	GWY39L	GWTBN-B26
GWB32NA2-F60			120	●								GW1B0440F020N	GWY39L	GWTBN-B32
GWB26NA2-G36	G	4.00	72	●	19	36	3.35	110	26	21.4	1	GW1M0400G	GWY39L	GWTBN-B26
GWB32NA2-G60			120	●	19	60	3.35	150	32	25	1	GW1M0400G	GWY39L	GWTBN-B32
GWB26NA2-G36	G	5.44	72	●								GW1B0540G020N	GWY39L	GWTBN-B26
GWB32NA2-G60			120	●								GW1B0540G020N	GWY39L	GWTBN-B32
GWB26NA2-H36	H	5.00	72	●	19	36	4.25	110	26	21.4	1	GW1M0500H	GWY39L	GWTBN-B26
GWB32NA2-H60			120	●	19	60	4.25	150	32	25	1	GW1M0500H	GWY39L	GWTBN-B32
GWB26NA2-H36	H	6.44	72	●								GW1B0640H020N	GWY39L	GWTBN-B26
GWB32NA2-H60			120	●								GW1B0640H020N	GWY39L	GWTBN-B32

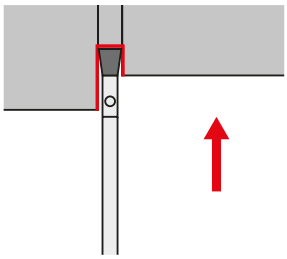
1. Recommended maximum coolant pressure 7 MPa.
*1 CUTDIA: Maximum cut off diameter
*2 OHN: Minimum overhang length
*3 OHX: Maximum overhang length

91 Vc

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

GW BLADE

FOR EXTERNAL CUTTING OFF / GROOVING



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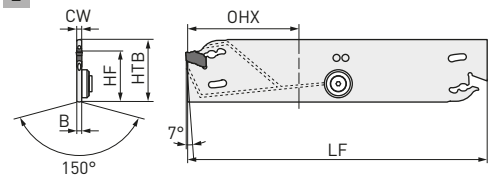


Simple insert clamping method offering high rigidity.
Possible to use with both external or through coolant.
Groove depth CW 2.0 – 5.0 mm.

WITH COOLANT HOLE

Order number	Seat size	CW	CUTDIA*1	Stock	OHN*2	OHX*3	B	LF	HTB	HF	Fig.	Insert type	Wrench	Tool block type
GWB26NA2-D36-C	D	2.00	72	●	16	36	1.55	110	26	21.4	2	GW1M0200D	GWY39L	GWTBN-B26-C
GWB32NA2-D60-C			120	●	26	60	1.55	150	32	25	2	GW1M0200D	GWY39L	GWTBN-B32-C
GWB26NA2-D36-C	D	3.24	72	●								GW1B0320D020N	GWY39L	GWTBN-B26-C
GWB32NA2-D60-C			120	●								GW1B0320D020N	GWY39L	GWTBN-B32-C
GWB26NA2-F36-C	F	3.00	72	●	16	36	2.45	110	26	21.4	2	GW1M0300F	GWY39L	GWTBN-B26-C
GWB32NA2-F60-C			120	●	26	60	2.45	150	32	25	2	GW1M0300F	GWY39L	GWTBN-B32-C
GWB26NA2-F36-C	F	4.44	72	●								GW1B0440F020N	GWY39L	GWTBN-B26-C
GWB32NA2-F60-C			120	●								GW1B0440F020N	GWY39L	GWTBN-B32-C
GWB26NA2-G36-C	G	4.00	72	●	19	36	3.35	110	26	21.4	2	GW1M0400G	GWY39L	GWTBN-B26-C
GWB32NA2-G60-C			120	●	26	60	3.35	150	32	25	2	GW1M0400G	GWY39L	GWTBN-B32-C
GWB26NA2-G36-C	G	5.44	72	●								GW1B0540G020N	GWY39L	GWTBN-B26-C
GWB32NA2-G60-C			120	●								GW1B0540G020N	GWY39L	GWTBN-B32-C
GWB26NA2-H36-C	H	5.00	72	●	19	36	4.25	110	26	21.4	2	GW1M0500H	GWY39L	GWTBN-B26-C
GWB32NA2-H60-C			120	●	26	60	4.25	150	32	25	2	GW1M0500H	GWY39L	GWTBN-B32-C
GWB26NA2-H36-C	H	6.44	72	●								GW1B0640H020N	GWY39L	GWTBN-B26-C
GWB32NA2-H60-C			120	●								GW1B0640H020N	GWY39L	GWTBN-B32-C

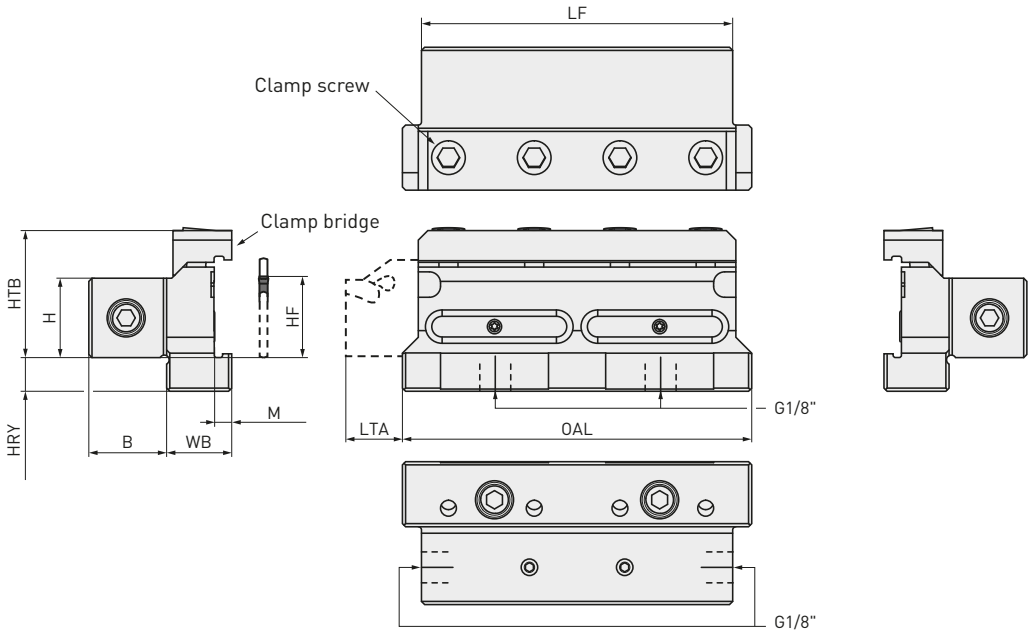
1. Recommended maximum coolant pressure 7 MPa.
*1 CUTDIA: Maximum cut off diameter
*2 OHN: Minimum overhang length
*3 OHX: Maximum overhang length

91 Vc

SPARE PARTS
FOR BLADES WITH COOLANT HOLE

Order number	CW	1 2 Washer	Clamp screw	Plug wrench
GWB26NA2-D36-C	2.0	1 GWW04038	GW04005F	HKY20R
GWB32NA2-D60-C	2.0	1 GWW04038		
GWB26NA2-F36-C	3.0	1 GWW04038		
GWB32NA2-F60-C	3.0	1 GWW04038		
GWB26NA2-G36-C	4.0	2 GWW04026		
GWB32NA2-G60-C	4.0	2 GWW04026		
GWB26NA2-H36-C	5.0	2 GWW04026		
GWB32NA2-H60-C	5.0	2 GWW04026		

TOOL BLOCK



Tool block with coolant hole shown.

WITHOUT COOLANT HOLE

Order number	Stock	H	HF	HTB	HRY	B	WB	M	LF	OAL	Clamp bridge	Clamp screw	Wrench
GWTBN2020-B26	★	20	20	33.5	11	19.5	20.0	5.0	75	85	1 GWCW1	HSC06020	HKY50R
GWTBN2020-B32	★	20	20	35.0	15.6	19.5	20.5	5.5	100	110	2 GWCW2		
GWTBN2525-B26	★	25	25	38.5	6	24.5	20.0	5.0	75	85	2 GWCW1		
GWTBN2525-B32	★	25	25	40.0	10.6	24.5	20.5	5.5	100	110	1 GWCW2		

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WITH COOLANT HOLE

Order number	Stock	H	HF	HTB	HRY	B	WB	M	LF	OAL	Clamp bridge	Clamp screw	Wrench
GWTBN2020-B26-C	●	20	20	33.5	11	19.5	20.0	5.0	75	85	1 GWCW1	HSC06020	HKY50R
GWTBN2020-B32-C	●	20	20	35.0	15.6	19.5	20.5	5.5	100	110	2 GWCW2		
GWTBN2525-B26-C	●	25	25	38.5	6	24.5	20.0	5.0	75	85	1 GWCW1		
GWTBN2525-B32-C	●	25	25	40.0	10.6	24.5	20.5	5.5	100	110	2 GWCW2		

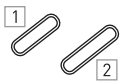
1. Recommended maximum coolant pressure 7 MPa
2. Clamp torque (N • m): HSC06020 = 7.0

91 Vc

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

TOOL BLOCK

SPARE PARTS
FOR TOOL BLOCK WITH COOLANT HOLE

Order number						
	O-ring	Plug	Plug	Wrench	Plug	Wrench
GWTBN2020-B26-C	1 ORGW332N9	HGJ-PT1/8	HSD05004S	HKY25R	CS300590T	TKY08R
GWTBN2020-B32-C	2 ORGW457N9					
GWTBN2525-B26-C	1 ORGW332N9					
GWTBN2525-B32-C	2 ORGW457N9					

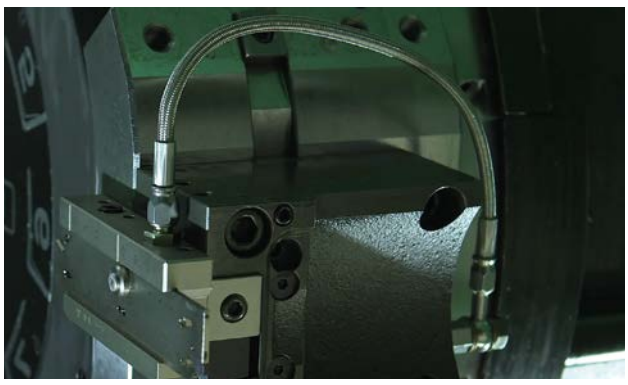
COOLANT HOSE KIT

Order number	Stock	Hose length	Kit details								
			Hose	Banjo adapter		Banjo bolt		Adapter		Washer	
			Code No.	Code No.	Qty.	Code No.	Qty.	Code No.	Qty.	Code No.	Qty.
STRAIGHT											
CS-1/8-150SS	●	150	HOSE-1/8-150	–	–	–	–	AD-G1/8	2	WA-M10	2
CS-1/8-200SS	●	200	HOSE-1/8-200	–	–	–	–	AD-G1/8	2	WA-M10	2
CS-1/8-250SS	●	250	HOSE-1/8-250	–	–	–	–	AD-G1/8	2	WA-M10	2
CS-1/8-300SS	●	300	HOSE-1/8-300	–	–	–	–	AD-G1/8	2	WA-M10	2
ELBOW STRAIGHT											
CS-1/8-150BS	●	150	HOSE-1/8-150	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3
CS-1/8-200BS	●	200	HOSE-1/8-200	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3
CS-1/8-250BS	●	250	HOSE-1/8-250	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3
CS-1/8-300BS	●	300	HOSE-1/8-300	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3
ELBOW											
CS-1/8-150BB	●	150	HOSE-1/8-150	AD-BM10	2	BB-G1/8	2	–	–	WA-M10	4
CS-1/8-200BB	●	200	HOSE-1/8-200	AD-BM10	2	BB-G1/8	2	–	–	WA-M10	4
CS-1/8-250BB	●	250	HOSE-1/8-250	AD-BM10	2	BB-G1/8	2	–	–	WA-M10	4
CS-1/8-300BB	●	300	HOSE-1/8-300	AD-BM10	2	BB-G1/8	2	–	–	WA-M10	4

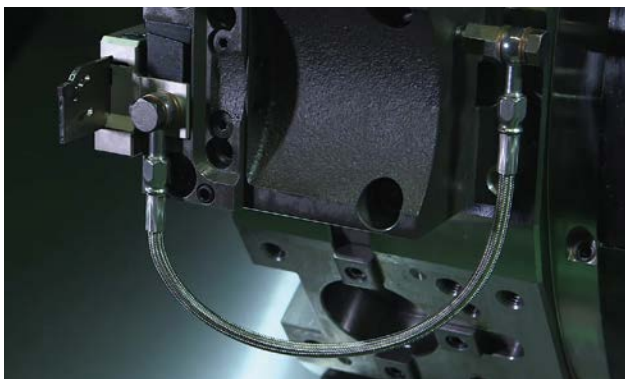
1. Connection screw size = G1/8"

91 Vc

MOUNTING EXAMPLE



Straight type

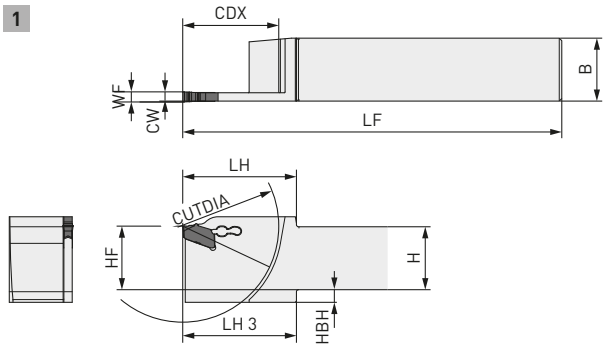


Elbow type

GW MONOBLOCK HOLDER

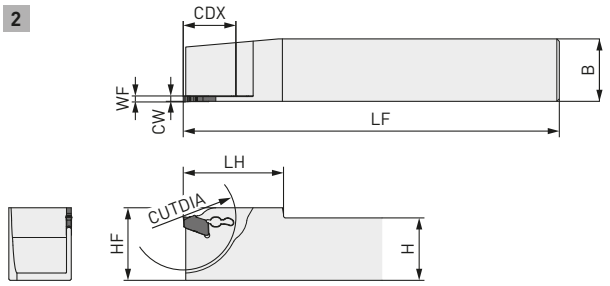
EXTERNAL FOR SWISS STYLE LATHES

1



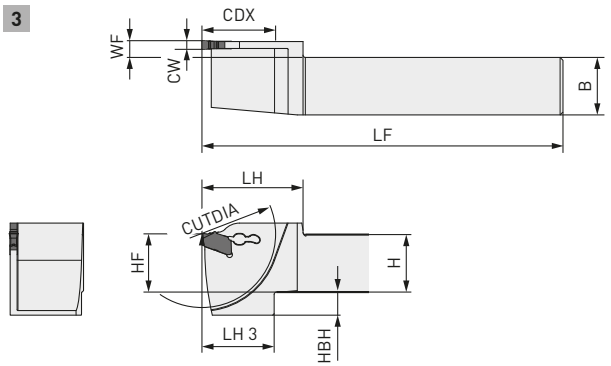
Right hand tool holder shown.

2



Right hand tool holder shown.

3



Left hand tool holder shown.

SPARE PARTS

Wrench
GWY39L

Order number	Stock	Seat size	CW	CDX	CUTDIA	Hand	H	B	LF	LH	LH3	HF	WF	HBH	Type
GWSR1616JX00-D38	●	D	2.00	19	38	R	16	16	120	30	30	16	0.3	6	1
GWSL1616JX00-D38	●					L	16	16	120	30	30	16	0.3	6	1
GWSR1915K00-D38	★					R	19.05	15.875	125	35	35	19.05	0.3	3	1
GWSL1915K00-D38	★					L	19.05	15.875	125	35	35	19.05	0.3	3	1
GWSR2020K00-D42	●			21	42	R	20	20	125	35	25	20	0.3	4	1
GWSL2020K00-D42	●					L	20	20	125	35	25	20	0.3	4	1
GWSR2012K00-D42	●					R	20	12	125	35	25	20	0.3	4	1
GWSL2012K00-D42	★					L	20	12	125	35	25	20	0.3	4	1
GWSR2525M00-D42	●					R	25	25	150	40	—	25	0.3	—	2
GWSL2525M00-D42	●					L	25	25	150	40	—	25	0.3	—	2
GWSR1915K00-E38	★	E	2.39	19	38	R	19.05	15.875	125	35	35	19.05	0.2	3	1
GWSL1915K00-E38	★					L	19.05	15.875	125	35	35	19.05	0.2	3	1
GWSR2020K00-E42	●			21	42	R	20	20	125	35	25	20	0.2	4	1
GWSL2020K00-E42	●					L	20	20	125	35	25	20	0.2	4	1
GWSL2020K00-E42-M	★					L	20	20	125	35	25	20	5.7	8	3
GWSR2012K00-E42	●					R	20	12	125	35	25	20	0.2	4	1
GWSL2012K00-E42	★					L	20	12	125	35	25	20	0.2	4	1
GWSR2525M00-E42	●					R	25	25	150	40	—	25	0.2	—	2
GWSL2525M00-E42	●					L	25	25	150	40	—	25	0.2	—	2

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

EXTERNAL FOR SWISS TYPE LATHES

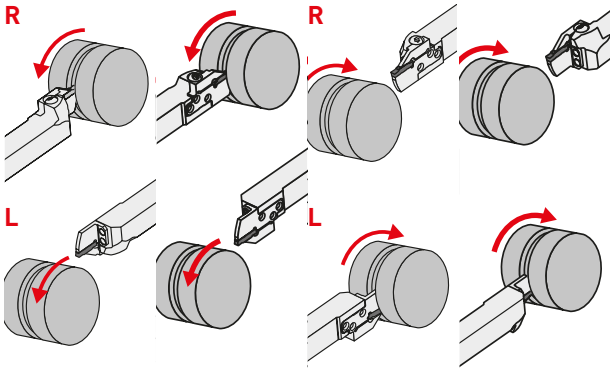
Order number	Stock	Seat size	CW	CDX	CUTDIA	Hand	H	B	LF	LH	LH3	HF	WF	HBH	Type
GWSR1915K00-F38	★	F	3.00	19	38	R	19.05	15.875	125	35	35	19.05	0.3	3	1
GWSL1915K00-F38	★					L	19.05	15.875	125	35	35	19.05	0.3	3	1
GWSR2012K00-F42	●			21	42	R	20	12	125	35	25	20	0.3	4	1
GWSL2012K00-F42	★					L	20	12	125	35	25	20	0.3	4	1
GWSR2020K00-F42	●					R	20	20	125	35	25	20	0.3	4	1
GWSL2020K00-F42	●					L	20	20	125	35	25	20	0.3	4	1
GWSL2020K00-F42-M	★					L	20	20	125	35	25	20	5.8	8	3
GWSR2020K00-F51	●			25.5	51	R	20	20	125	35	25	20	0.3	8	1
GWSL2020K00-F51	●					L	20	20	125	35	25	20	0.3	8	1
GWSL2020K00-F51-M	★					L	20	20	125	35	25	20	5.8	8	3
GWSR2525M00-F51	●					R	25	25	150	40	40	25	0.3	3	1
GWSL2525M00-F51	●					L	25	25	150	40	40	25	0.3	3	1
GWSR2020M00-F65	●			32.5	65	R	20	20	150	40	33	20	0.3	10	1
GWSL2020M00-F65	●					L	20	20	150	40	33	20	0.3	10	1
GWSR2525M00-F76	★			38	76	R	25	25	150	45	45	25	0.3	5	1
GWSL2525M00-F76	★					L	25	25	150	45	45	25	0.3	5	1
GWSR2525M00-G76	★	G	4.00	38	76	R	25	25	150	45	45	25	0.4	5	1
GWSL2525M00-G76	★					L	25	25	150	45	45	25	0.4	5	1

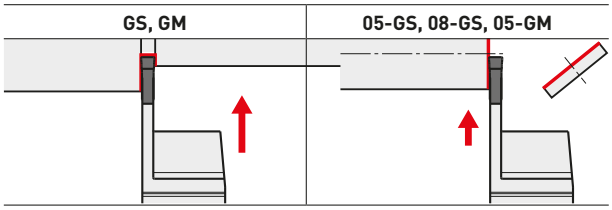
91 Vc

CUTTING MODE

Clockwise

Anticlockwise





A WIDE SELECTION OF INSERTS

Seat size	Inserts
D	GW1M0200D
E	GW1M0239E
F	GW1M0300F
G	GW1M0400G

FOR GROOVING/CUTTING OFF BREAKER

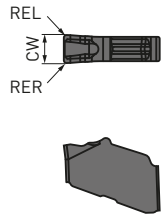
Seat size	CW	GS Low feeds	GM Medium feeds	05-GS Low feeds	08-GS Low feeds	05-GM Cutting off
		neutral	neutral	with hand	with hand	with hand
D	2.00	●	●	●	●	●
E	2.39	●	●	●	●	●
F	3.00	●	●	●	●	●
G	4.00	●	●			●

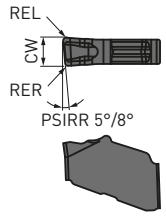
●: Standard insert with dimensions

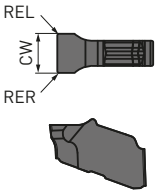
INSERTS

P M K S

Order number	RT9010	RT9020	MY5015	VP10RT	VP20RT	VP30RT	CW Width of cutting edge	CW Tolerance	REL	RER	PSIRR	Geometry
GROOVING / CUTTING OFF												
GW1M0200D020N-GS				●	●	●	2.00	±0.03	0.2	0.2	–	
GW1M0239E020N-GS				●	●	●	2.39	±0.03	0.2	0.2	–	
GW1M0300F020N-GS				●	●	●	3.00	±0.03	0.2	0.2	–	
GW1M0400G020N-GS				●	●	●	4.00	±0.04	0.2	0.2	–	
GW1M0500H030N-GS				●	●	●	5.00	±0.04	0.3	0.3	–	
GW1M0200D020N-GM			●	●	●	●	2.00	±0.03	0.2	0.2	–	
GW1M0239E020N-GM			●	●	●	●	2.39	±0.03	0.2	0.2	–	
GW1M0300F030N-GM			●	●	●	●	3.00	±0.03	0.3	0.3	–	
GW1M0400G030N-GM			●	●	●	●	4.00	±0.04	0.3	0.3	–	
GW1M0500H040N-GM			●	●	●	●	5.00	±0.04	0.4	0.4	–	
CUTTING OFF												
GW1M0200D020R05-GS				★	★	★	2.00	±0.03	0.2	0.2	5	
GW1M0239E020R05-GS				●	●	★	2.39	±0.03	0.2	0.2	5	
GW1M0300F020R05-GS				★	★	★	3.00	±0.03	0.2	0.2	5	
GW1M0200D003R08-GS				★	★	★	2.00	±0.03	0.03	0.03	8	
GW1M0239E003R08-GS				★	★	★	2.39	±0.03	0.03	0.03	8	
GW1M0300F003R08-GS				★	★	★	3.00	±0.03	0.03	0.03	8	
GW1M0200D020R05-GM				●	●	●	2.00	±0.03	0.2	0.2	5	
GW1M0200D020L05-GM				●	●	●	2.00	±0.03	0.2	0.2	5	
GW1M0239E020R05-GM				●	●	★	2.39	±0.03	0.2	0.2	5	
GW1M0239E020L05-GM				●	●	★	2.39	±0.03	0.2	0.2	5	
GW1M0300F030R05-GM				●	●	●	3.00	±0.03	0.3	0.3	5	
GW1M0300F030L05-GM				●	●	●	3.00	±0.03	0.3	0.3	5	
GW1M0400G030R05-GM				●	●	●	4.00	±0.04	0.3	0.3	5	
GW1M0400G030L05-GM				●	●	●	4.00	±0.04	0.3	0.3	5	
GW1M0500H040R05-GM				●	●	●	5.00	±0.04	0.4	0.4	5	
GW1M0500H040L05-GM				●	●	●	5.00	±0.04	0.4	0.4	5	
RAW BLANK												
GW1B0320D020N	★	★					3.24	±0.10	0.2	0.2	–	
GW1B0440F020N	★	★					4.44	±0.10	0.2	0.2	–	
GW1B0540G020N	★	★					5.44	±0.10	0.2	0.2	–	
GW1B0640H020N	★	★					6.44	±0.10	0.2	0.2	–	







Right hand insert shown.

(10 inserts in one case)

1. Blank inserts to be ground by customer.

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

GW

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Properties	Grade	Vc
P	Mild steel	<160HB	VP20RT/RT9020	100 – 240
			VP10RT/RT9010	110 – 250
	Carbon steel Alloy steel	160 – 280HB	VP20RT/RT9020	80 – 200
			VP10RT/RT9010	90 – 210
			VP30RT	60 – 180
			MY5015	110 – 250
		>280HB	VP20RT/RT9020	60 – 160
			VP10RT/RT9010	70 – 170
			VP30RT	40 – 140
			MY5015	90 – 210
M	Stainless steel	<270HB	VP20RT/RT9020	60 – 180
			VP10RT/RT9010	70 – 190
			VP30RT	40 – 160
K	Gray cast iron	Tensile strength <300MPa	VP20RT/RT9020	80 – 200
			VP10RT/RT9010	90 – 210
			MY5015	140 – 300
	Ductile cast iron	Tensile strength <800MPa	VP20RT/RT9020	60 – 160
			VP10RT/RT9010	70 – 170
			MY5015	90 – 210
S	Heat resistant alloy Titanium alloy	—	VP20RT/RT9020	30 – 60
			VP10RT/RT9010	40 – 70

1. VP20RT is the first recommended grade for general materials.
2. For VP10RT, VP20RT, VP30RT and MY5015, wet cutting is recommended.

FEED PER REVOLUTION

	f			
	Seat size D	Seat size F	Seat size G	Seat size H
GM Breaker	0.09 – 0.16 (0.05 – 0.20)	0.13 – 0.22 (0.07 – 0.26)	0.15 – 0.27 (0.08 – 0.32)	0.17 – 0.30 (0.10 – 0.35)
GS Breaker	0.06 – 0.12 (0.03 – 0.15)	0.09 – 0.16 (0.05 – 0.20)	0.11 – 0.18 (0.06 – 0.22)	0.13 – 0.22 (0.08 – 0.25)

FEED PER REVOLUTION

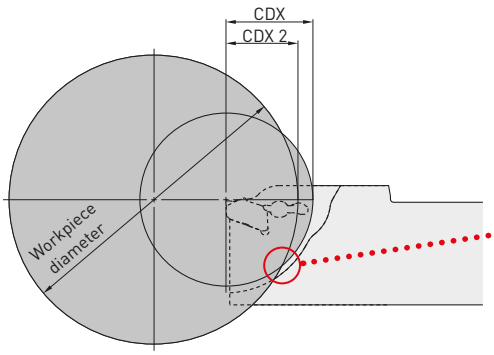
Chipbreaker	PSIPR	Hand	f			
			Seat size D	Seat size E	Seat size F	Seat size G
R05-GS	5°	R	0.03 – 0.10	0.03 – 0.12	0.03 – 0.14	—
R08-GS	8°	R	0.03 – 0.08	0.03 – 0.09	0.03 – 0.10	—
R05-GM	5°	R/L	0.05 – 0.15	0.06 – 0.17	0.07 – 0.20	0.08 – 0.23

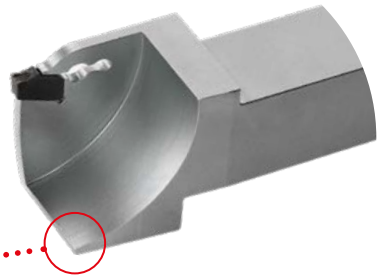
LIMITATION OF THE MAXIMUM GROOVE DEPTH

FOR EXTERNAL GROOVING

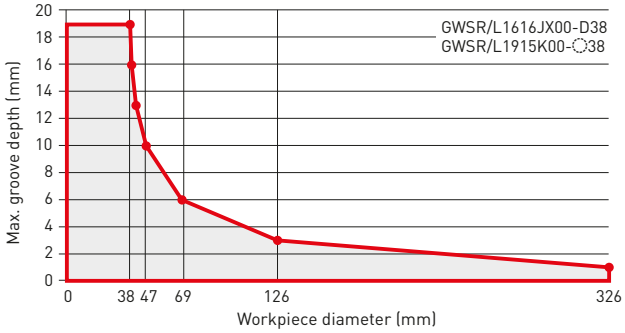
- For mono block type holders for Swiss type lathes, the maximum groove depth is limited by the workpiece diameter.

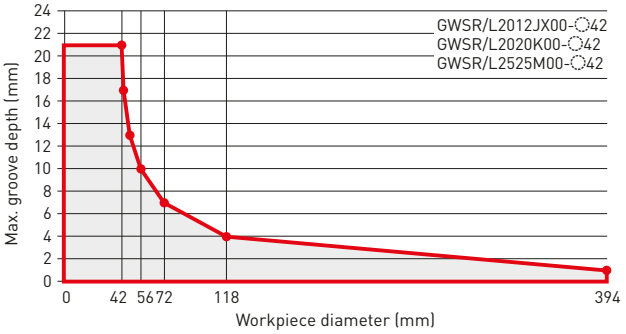
Max. groove depth

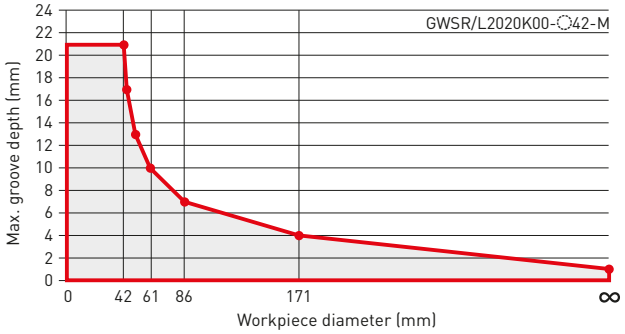


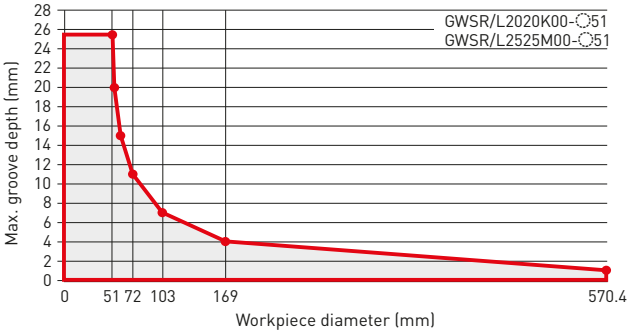


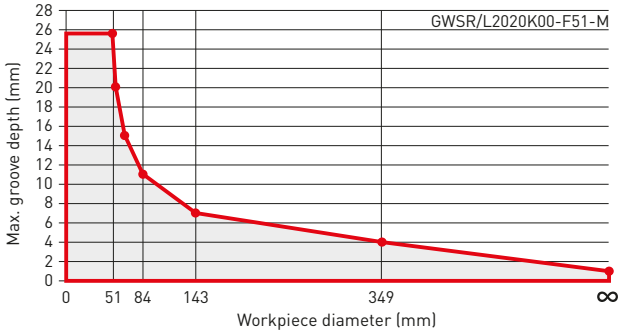
Due to the interference on this part, the maximum groove depth is limited by the workpiece diameter.

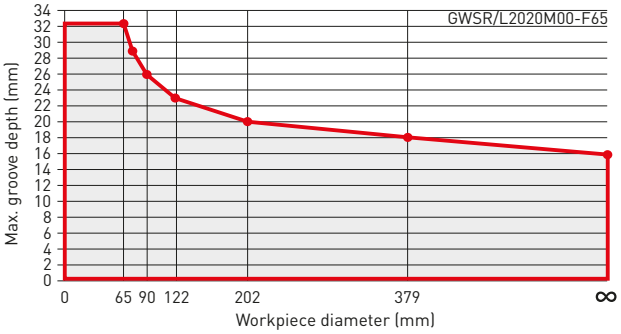


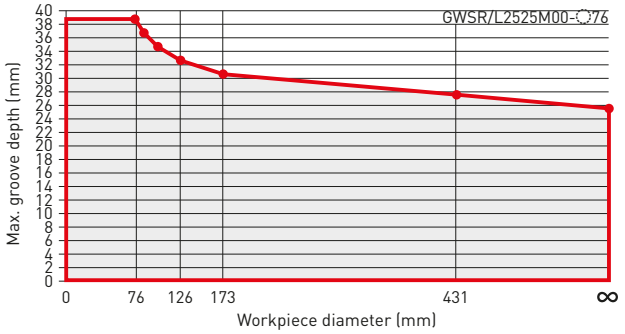










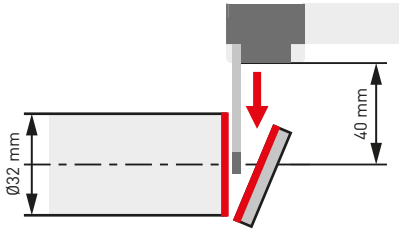


CUTTING PERFORMANCE

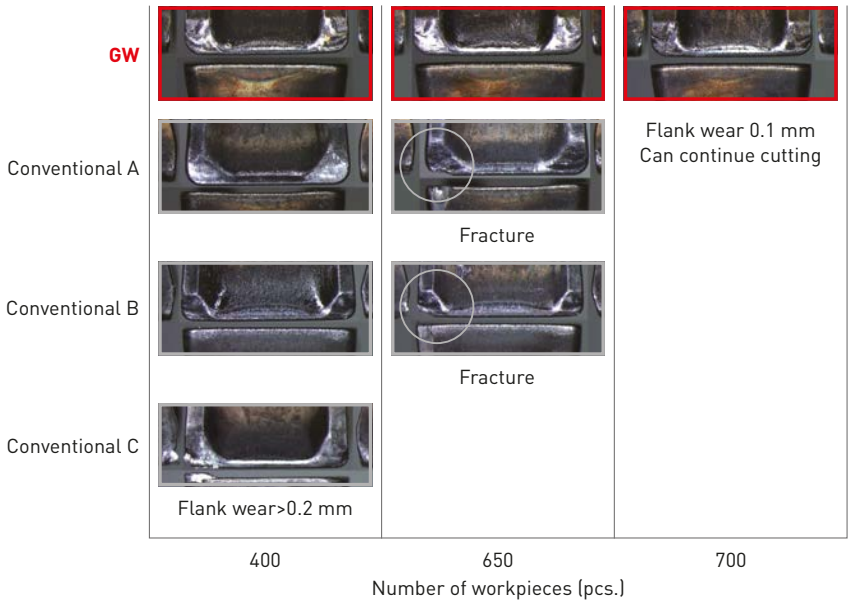
ALLOY STEEL (DIN 41CRMO4) CUTTING OFF

No abnormal cutting edge damage, possible to extend tool life.

Material	DIN 41CrMo4
Insert	GW1M0300F030N-GM (MY5015)
CW (mm)	3
Vc (m/min)	170
f (mm/rev)	0.15 (smaller than Ø10 mm = 0.03)
Overhang (mm)	40
Coolant	Internal coolant 1 MPa

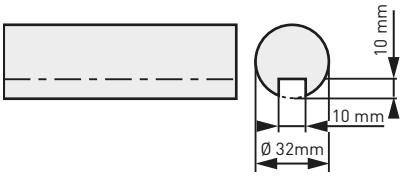


Tool life criteria: Flank wear up to 0.2 mm or fracturing.

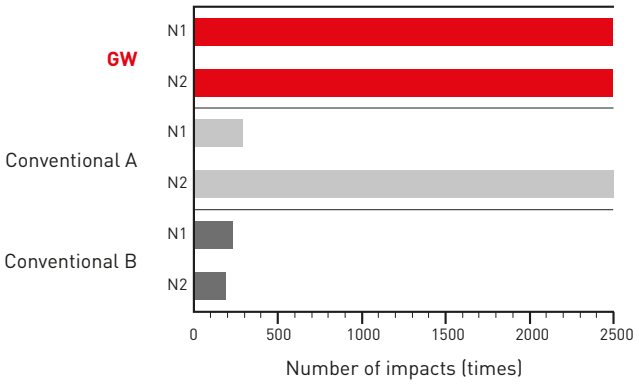


ALLOY STEEL (DIN 41CRMO4) INTERRUPTED CUTTING OFF

Material	DIN 41CrMo4
Insert	GW1M0300F030N-GM (VP30RT)
CW (mm)	3
Vc (m/min)	120
f (mm/rev)	0.20 (smaller than Ø10 mm = 0.03)
Overhang (mm)	30
Coolant	Internal coolant 1 MPa



Tool life criteria: Fracture or breakage.



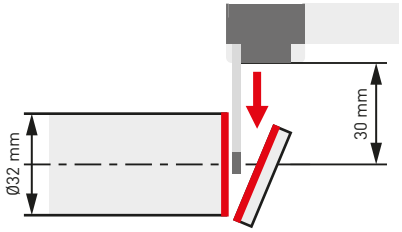
■ : Mitsubishi Materials tool ■ : Conventional tool

CUTTING PERFORMANCE

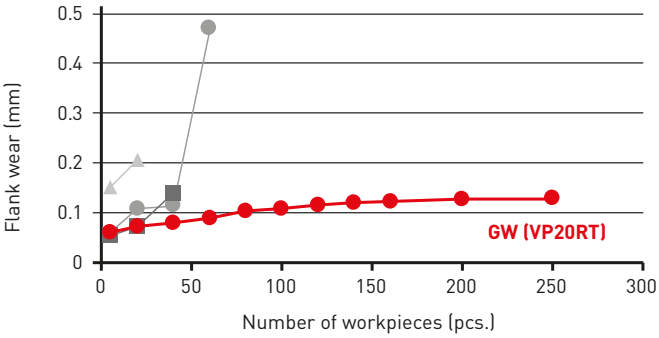
STAINLESS STEEL (DIN X5CRNI189) CUTTING OFF

No abnormal cutting edge damage, 4 times longer tool life.

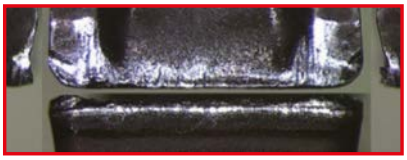
Material	DIN X5CrNi189
Insert	GW1M0300F030N-GM (VP20RT)
CW (mm)	3
Vc (m/min)	180
f (mm/rev)	0.15 (smaller than Ø10 mm = 0.03)
Overhang (mm)	30
Coolant	Internal coolant 1 MPa



Tool life criteria: Flank wear up to 0.2 mm or fracture.



GW

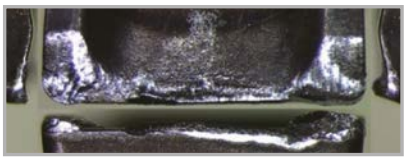


250 pcs.: Normal wear

Conventional A

60 pcs.: Fracture

Conventional B

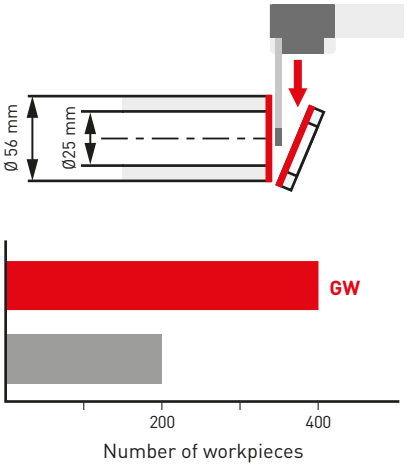


40 pcs.: Fracture

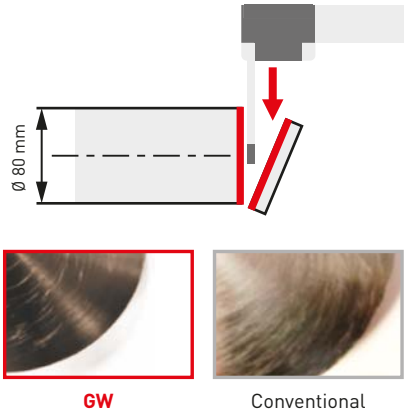
■ : Mitsubishi Materials tool ■ : Conventional tool

APPLICATION EXAMPLES

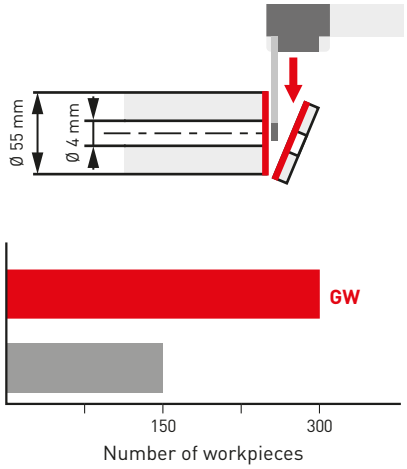
Insert	GW1M0300F030N-GM(VP20RT)
Workpiece	Stainless steel
Component	Machine parts
Vc (m/min)	160
f (mm/rev)	0.1
Cutting method	Cutting off
Coolant	Internal coolant (2 MPa)
Results	Double tool life compared to conventional products. Plus improved tool handling.



Insert	GW1M0300F030N-GM(VP20RT)
Workpiece	Carbon tool steel (AISI W5)
Component	Machine parts
Vc (m/min)	180
f (mm/rev)	0.13
Cutting method	Cutting off
Coolant	Internal coolant (0.5MPa)
Results	A good surface finish was obtained due to the smooth chip evacuation.



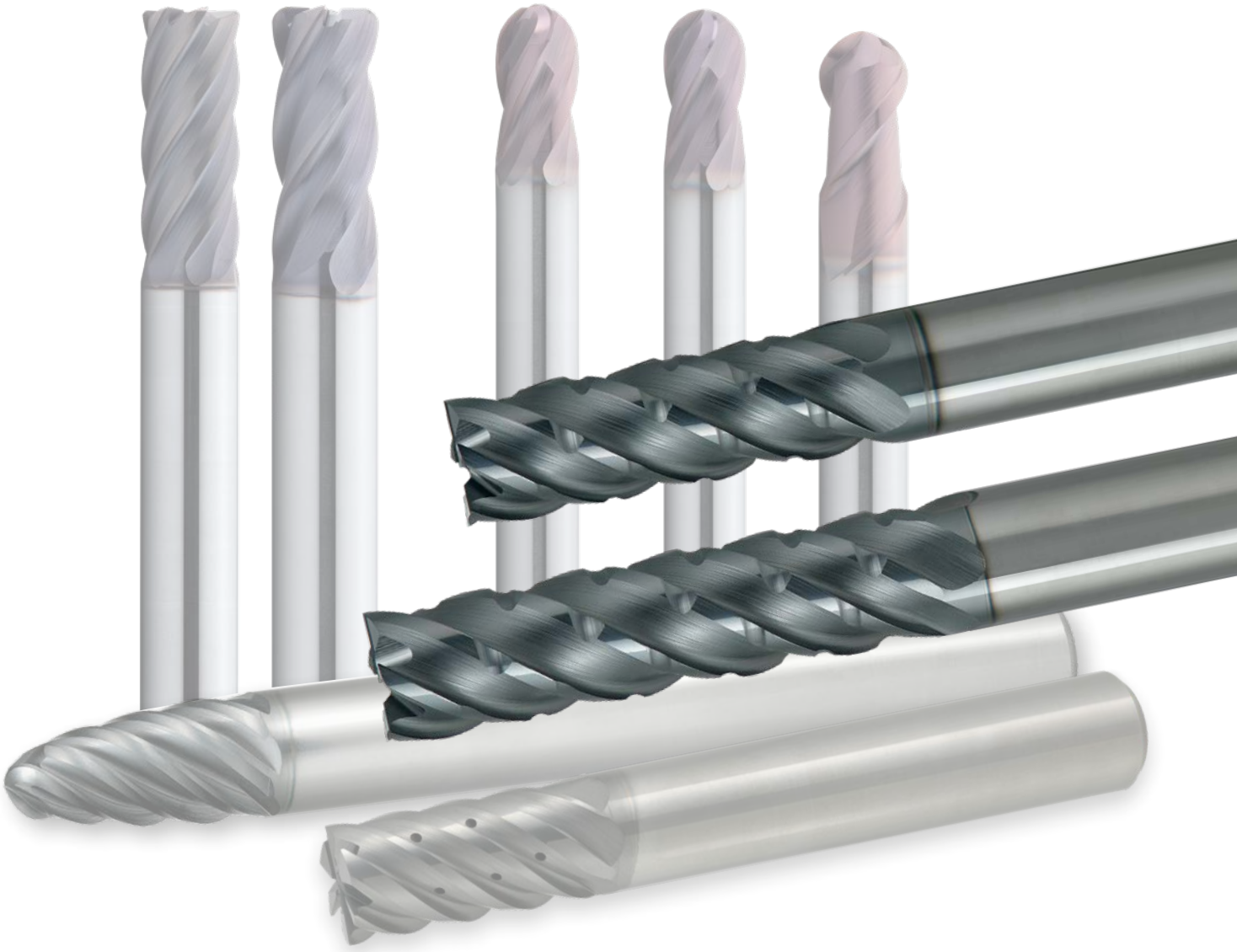
Insert	GW1M0300F030N-GM(VP20RT)
Workpiece	Stainless steel (DIN X46Cr13)
Component	Machine parts
Vc (m/min)	110
f (mm/rev)	0.04
Cutting method	Cutting off
Coolant	Internal coolant
Results	Compared to conventional products, double the number of workpieces were machined.



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

VQ

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



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DIA EDGE

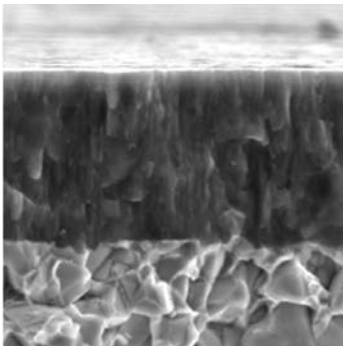
VQ

REVOLUTIONARY PERFORMANCE FOR DIFFICULT-TO-CUT MATERIALS

INNOVATIVE TECHNOLOGY

VQ end mills have been treated with a newly developed (Al, Cr)N group coating that delivers substantially better wear resistance. The surface of the coating has been given a smoothening treatment resulting in better machined surfaces, reduced cutting resistance and improved chip discharge. This is the next generation of coated end mills that deliver long tool life when machining stainless steels and other difficult-to-cut materials.

VQ coating

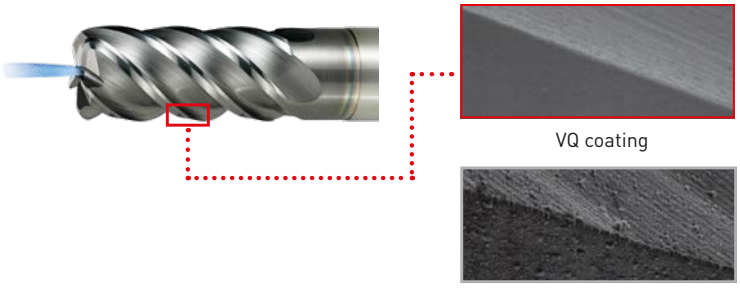


- Smoothened "ZERO-μ Surface".
- Newly developed (Al, Cr)N PVD coating.
- Super-fine-particle, super-hard base material.

Conventional coating

ZERO-μ SURFACE

With the unique ZERO-μ Surface, the cutting edge retains its sharpness. While previous technologies often resulted in diminshed sharpness, the ZERO-μ Surface achieves both smoothness and sharpness, as well as longer tool life.

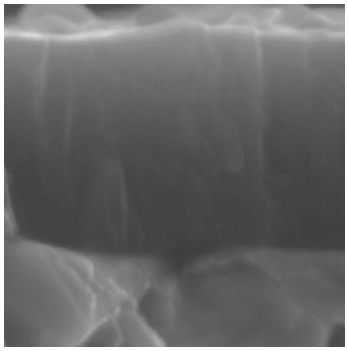


VQ coating

Conventional coating

(AL, Ti, Si) BASED COATING

The (Al, Ti, Si) based coatings maintain their film hardness and heat resistant properties under the harshest of conditions making it highly suitable for applying to end mills for machining Ni-based super alloys.



- New (Al, Ti, Si) based coating
- High quality grade focusing on wear resistance

VQN coating

NEW

VQJCS / VQLCS

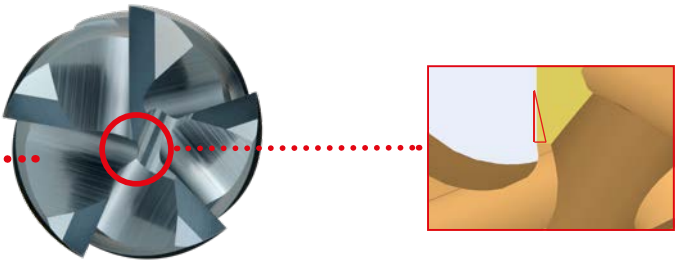
NEW END MILL WITH IRREGULAR PITCH FLUTES AND CHIPBREAKER GEOMETRY

VQLCS (4XDC)

VQJCS (3XDC)

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

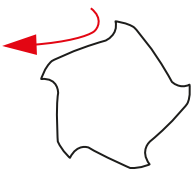
Due to its excellent vibration damping properties, chatter and vibration are suppressed making stable machining possible.

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

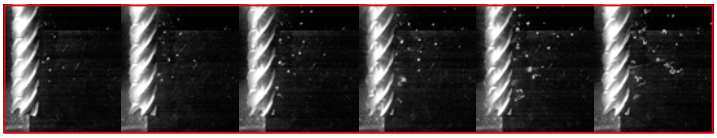
NEW

VQJCS / VQLCS

CHIPBREAKER FUNCTION: HIGH-SPEED CAMERA COMPARISON

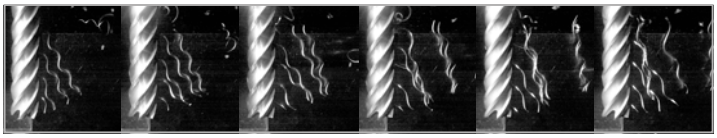
The excellent chip breaking properties reduces chip clogging and removes chips efficiently while also reducing chips collecting together on the machine.

VQLCS



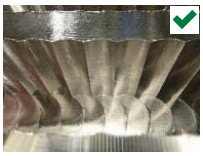
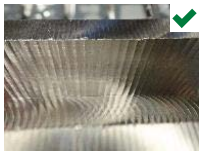
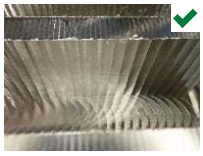
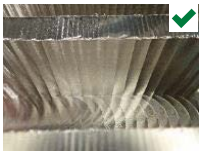
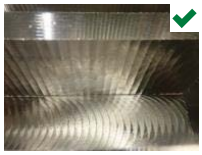
After Machining with VQLCS

Without breaker



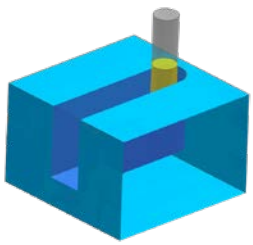
After Machining with conventional

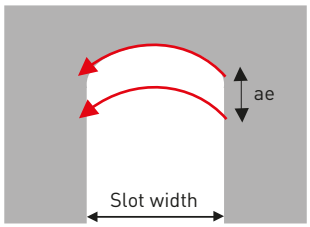
EVALUATION OF TROCHOIDAL MILLING

	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	DC = Ø 12 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 External coolant (Emulsion)





VQN4/6MVRB

SMART MIRACLE END MILL SERIES FOR DIFFICULT-TO-CUT MATERIALS

Featuring the new (Al, Ti, Si)N based coating that has excellent wear resistance. Additionally, the optimum number of irregular helix flutes greatly dampens vibration to enable stable, efficient machining.

VQN6MVRB VQN4MVRB

CORNER R-GEOMETRY WITH IMPROVED FRACTURE RESISTANCE

The negative shape of the rake angle for the corner radius cutting edge allows the smooth flow of chips, there by improving chip resistance.

OPTIMISED NUMBER OF FLUTES

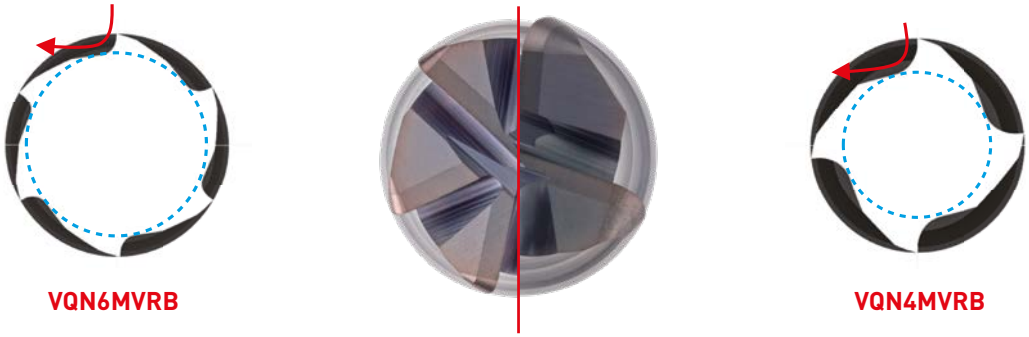
The number of flutes has been optimised in relation to the outer diameter to achieve excellent chip evacuation and increased tool rigidity.

IRREGULAR HELIX FLUTES

Helix angles vary from flute to flute by up to 4° to prevent vibration.

SPECIAL FLUTE SHAPE

The flute shape is specially designed for machining super heat resistant alloys by utilising the excellent chip evacuation and wear resistance properties.



VQN6MVRB VQN4MVRB

VQN4/6MVRB

Conventional

Defection due to high load

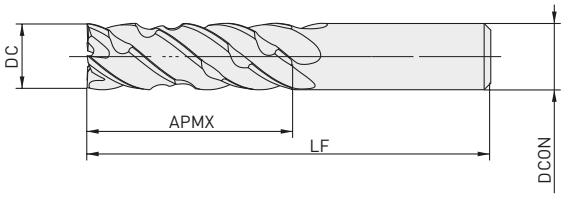
Defection due to lack of strength

NEW

VQJCS

END MILL, SEMI LONG CUT LENGTH (3XDC), 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



DC≤12	DC>12		
0 -0.030	0 -0.040		
DCON=6	8≤DCON≤10	12≤DCON≤16	DCON=20
0 -0.008	0 -0.009	0 -0.011	0 -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	DCON	ZEFP
VQJCSD0600	●	6	18	70	6	5
VQJCSD0800	●	8	24	80	8	
VQJCSD1000	●	10	30	90	10	
VQJCSD1200	●	12	36	100	12	
VQJCSD1600	●	16	48	110	16	
VQJCSD2000	●	20	60	125	20	

* If a flat is required on the tool for side clamping, please contact our Technical Department.

102 Vc

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

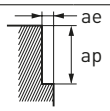
NEW

VQJCS

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, Carbon steel, Alloy 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	Austenitic, Ferritic and Martensitic stainless steels,	6	120	6400	1000	18	0.45	0.006	0.012
		8	120	4800	1000	24	0.6	0.008	0.016
		10	120	3800	900	30	0.75	0.010	0.019
S	Titanium alloys	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 steels, Cobaly chromium alloy	6	100	5300	800	18	0.45	0.006	0.012
		8	100	4000	800	24	0.6	0.008	0.016
		10	100	3200	800	30	0.75	0.01	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 alloys	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	0.3	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	0.6	0.004	0.007



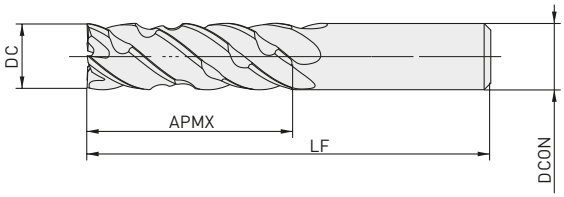
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration 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 stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

NEW

VQLCS

END MILL, LONG CUT LENGTH (4XDC), 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



DC≤12
0 -0.030

DCON=6	8≤DCON≤10	DCON=12
0 -0.008	0 -0.009	0 -0.011

- 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	DCON	ZEFP
VQLCSD0600	●	6	24	70	6	5
VQLCSD0800	●	8	32	90	8	
VQLCSD1000	●	10	40	100	10	
VQLCSD1200	●	12	48	110	12	

* If a flat is required on the tool for side clamping, please contact our Technical Department.

104 Vc

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

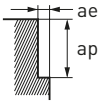
NEW

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	18	0.6	0.008	0.015
		8	180	7200	1600	24	0.8	0.010	0.020
		10	180	5700	1500	30	1.0	0.012	0.023
		12	180	4800	1500	36	1.2	0.015	0.028
	Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	6	160	8500	1200	18	0.6	0.007	0.013
		8	160	6400	1300	24	0.8	0.009	0.018
		10	160	5100	1200	30	1.0	0.011	0.022
		12	160	4200	1200	36	1.2	0.013	0.025
M	Austenitic, Ferritic and Martensitic stainless steels,	6	100	5300	800	18	0.3	0.005	0.010
		8	100	4000	800	24	0.4	0.006	0.013
S	Titanium alloys	10	100	3200	700	30	0.5	0.008	0.015
		12	100	2700	700	36	0.6	0.008	0.017
M	Hardened stainless steels, Cobaly chromium alloy	6	90	4800	700	18	0.3	0.005	0.010
		8	90	3600	700	24	0.4	0.006	0.013
		10	90	2900	700	30	0.5	0.008	0.015
		12	90	2400	600	36	0.6	0.008	0.016
N	Copper, Copper alloy	6	200	10600	1800	18	0.6	0.008	0.015
		8	200	8000	1800	24	0.8	0.011	0.020
		10	200	6400	1600	30	1.0	0.012	0.022
		12	200	5300	1600	36	1.2	0.014	0.027
S	Heat resistant alloys	6	30	1600	100	18	0.12	0.002	0.003
		8	30	1200	100	24	0.16	0.002	0.004
		10	30	1000	100	30	0.2	0.003	0.005
		12	30	800	100	36	0.24	0.003	0.005



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.

VQN4 / 6MVRB

VQN4

VQN6

VQN4

VQN6

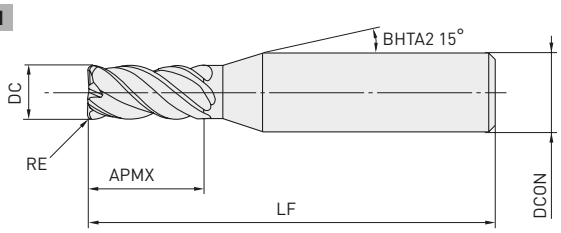
CORNER RADIUS, MEDIUM CUT LENGTH, 4 / 6 FLUTE

S

VQN4MVRB

VQN6MVRB

1



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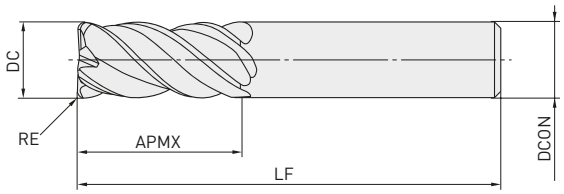
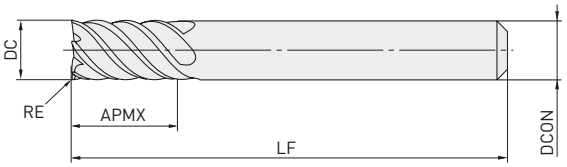


3



VQN4	VQN6
±0.015	±0.02

DC≤12
0 - 0.02

DCON = 6	DCON = 8, 12	DCON = 12
0 -0.008	0 - 0.009	0 - 0.012

- (Al, Ti, Si) N-based coating exhibits excellent wear and chipping resistance when machining heat resistant super alloys.
- Optimised number of flutes for efficient and stable machining.

Order number	Stock	DC	RE	APMX	LF	DCON	ZEFP	Type
VQN4MVRBD0300R030	●	3	0.3	7	45	6	4	1
VQN4MVRBD0300R050	●	3	0.5	7	45	6	4	1
VQN4MVRBD0400R030	●	4	0.3	10	45	6	4	1
VQN4MVRBD0400R050	●	4	0.5	10	45	6	4	1
VQN4MVRBD0500R050	●	5	0.5	12	50	6	4	1
VQN4MVRBD0600R050	●	6	0.5	13	50	6	4	2
VQN4MVRBD0600R100	●	6	1	13	50	6	4	2
VQN6MVRBD0800R050	●	8	0.5	19	60	8	6	3
VQN6MVRBD0800R100	●	8	1	19	60	8	6	3
VQN6MVRBD1000R050	●	10	0.5	22	70	10	6	3
VQN6MVRBD1000R100	●	10	1	22	70	10	6	3
VQN6MVRBD1200R050	●	12	0.5	26	75	12	6	3
VQN6MVRBD1200R100	●	12	1	26	75	12	6	3

106 Vc

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

VQN4 / 6MVRB

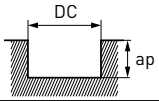
RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	ZEFP	n	Vf	ap	ae
S	Nickel-based heat resistant super alloy	3	4	4200	340	4.5	0.3
		4	4	3200	260	6	0.4
		5	4	2500	300	7.5	0.5
		6	4	2100	250	9	0.6
		8	6	1600	290	12	0.8
		10	6	1300	310	15	1
		12	6	1100	260	18	1.2

SLOT MILLING

	Material	DC	ZEFP	n	Vf	ap
S	Nickel-based heat resistant super alloy	3	4	3200	260	1.5
		4	4	2400	190	2
		5	4	1900	230	2.5
		6	4	1600	190	3
		8	6	1200	140	4
		10	6	1000	120	5
		12	6	800	140	6



1. For machining heat resistant super alloys, the use of water-solble coolant is effective.
2. Chattering can still occur if the machine rigidity and clamping method are insufficient.
   In these cases the feed and speed should be reduced proportionately.
3. If the depth of cut is shallow, the revolution and feed rate can be increased.

iMX

EXCHANGEABLE HEAD END MILLS

Interested in more...

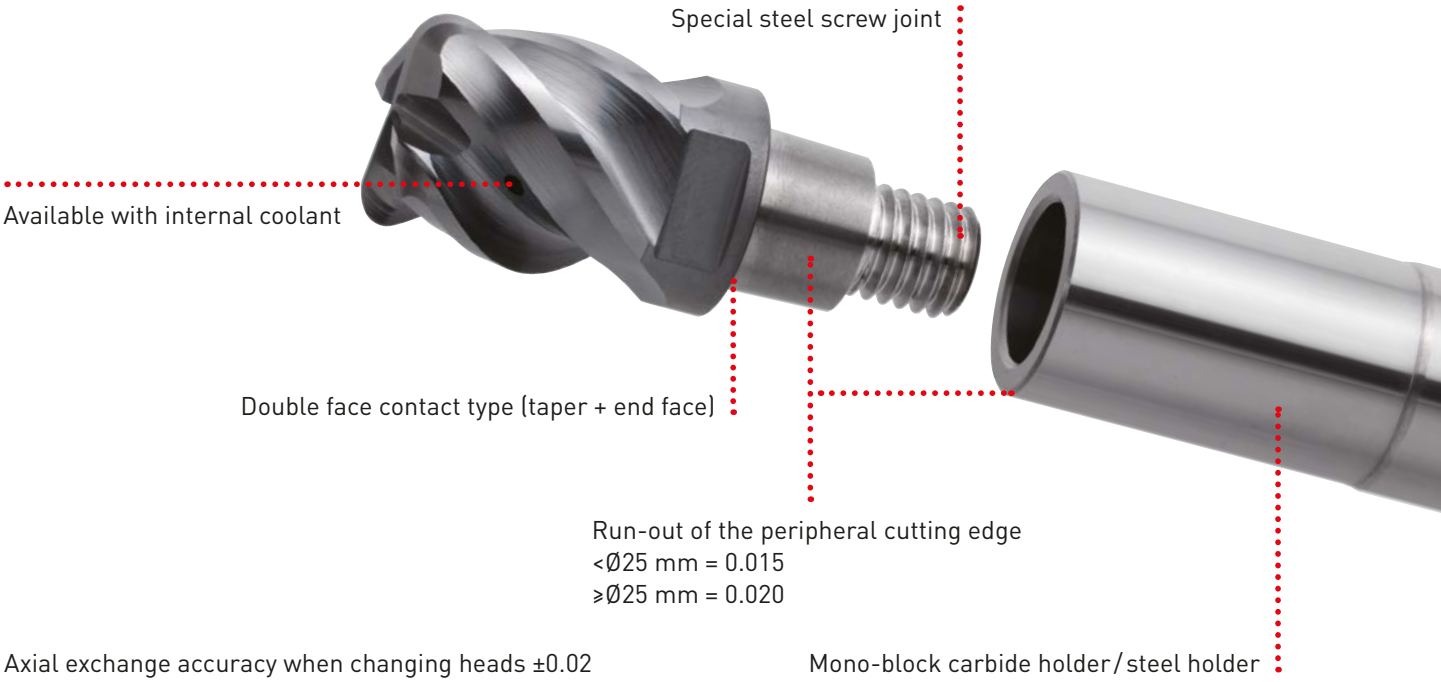
B200

www.mhg-mediastore.net

DIA EDGE

iMX

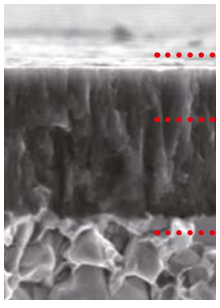
EXCHANGEABLE HEAD END MILLS



FEATURES

The iMX series is a revolutionary end mill system that enables efficiency, high accuracy and rigidity by combining the advantages of both solid carbide and indexable end mills.
Security and rigidity is close to that of a solid carbide end mill because all clamping faces are solid carbide.
Suitable for a variety of applications due to the exchangeable head, therefore excellent for reducing inventory.

HIGHLY VERSATILE GRADES

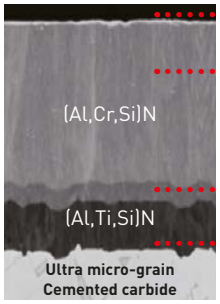


- Smooth "ZERO-μ surface"
- Newly developed (Al, Cr)N group coating
- Super-fine particle, super-hard base material

ET2020 (Uncoated)
Suitable for milling aluminium.

EP7020
Suitable for difficult-to-cut materials.

EP6120
Suitable for high feed milling of steel.



- High lubricity
- High oxidation temperature
- Better wear resistance
- High adhesion

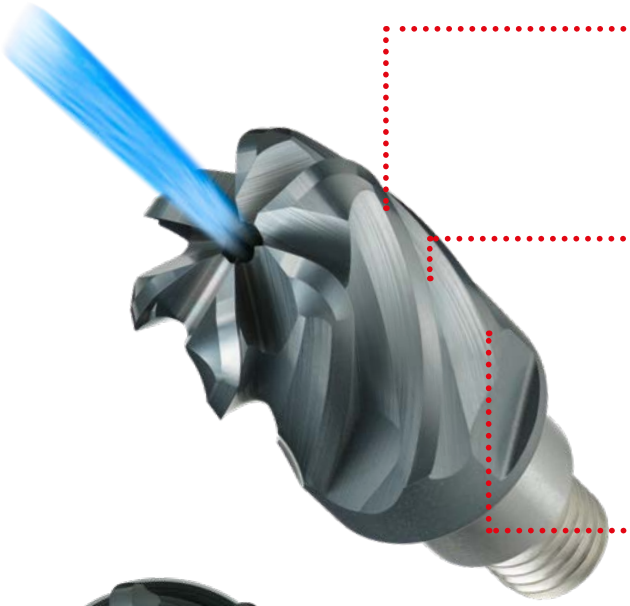
EP8110 / EP8120
The newly developed (Al,Cr,Si)N coating that has a high oxidation temperature and high lubricity. Together with the (Al,Ti,Si)N coating, for better wear resistance and higher adhesion, allows hardened steel machining with longer tool life to be maintained.

NEW

iMX-C6HV-C

High efficiency machining enables process consolidation.

CORNER RADIUS HEAD WITH COOLANT HOLE, 6 FLUTE, IRREGULAR HELIX



IRREGULAR HELIX ANGLE

Irregularity between each flute provides stability due to reduced vibration.

FLUTE GEOMETRY

Good chip evacuation in the corners of pockets by adopting an ideal flute geometry.

Cross section of the flute geometry

SMALL RELIEF

Provides a margin effect whilst maintaining edge sharpness. Also achieves less burr creation and enables vibration damping.

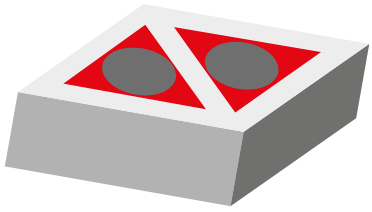
CENTRE COOLANT HOLE

Effective when machining the corner of a pocket when external coolant isn't sufficient.

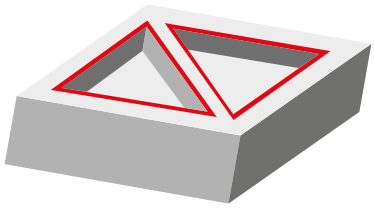
TOOL INTEGRATION ACHIEVED

Multi functionality brings efficiency to the entire machining process.

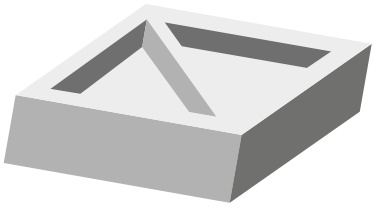
Pocket Milling



Semi-finish Machining



Finish Machining



COMPARISON OF ANTI-VIBRATION WHEN MACHINING CORNERS

Excellent vibration damping that prevents the usual problems even when machining corner radii.

Vc =200 m/min, R15, Photographed after machining

iMX-C6HV-C

Conventional

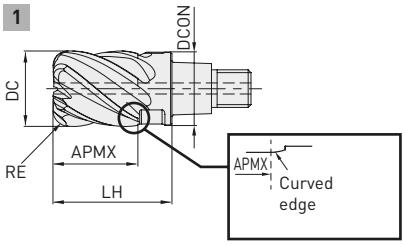
NEW

iMX-C6HV-C

36°
40°

CORNER RADIUS HEAD, 6 FLUTE, IRREGULAR HELIX, WITH COOLANT HOLE

P M S



RE
±0.020

DC<12	12<DC<12	20<DC<25
0 - 0.030	0 - 0.040	0 - 0.050

Order number	EP7020	DC	RE	APMX	LH	DCON	ZEFP	Type
IMX10C6HV100R05010C	●	10	0.5	10	16	9.7	6	1
IMX10C6HV100R10010C	●	10	1	10	16	9.7	6	
IMX12C6HV120R05012C	●	12	0.5	12	19	11.7	6	
IMX12C6HV120R10012C	●	12	1	12	19	11.7	6	
IMX16C6HV160R10016C	●	16	1	16	24	15.5	6	
IMX16C6HV160R30016C	●	16	3	16	24	15.5	6	
IMX20C6HV200R10020C	●	20	1	20	30	19.5	6	
IMX20C6HV200R30020C	●	20	3	20	30	19.5	6	
IMX25C6HV250R10025C	●	25	1	25	37.5	24.5	6	
IMX25C6HV250R30025C	●	25	3	25	37.5	24.5	6	

111 Vc

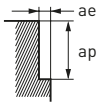
NEW

iMX-C6HV-C

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	fz	Vf	ap	ae
P	Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	10	200	6400	0.07	2700	10	1.0
		12	200	5300	0.085	2700	12	1.2
		16	200	4000	0.088	2100	16	1.6
		20	200	3200	0.1	1900	20	2.0
		25	200	2500	0.1	1500	25	2.5
M	Austenitic and Ferritic stainless steel	10	150	4800	0.07	2000	10	1.0
		12	150	4000	0.085	2000	12	1.2
		16	150	3000	0.088	1600	16	1.6
		20	150	2400	0.1	1400	20	2.0
		25	150	1900	0.1	1100	25	2.5
S	Heat resistant alloy	10	40	1300	0.033	260	10	0.5
		12	40	1100	0.035	230	12	0.6
		16	40	800	0.038	180	16	0.8
		20	40	640	0.04	150	20	1.0
		25	40	510	0.04	120	25	1.3
M	Precipitation hardening stainless steel, Cobalt chromium alloy	10	100	3200	0.07	1300	10	1.0
		12	100	2700	0.085	1400	12	1.2
		16	100	2000	0.088	1100	16	1.6
S	Titanium alloy	20	100	1600	0.1	1000	20	2.0
		25	100	1300	0.1	800	25	2.5



1. For stainless steel, titanium alloy and heat resistant alloy, the use of water-soluble coolant is effective.
2. If the depth of cut is shallow, the revolution and feed rate can be increased.
3. Irregular helix flute end mills have a large effect on controlling vibration when compared to standard end mills.
   However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur.
   In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

VFR

NEXT GENERATION END MILL SERIES
FOR MACHINING HIGH HARDNESS STEELS

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B231

www.mhg-mediastore.net

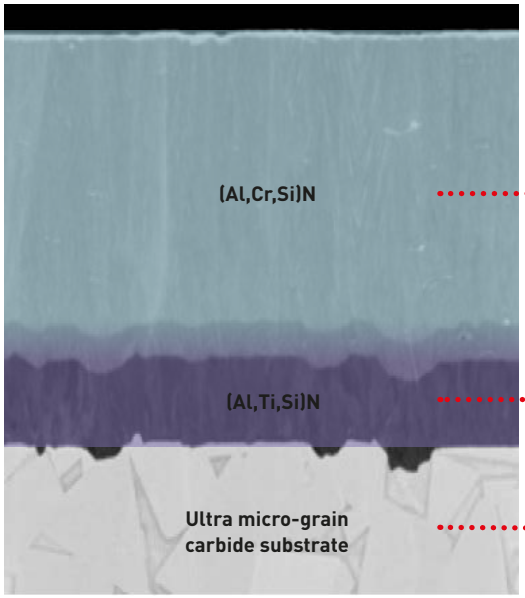
DIA EDGE

VFR

END MILL SERIES
FOR MILLING HIGH HARDNESS STEELS

NEW COATING TECHNOLOGY

Newly developed (Al,Cr,Si)N multi-layer PVD coating offers higher oxidation resistance and better lubricity, together with improved wear resistance and adhesion strength. Ideal for milling extremely hard materials up to 70 HRC.



- Improved oxidation resistance
- Higher lubricity

- Increased wear resistance
- Improved adhesion strength

VFR2XLB

IDEAL FOR FINISHING

Precise machining of vertical walls is possible due to a back taper and a strong, seamless ball nose cutting edge geometry.

BALL NOSE OPTIMISATION

Ideal centre flute geometry for finish machining.

RAKE ANGLE OPTIMISATION

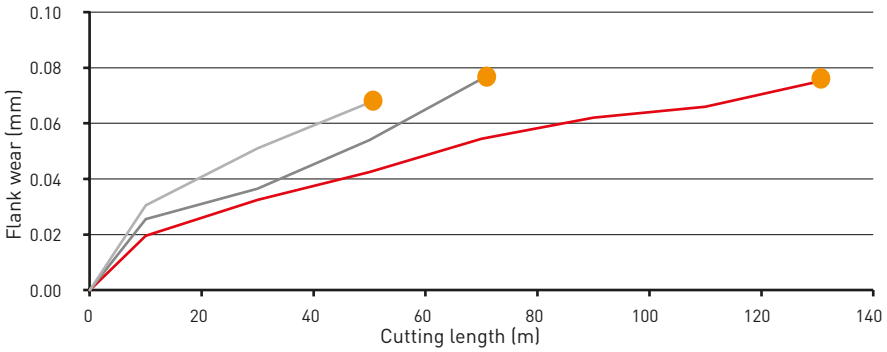
Optimum geometry provides a sharp edge together with good fracture resistance that enables excellent surface finishes.

STRONG BACK TAPER

Reduces chatter and vibration when machining vertical walls.

CUTTING PERFORMANCE

Machining 1.3344 (62HRC) – Comparison of wear resistance.
Greatly improved wear resistance for high-precision machining.



Material	1.3344 (62HRC)
Tool	VFR2XLBR0100N120
n (min^{-1})	1600
f (mm/min)	1600
fz (mm/t.)	0.05
ap (mm)	0.05 x 10
ae (mm)	0.1 x 10
Overhang length (mm)	18
Cutting mode	Air blow
Machine	Vertical MC (HSK-E32)

VFR2XLB Conventional A Conventional B

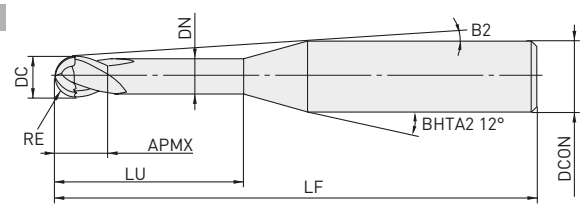
VFR2XLB A B: Conventional tool

VFR2XLB

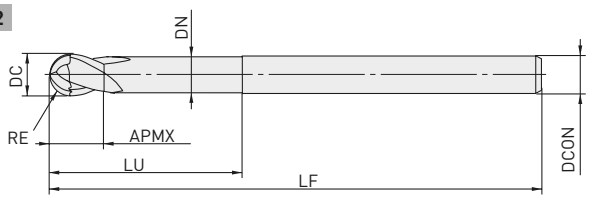
BALL NOSE, 2 FLUTE, LONG NECK

P H

1



2



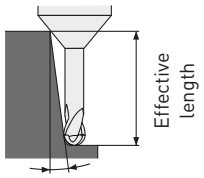
RE ≤ 3

±0.005

h5 4 ≤ DCON ≤ 6

0
- 0.005

Effective length for inclined angle



- Precise machining of vertical walls is possible due to a back taper and a strong, seamless ball nose cutting edge geometry.

Order number	Stock	RE	DC	APMX	LU	DN	LF	DCON	B2	ZEFP	Type	Effective length for inclined angle			
												0.5°	1°	2°	3°
VFR2XLBR0010N005	●	0.1	0.2	0.15	0.5	0.18	50	4	11.5°	2	1	0.5	0.5	0.6	0.7
VFR2XLBR0010N010	●	0.1	0.2	0.15	1	0.18	50	4	10.9°	2	1	1	1.1	1.2	1.3
VFR2XLBR0015N010	●	0.15	0.3	0.24	1	0.28	50	4	10.9°	2	1	1	1.1	1.2	1.3
VFR2XLBR0015N015	●	0.15	0.3	0.24	1.5	0.28	50	4	10.4°	2	1	1.6	1.6	1.8	2
VFR2XLBR0015N020	●	0.15	0.3	0.24	2	0.28	50	4	9.9°	2	1	2.1	2.2	2.4	2.6
VFR2XLBR0020N010	●	0.2	0.4	0.3	1	0.37	50	4	11°	2	1	1	1.1	1.2	1.3
VFR2XLBR0020N015	●	0.2	0.4	0.3	1.5	0.37	50	4	10.4°	2	1	1.5	1.6	1.7	1.9
VFR2XLBR0020N020	●	0.2	0.4	0.3	2	0.37	50	4	9.9°	2	1	2.1	2.2	2.3	2.6
VFR2XLBR0020N025	●	0.2	0.4	0.3	2.5	0.37	50	4	9.5°	2	1	2.6	2.7	2.9	3.3
VFR2XLBR0020N030	●	0.2	0.4	0.3	3	0.37	50	4	9.1°	2	1	3.1	3.2	3.5	3.9
VFR2XLBR0020N040	●	0.2	0.4	0.3	4	0.37	50	4	8.4°	2	1	4.2	4.3	4.7	5.2
VFR2XLBR0025N015	●	0.25	0.5	0.37	1.5	0.47	50	4	10.4°	2	1	1.5	1.6	1.7	1.9
VFR2XLBR0025N020	●	0.25	0.5	0.37	2	0.47	50	4	9.9°	2	1	2.1	2.1	2.3	2.6
VFR2XLBR0025N025	●	0.25	0.5	0.37	2.5	0.47	50	4	9.5°	2	1	2.6	2.7	2.9	3.2
VFR2XLBR0025N030	●	0.25	0.5	0.37	3	0.47	50	4	9.1°	2	1	3.1	3.2	3.5	3.9
VFR2XLBR0025N040	●	0.25	0.5	0.37	4	0.47	50	4	8.3°	2	1	4.1	4.3	4.7	5.2
VFR2XLBR0030N020	●	0.3	0.6	0.45	2	0.57	50	4	9.9°	2	1	2.1	2.2	2.4	2.6
VFR2XLBR0030N020S06	●	0.3	0.6	0.45	2	0.57	50	6	10.6°	2	1	2.1	2.2	2.4	2.6
VFR2XLBR0030N030	●	0.3	0.6	0.45	3	0.57	50	4	9°	2	1	3.1	3.3	3.6	4
VFR2XLBR0030N030S06	●	0.3	0.6	0.45	3	0.57	50	6	9.9°	2	1	3.1	3.3	3.6	4

1. The colour of the coating on the VFR2XLB items is different from other end mills in the VFR series.

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

VFR2XLB

Order number	Stock	RE	DC	APMX	LU	DN	LF	DCON	B2	ZEFP	Type	Effective length for inclined angle			
												0.5°	1°	2°	3°
VFR2XLBR0030N040	●	0.3	0.6	0.45	4	0.57	50	4	8.2°	2	1	4.2	4.4	4.8	5.3
VFR2XLBR0030N050	●	0.3	0.6	0.45	5	0.57	50	4	7.6°	2	1	5.2	5.5	6	6.6
VFR2XLBR0030N060	●	0.3	0.6	0.45	6	0.57	50	4	7.1°	2	1	6.3	6.6	7.2	7.9
VFR2XLBR0040N030	●	0.4	0.8	0.6	3	0.77	50	4	8.9°	2	1	3.1	3.3	3.6	3.9
VFR2XLBR0040N040	●	0.4	0.8	0.6	4	0.77	50	4	8.2°	2	1	4.2	4.4	4.8	5.2
VFR2XLBR0040N060	●	0.4	0.8	0.6	6	0.77	50	4	6.9°	2	1	6.3	6.5	7.2	7.9
VFR2XLBR0040N080	●	0.4	0.8	0.6	8	0.77	50	4	6°	2	1	8.4	8.7	9.5	10.6
VFR2XLBR0050N030	●	0.5	1	0.75	3	0.96	50	4	8.7°	2	1	3.2	3.4	3.7	4.1
VFR2XLBR0050N030S06	●	0.5	1	0.75	3	0.96	50	6	9.8°	2	1	3.2	3.4	3.7	4.1
VFR2XLBR0050N040	●	0.5	1	0.75	4	0.96	50	4	7.9°	2	1	4.3	4.5	4.9	5.4
VFR2XLBR0050N040S06	●	0.5	1	0.75	4	0.96	50	6	9.2°	2	1	4.3	4.5	4.9	5.4
VFR2XLBR0050N060	●	0.5	1	0.75	6	0.96	50	4	6.7°	2	1	6.3	6.5	7.2	7.9
VFR2XLBR0050N060S06	●	0.5	1	0.75	6	0.96	50	6	8.2°	2	1	6.3	6.5	7.2	7.9
VFR2XLBR0050N080	●	0.5	1	0.75	8	0.96	50	4	5.8°	2	1	8.5	8.9	9.7	10.7
VFR2XLBR0050N100	●	0.5	1	0.75	10	0.96	50	4	5.1°	2	1	10.6	11.1	12.1	13.4
VFR2XLBR0050N120	●	0.5	1	0.75	12	0.96	50	4	4.6°	2	1	12.7	13.2	14.5	16
VFR2XLBR0075N060	●	0.75	1.5	1.1	6	1.44	50	4	6.3°	2	1	6.3	6.6	7.2	7.9
VFR2XLBR0075N060S06	●	0.75	1.5	1.1	6	1.44	50	6	8°	2	1	6.3	6.6	7.2	7.9
VFR2XLBR0075N080	●	0.75	1.5	1.1	8	1.44	50	4	5.4°	2	1	8.4	8.8	9.6	10.6
VFR2XLBR0075N080S06	●	0.75	1.5	1.1	8	1.44	50	6	7.2°	2	1	8.4	8.8	9.6	10.6
VFR2XLBR0075N100	●	0.75	1.5	1.1	10	1.44	50	4	4.7°	2	1	10.5	11	12	13.2
VFR2XLBR0075N120	●	0.75	1.5	1.1	12	1.44	50	4	4.2°	2	1	12.6	13.1	14.4	15.9
VFR2XLBR0075N140	●	0.75	1.5	1.1	14	1.44	50	4	3.8°	2	1	14.7	15.3	16.8	18.5
VFR2XLBR0075N160	●	0.75	1.5	1.1	16	1.44	60	4	3.4°	2	1	16.8	17.5	19.2	21.2
VFR2XLBR0100N060	●	1	2	1.5	6	1.94	50	4	5.8°	2	1	6.3	6.6	7.1	7.8
VFR2XLBR0100N060S06	●	1	2	1.5	6	1.94	50	6	7.8°	2	1	6.3	6.6	7.1	7.8
VFR2XLBR0100N080	●	1	2	1.5	8	1.94	50	4	4.8°	2	1	8.4	8.8	9.5	10.5
VFR2XLBR0100N080S06	●	1	2	1.5	8	1.94	50	6	6.9°	2	1	8.4	8.8	9.5	10.5
VFR2XLBR0100N100	●	1	2	1.5	10	1.94	50	4	4.2°	2	1	10.5	10.9	11.9	13.1
VFR2XLBR0100N100S06	●	1	2	1.5	10	1.94	50	6	6.2°	2	1	10.5	10.9	11.9	13.1
VFR2XLBR0100N120	●	1	2	1.5	12	1.94	50	4	3.6°	2	1	12.6	13.1	14.3	15.8
VFR2XLBR0100N120S06	●	1	2	1.5	12	1.94	50	6	5.6°	2	1	12.6	13.1	14.3	15.8
VFR2XLBR0100N160	●	1	2	1.5	16	1.94	60	4	2.9°	2	1	16.8	17.5	19.1	*
VFR2XLBR0100N160S06	●	1	2	1.5	16	1.94	60	6	4.7°	2	1	16.8	17.5	19.1	21.1
VFR2XLBR0100N200	●	1	2	1.5	20	1.94	60	4	2.4°	2	1	20.9	21.8	23.9	*
VFR2XLBR0100N200S06	●	1	2	1.5	20	1.94	60	6	4°	2	1	20.9	21.8	23.9	26.4
VFR2XLBR0125N100	●	1.25	2.5	1.9	10	2.4	60	4	3.5°	2	1	10.4	10.8	11.8	12.9
VFR2XLBR0125N150	●	1.25	2.5	1.9	15	2.4	60	4	2.5°	2	1	15.6	16.3	17.8	*
VFR2XLBR0150N100	●	1.5	3	2.3	10	2.9	60	6	5.5°	2	1	10.4	10.8	11.7	12.9
VFR2XLBR0150N120	●	1.5	3	2.3	12	2.9	60	6	4.9°	2	1	12.5	13	14.1	15.5
VFR2XLBR0150N160	●	1.5	3	2.3	16	2.9	70	6	4°	2	1	16.7	17.3	18.9	20.8
VFR2XLBR0150N200	●	1.5	3	2.3	20	2.9	70	6	3.4°	2	1	20.8	21.7	23.7	26.1
VFR2XLBR0150N250	●	1.5	3	2.3	25	2.9	70	6	2.8°	2	1	26.1	27.2	29.7	*
VFR2XLBR0150N300	●	1.5	3	2.3	30	2.9	70	6	2.5°	2	1	31.3	32.6	35.7	*

VFR2XLB

Order number	Stock	RE	DC	APMX	LU	DN	LF	DCON	B2	ZEFP	Type	Effective length for inclined angle			
												0.5°	1°	2°	3°
VFR2XLBR0200N100	●	2	4	3	10	3.9	70	6	4.5°	2	1	10.4	10.8	11.6	12.7
VFR2XLBR0200N120	●	2	4	3	12	3.9	70	6	3.9°	2	1	12.5	12.9	14	15.4
VFR2XLBR0200N160	●	2	4	3	16	3.9	70	6	3.1°	2	1	16.6	17.3	18.8	20.7
VFR2XLBR0200N200	●	2	4	3	20	3.9	70	6	2.6°	2	1	20.8	21.7	23.6	*
VFR2XLBR0200N250	●	2	4	3	25	3.9	70	6	2.1°	2	1	26	27.1	29.6	*
VFR2XLBR0200N300	●	2	4	3	30	3.9	70	6	1.8°	2	1	31.2	32.6	*	*
VFR2XLBR0250N200	●	2.5	5	3.8	20	4.9	70	6	1.5°	2	1	20.8	21.6	*	*
VFR2XLBR0250N250	●	2.5	5	3.8	25	4.9	70	6	1.2°	2	1	26	27.1	*	*
VFR2XLBR0300N180	●	3	6	6	18	5.85	80	6	—	2	2	*	*	*	*
VFR2XLBR0300N300	●	3	6	6	30	5.85	80	6	—	2	2	*	*	*	*

* No interference

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VFR2XLB

RECOMMENDED CUTTING CONDITIONS

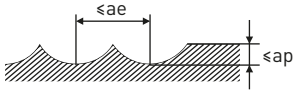
Material		RE	LU	n	f	ap	ae
P	Hardened steel (45-55 HRC)	0.1	0.5	40000	300	0.003	0.01
		0.1	1	40000	300	0.002	0.01
		0.15	1	40000	500	0.007	0.015
		0.15	1.5	40000	500	0.005	0.015
		0.15	2	40000	500	0.003	0.015
		0.2	1	40000	1400	0.015	0.02
		0.2	1.5	40000	1000	0.01	0.02
		0.2	2	40000	1000	0.01	0.02
		0.2	2.5	40000	700	0.005	0.02
		0.2	3	40000	700	0.005	0.02
		0.2	4	40000	600	0.004	0.02
		0.25	1.5	40000	2000	0.02	0.025
		0.25	2	40000	2000	0.02	0.025
		0.25	2.5	40000	1500	0.015	0.025
		0.25	3	40000	1200	0.015	0.025
		0.25	4	36000	900	0.1	0.025
		0.3	2	40000	2800	0.03	0.03
		0.3	3	40000	2800	0.03	0.03
		0.3	4	35000	2000	0.02	0.03
		0.3	5	30000	1000	0.01	0.03
		0.3	6	30000	800	0.008	0.03
		0.4	3	40000	3000	0.04	0.04
		0.4	4	40000	3000	0.02	0.04
		0.4	6	30000	1600	0.02	0.04
		0.4	8	25000	1000	0.01	0.04
		0.5	3	40000	4000	0.05	0.05
		0.5	4	40000	4000	0.05	0.05
		0.5	6	35000	2000	0.03	0.05
		0.5	8	30000	1600	0.02	0.05
		0.5	10	20000	1000	0.01	0.05
		0.5	12	20000	1000	0.01	0.05
		0.75	6	40000	5000	0.07	0.075
		0.75	8	40000	5000	0.07	0.075
		0.75	10	40000	4500	0.06	0.075
		0.75	12	32000	3400	0.04	0.075
		0.75	14	16000	1500	0.04	0.075
		0.75	16	13000	1200	0.03	0.075
		1	6	40000	6000	0.1	0.1
		1	8	40000	5000	0.1	0.1
		1	10	40000	5000	0.08	0.1
		1	12	40000	5000	0.08	0.1
		1	16	32000	3500	0.05	0.1
		1	20	10000	1000	0.04	0.1
		1.25	10	36000	5000	0.12	0.25
		1.25	15	36000	4600	0.08	0.25
		1.5	10	32000	5100	0.15	0.3
		1.5	12	32000	5100	0.13	0.3

VFR2XLB

	Material	RE	LU	n	f	ap	ae
P	Hardened steel (45-55 HRC)	1.5	16	32000	4500	0.1	0.3
		1.5	20	27000	3800	0.1	0.3
		1.5	25	21000	2700	0.08	0.3
		1.5	30	9000	1000	0.08	0.3
		2	10	24000	4800	0.2	0.4
		2	12	24000	4800	0.2	0.4
		2	16	24000	3800	0.15	0.4
		2	20	24000	3800	0.15	0.4
		2	25	24000	3800	0.15	0.4
		2	30	24000	3000	0.1	0.4
		2.5	20	19000	3400	0.2	0.5
		2.5	25	19000	3400	0.2	0.5
		3	18	16000	3500	0.25	0.6
		3	30	16000	3500	0.2	0.6
H	Hardened steel (55-70 HRC)	0.1	0.5	40000	300	0.002	0.01
		0.1	1	40000	300	0.002	0.01
		0.15	1	40000	500	0.005	0.015
		0.15	1.5	40000	500	0.003	0.015
		0.15	2	40000	500	0.002	0.015
		0.2	1	40000	1400	0.01	0.02
		0.2	1.5	40000	1000	0.006	0.02
		0.2	2	40000	1000	0.006	0.02
		0.2	2.5	40000	700	0.003	0.02
		0.2	3	40000	700	0.003	0.02
		0.2	4	40000	500	0.003	0.02
		0.25	1.5	40000	2000	0.015	0.025
		0.25	2	40000	2000	0.015	0.025
		0.25	2.5	40000	1500	0.01	0.025
		0.25	3	40000	1200	0.01	0.025
		0.25	4	36000	900	0.007	0.025
		0.3	2	40000	2800	0.02	0.03
		0.3	3	40000	2800	0.02	0.03
		0.3	4	35000	2000	0.015	0.03
		0.3	5	30000	1000	0.007	0.03
		0.3	6	30000	800	0.005	0.03
		0.4	3	40000	3000	0.03	0.04
		0.4	4	40000	3000	0.015	0.04
		0.4	6	30000	1600	0.01	0.04
		0.4	8	25000	1000	0.007	0.04
		0.5	3	40000	4000	0.04	0.05
		0.5	4	40000	4000	0.04	0.05
		0.5	6	35000	2000	0.02	0.05
		0.5	8	30000	1600	0.01	0.05
		0.5	10	20000	1000	0.01	0.05
		0.5	12	20000	800	0.008	0.05
		0.75	6	40000	4000	0.06	0.075
		0.75	8	40000	3500	0.06	0.075
		0.75	10	40000	2400	0.06	0.075
		0.75	12	32000	2000	0.04	0.075
		0.75	14	16000	1200	0.03	0.075

VFR2XLB

	Material	RE	LU	n	f	ap	ae
H	Hardened steel (55-70 HRC)	0.75	16	13000	1200	0.02	0.075
		1	6	40000	3400	0.1	0.1
		1	8	40000	3000	0.1	0.1
		1	10	40000	3000	0.07	0.1
		1	12	40000	2600	0.05	0.1
		1	16	32000	1700	0.03	0.1
		1	20	10000	1000	0.03	0.1
		1.25	10	36000	2600	0.11	0.25
		1.25	15	36000	2000	0.075	0.25
		1.5	10	32000	2200	0.15	0.3
		1.5	12	32000	2200	0.13	0.3
		1.5	16	32000	1800	0.1	0.3
		1.5	20	27000	1600	0.06	0.3
		1.5	25	21000	1200	0.06	0.3
		1.5	30	9000	700	0.05	0.3
		2	10	24000	2200	0.2	0.4
		2	12	24000	2200	0.2	0.4
		2	16	24000	1500	0.15	0.4
		2	20	24000	1500	0.15	0.4
		2	25	24000	1100	0.1	0.4
		2	30	24000	1100	0.08	0.4
		2.5	20	19000	1400	0.2	0.5
		2.5	25	19000	1400	0.2	0.5
		3	18	16000	1000	0.2	0.6
		3	30	16000	1000	0.2	0.6



1. When the inclination angle of machined surface is large, or machining with large cutting loads such as in a corner area, reduce the revolution and feed rate.
2. If the depth of cut is shallow, the revolution and feed rate can be increased.
3. Cutting conditions may differ considerably due to the tool overhang, depth of cut and machine tool condition. Please use the table above as a reference starting point.

WSF406W

A NEW GENERATION OF HIGH EFFICIENCY CAST IRON MACHINING IS ACHIEVED WITH LOW CUTTING RESISTANCE AND AN ADJUSTABLE RUN-OUT SYSTEM

Interested in more...

B265

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DIA EDGE

FACE MILLING CUTTER FOR CAST IRON MACHINING WITH AN ADJUSTABLE RUN-OUT SYSTEM

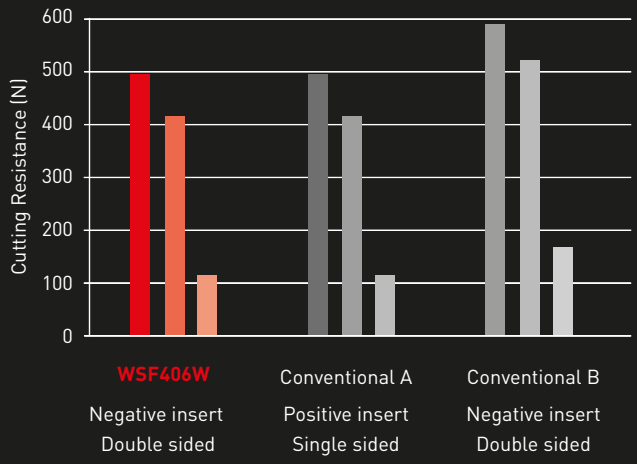
Double sided,
Z Geometry

Chamfer geometry

WSF406W

DOUBLE SIDED INSERT WITH POSITIVE GEOMETRY FOR LOW CUTTING RESISTANCE

Material	GG30
Tool	WSF406WR12516EN
Insert	SNMU1206C05ZNER-M (MC520)
Vc (m/min)	160
fz (mm)	0.1
ap (mm)	3.0
ae (mm)	100
Cutting mode	Dry cutting



LOW CUTTING RESISTANCE AND ADJUSTABLE CUTTING EDGE RUN-OUT PRODUCE EXCELLENT SURFACE FINISHES AND INCREASE PRODUCTIVITY

TOUGH AND SHARP INSERTS FOR LOW CUTTING RESISTANCE

MITSUBISHI MATERIALS uniquely developed proprietary "Double Sided, Z Geometry" insert combines the best features of both positive and negative rake inserts to provide multiple cutting edges and achieve low resistance and sharpness. In addition, the chamfer geometry suppresses edge chipping that tends to occur during cast iron machining.

EASY-TO-USE ADJUSTABLE RUN-OUT SYSTEM

The M-Class insert provides a great cost performance ratio and allows for axial cutting edge adjustments of 0.01 mm or less. This helps to achieve surface finishes of Ra 1.6 µm or less over a wide range of feeds and speeds.

WSF406W

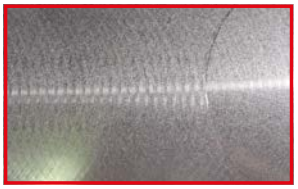
HIGH PRECISION MACHINING IS POSSIBLE OVER A WIDE RANGE OF CUTTING CONDITIONS

FINISH CUTTING CONDITIONS

Ra: 1.351 µm

fz = 0.3 mm / ap = 1.5 mm

Ra: 0.612 µm



fz = 0.1 mm / ap = 0.3 mm

Material	GG30
Tool	WSF406WR12516EN (Minor cutting edge run-out accuracy: 3 µm)
Insert	SNMU1206C05ZNER-M (MC520)
Vc (m/min)	250
Cutting mode	Dry cutting

ACHIEVES HIGH ACCURACY WITH A SIMPLE OPERATION

Cutting edge run-out is easily altered by turning the adjustment screw.

1. Loosen the adjustment screw.
2. Locate the insert, half tighten it so accurate adjustment can be made.
3. Turn the adjustment screw until the insert is in the required position.
4. Fully tighten the insert clamp.

WSF406W

MATERIAL

Chamfer geometry prevents chipping of the workpiece
The insert corner is chamfered to allow extra workpiece material thickness to help prevent cracking.

A thin edge is prone to cracking.

WSF406W

Conventional

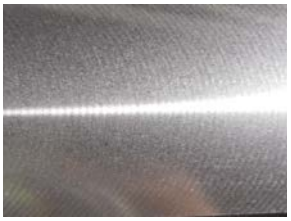
Material	GG30
Tool	WSF406WR12516EN
Insert	SNMU1206C05ZNER-M (MC520)
Vc (m/min)	160
fz (mm)	0.1
ap (mm)	3.0
ae (mm)	100
Cutting mode	Dry cutting

WSF406W

RECOMMENDED CUTTING CONDITIONS

COMPARISON OF SURFACE FINISHES FOR EACH DEPTH OF CUT AND FEED: JIS GG30

Achieves an Ra of 1.6 µm or less over a wide range of feeds and depths of cut.

fz = 0.1 mm	fz = 0.2 mm	fz = 0.3 mm
ap = 3.0 mm		
Ra: 0.819 µm		
ap = 1.5 mm		
Ra: 0.841 µm	 Ra: 1.039 µm	Ra: 1.351 µm
ap = 0.3 mm		
Ra: 0.612 µm	Ra: 0.897 µm	Ra: 1.249 µm

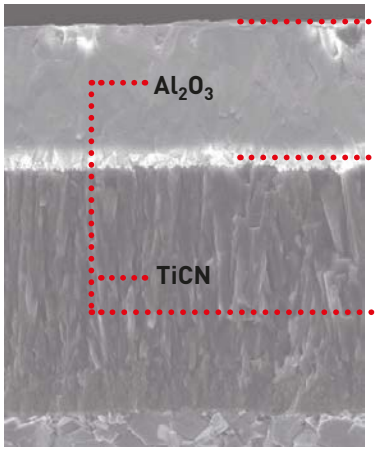
CUTTING CONDITIONS

Material	GG30
Tool	WSF406WR12516EN
Insert	SNMU1206C05ZNER-M (MC520)
Vc (m/min)	250
ae (mm)	100
Cutting mode	Dry cutting Minor cutting edge Run-out accuracy = 3 µm

MC520

CVD COATED CARBIDE GRADE FOR CAST IRON MILLING

Improved peeling resistance of the coating layer for gray cast iron milling
By optimising the coating layer and improving the adhesion with the cemented carbide base material, plastic deformation of the cutting edge is suppressed. The coating layer has an excellent resistance to peeling, thereby providing longer tool life.



All Black Super-Even Coating
The new, smoother than standard surface coating prevents welding and edge chipping to allow stable and reliable cutting.

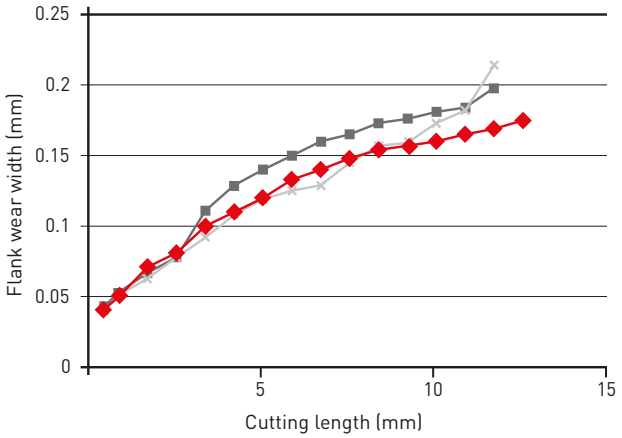
Tough-Grip Coating Technology
Adhesion between the coating layers has been improved exponentially, allowing for greater strength and toughness.

Nano-texture Coating Technology
The optimised crystal growth and the Nano-texture coating technology provide outstanding wear and chipping resistance.

MACHINING PERFORMANCE

COMPARISON OF WEAR RESISTANCE; JIS GG30

The MC520 grade provides excellent wear resistance when machining gray cast iron.



Material	GG30
Tool	WSF406WR12516EN
Insert	SNMU1206C05ZNER-M
Vc (m/min)	300
fz (mm)	0.2
ap (mm)	2.0
Cutting mode	Dry cutting, Single insert

After machining a cutting length of 8.0 m

MC520

Conventional A

Conventional B

MC520 : Conventional

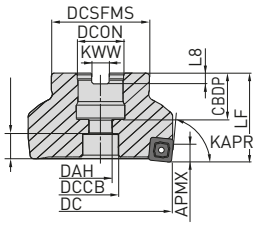
WSF406W

84° KAPR

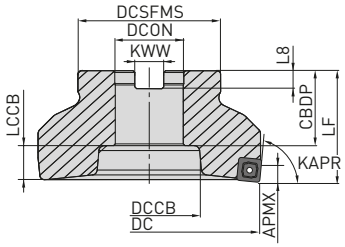
HIGH EFFICIENCY CUTTING OF CAST IRON

K

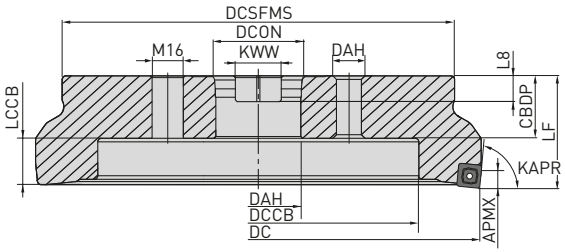
1
Ø80



2
Ø100
Ø125
Ø160



3
Ø200
Ø250



Right hand tool holder only.

ARBOR TYPE

Order number	Stock	DC	CICT	LF	DCON	WT	APMX	RPMX	Type
WSF406WR08006CN	★	80	6	50	25.4	1.2	7.0	7.800	1
WSF406WR08009CN	★	80	9	50	25.4	1.2	7.0	7.800	1
WSF406WR10008DN	★	100	8	50	31.75	1.7	7.0	7.000	2
WSF406WR10012DN	★	100	12	50	31.75	1.7	7.0	7.000	2
WSF406WR12510EN	★	125	10	63	38.1	3.3	7.0	6.250	2
WSF406WR12516EN	★	125	16	63	38.1	3.2	7.0	6.250	2
WSF406WR16014FN	★	160	14	63	50.8	5	7.0	5.500	2
WSF406WR16020FN	★	160	20	63	50.8	4.9	7.0	5.500	2
WSF406WR20016KN	★	200	16	63	47.625	8.6	7.0	4.900	3
WSF406WR20024KN	★	200	24	63	47.625	8.5	7.0	4.900	3
WSF406WR25022KN	★	250	22	63	47.625	14	7.0	4.400	3
WSF406WR25032KN	★	250	32	63	47.625	13.9	7.0	4.400	3

1. A set bolt for the arbor is not supplied with the body. Please refer to page 130 to find the correct type of set bolt to order.

131 Vc

MOUNTING DIMENSIONS

Order number	DC	DCON	CBDP	DAH	DCCB	CRKS	LCCB	DCSFMS	KWW	L8	Type
WSF406WR080	80	25.4	34	13	20	—	14	55	9.5	6	1
WSF406WR100	100	31.75	32	—	46	—	16	70	12.7	8	2
WSF406WR125	125	38.1	42	—	56	—	19	80	15.9	10	2
WSF406WR160	160	50.8	45	—	80	—	16	100	19.1	11	2
WSF406WR200	200	47.625	35	18	140	M16	26	175	25.4	14.22	3
WSF406WR250	250	47.625	35	18	180	M16	26	220	25.4	14.22	3

131 Vc

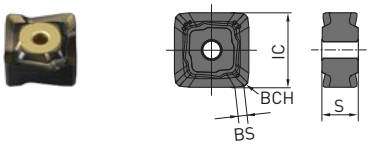
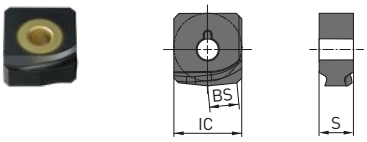
● : Inventory maintained. ★ : Inventory maintained in Japan.

WSF406W

INSERTS

K	Cast iron

Cutting conditions :
●: Stable cutting ◕: General cutting
✥: Unstable cutting
Honing:
E: Round

	Order number	Class	Honing	MC520	IC	S	BS	BCH	Geometry *Right hand insert only.*
	SNMU1206C05ZNER-M	M	E	★	12.7	6.2	1.6	0.5	
NEW	WNGU1206ZNER5C-M	G	E	★	12.7	6.2	5.2		

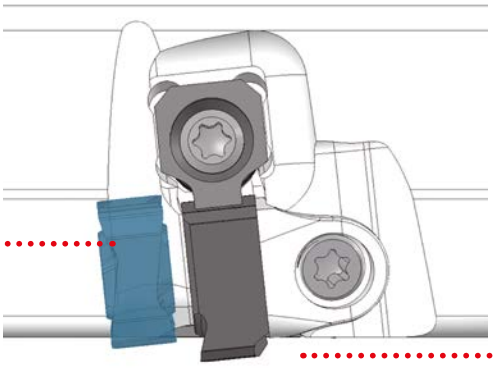
131 Vc

HOW TO USE WIPER INSERT FOR BEST RESULTS

The WSF406W can obtain a good surface finish when using a standard insert due to the adjustable run-out system, but by using a wiper insert, an excellent surface finish can be achieved without having to set a high accuracy face run out. When a wiper insert is mounted, aim to set the standard insert run out accuracy to within 0.04 mm.

Just one wiper insert is enough to achieve excellent finished surfaces.
However, if the feed per revolution is greater than 5.0 mm/rev, attach two or more wiper inserts so that they are evenly spaced in the cutter body and set the run out accuracy between multiple wiper inserts to within 0.003 mm before use.

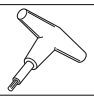
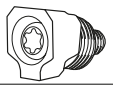
Standard insert



Set the wiper to protrude from the standard insert by up to 0.07 mm.

WSF406W

SPARE PARTS

Tool holder type				
	Wedge	**Clamp screw**	**Wrench**	**Adjustable run-out screw**
WSF406W	CWSF406N	LS0622T	TKY15T	ADW04

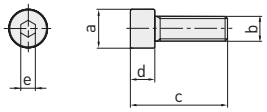
* Clamp Torque (N • m): LS6022T = 6.0

SET BOLT (SOLD SEPARATELY)

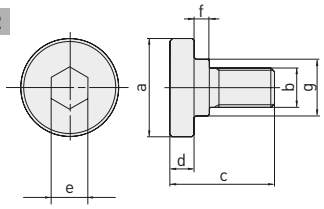
Tool holder type	Set bolt	Reference dimensions							Type
		a	b	c	d	e	f	g	
WSF406WR080	HSC12035 / HSC12045	18	M12x1.75	47 / 57	12	10	—	—	1
WSF406WR100	—	40	M16x2	43	10	14	6	23	2
WSF406WR125	—	50	M20x2.5	54	14	17	6	27	2
WSF406WR160	—	65	M24x3	59	14	17	10	37	2
WSF406WR200	—	24	M16x2	43	43	16	14	—	1
WSF406WR250	—	24	M16x2	43	43	16	14	—	1

Geometry

1



2



WSF406W

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

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

	Material	Properties	Conditions	ap	Grade	Vc	fz	ae
K	Cast irons	≤350MPa	●	<2.0 mm	MC520	250 (210–300)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	220 (190–260)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	200 (180–230)	0.10 (0.08–0.15)	<0.8
			◐	<2.0 mm	MC520	220 (190–260)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	200 (180–230)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	180 (160–210)	0.10 (0.08–0.15)	<0.8
			✱	<2.0 mm	MC520	200 (180–230)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	180 (160–210)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	150 (100–180)	0.10 (0.08–0.15)	<0.8
	Ductile cast irons	≤450MPa	●	<2.0 mm	MC520	200 (170–230)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	180 (150–210)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	160 (130–190)	0.10 (0.08–0.15)	<0.8
			◐	<2.0 mm	MC520	180 (150–210)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	160 (130–190)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	140 (110–170)	0.10 (0.08–0.15)	<0.8
			✱	<2.0 mm	MC520	160 (130–190)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	140 (110–170)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	120 (90–150)	0.10 (0.08–0.15)	<0.8
	Ductile cast irons	≤800MPa	●	<2.0 mm	MC520	200 (170–230)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	180 (150–210)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	160 (130–190)	0.10 (0.08–0.15)	<0.8
			◐	<2.0 mm	MC520	180 (150–210)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	160 (130–190)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	140 (110–170)	0.10 (0.08–0.15)	<0.8
			✱	<2.0 mm	MC520	160 (130–190)	0.15 (0.10–0.25)	<0.8
				2.0 mm – 4.0 mm	MC520	140 (110–170)	0.13 (0.10–0.20)	<0.8
				4.0 mm – 7.5 mm	MC520	120 (90–150)	0.10 (0.08–0.15)	<0.8

AJX

REDUCE COSTS OVER A WIDE RANGE OF APPLICATIONS WITH ULTRA HIGH FEED MILLING

Interested in more...

B028

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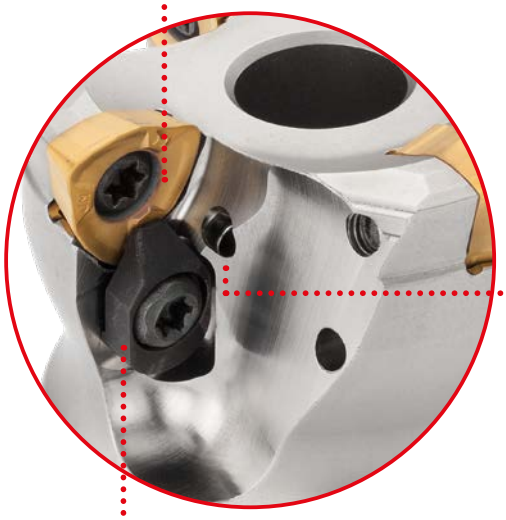
DIA EDGE

AJX

HIGH FEED MILLING CUTTER

HARD WEARING CUTTER BODY



COST-EFFECTIVE INSERT

Specially designed triangular style insert geometry for efficient milling.

WITH COOLANT HOLES AS STANDARD

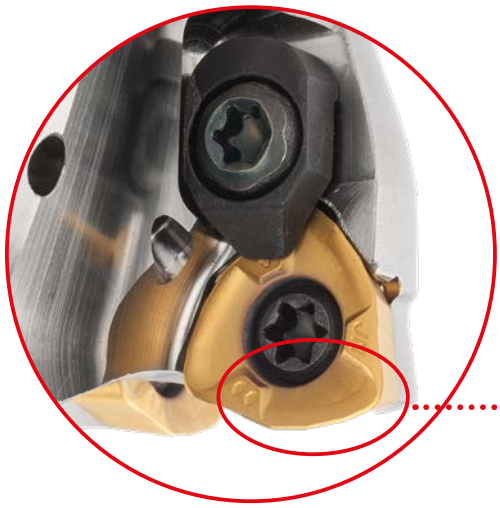
All AJX bodies are supplied with through coolant holes for cutting edge cooling, lubrication and for smooth chip discharge.

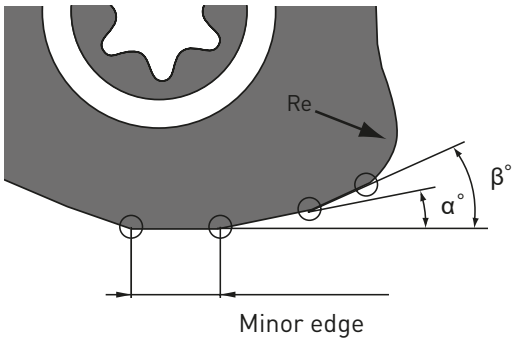
HIGH RIGIDITY CLAMPING

Insert clamp bridges are standard (except AJX 06 and 08). Rigid insert clamping enables stable and reliable cutting.

ULTRA HIGH FEED CUTTING

By using a double phased straight cutting edge to form the lead angle α and β with a minor edge, AJX can achieve an ultra high feed rate of up to 1.5 mm/tooth for the ultimate in rough machining efficiency.

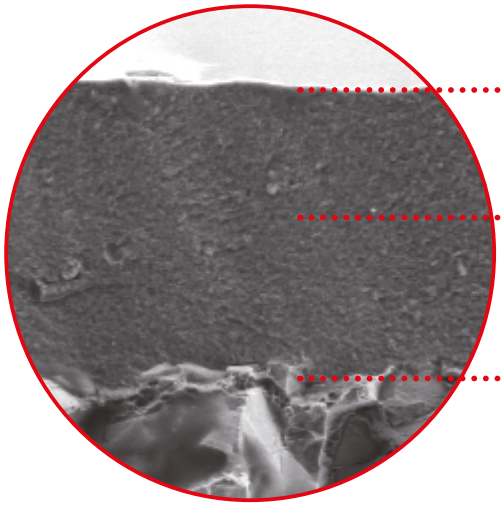




MP9140

PVD COATED GRADE FOR DIFFICULT-TO-CUT MATERIALS

FEATURES OF THE COATING SURFACE



The smooth coating surface provides excellent welding resistance.

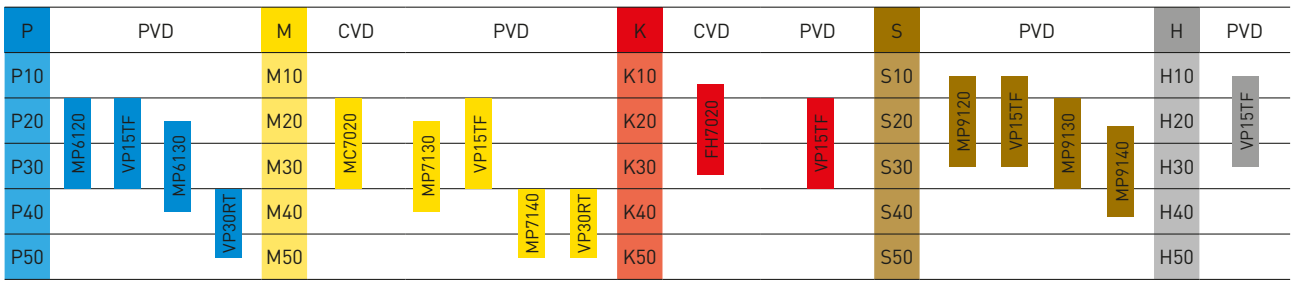
The high Al-rich AlTiN coating succeeds in dramatically improving wear and heat resistance.

Special cemented carbide substrate with improved fracture resistance.

JL CHIPBREAKER

Grade	Features
MP9140	Focus on fracture resistance
MP9130	Standard grade
MP9120	Focus on wear resistance

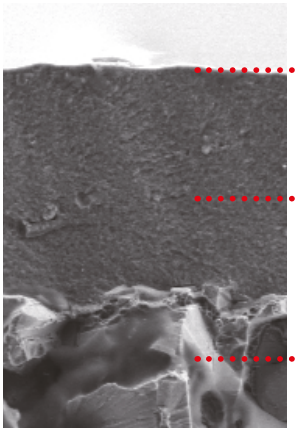
APPLICATION RANGE



INSERT GRADES FOR A WIDE RANGE OF MATERIALS

MP9140

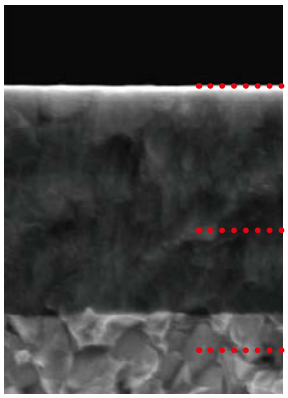
PVD coated grade for difficult to cut materials.



- The smooth coating surface provides excellent welding resistance.
- The high Al-rich AlTiN coating succeeds in dramatically improving wear and heat resistance.
- Special cemented carbide substrate with improved fracture resistance.

MP6100/MP7100

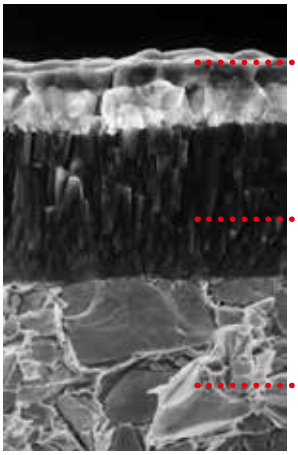
PVD coatings have properties such as toughness, low coefficient of friction and excellent welding, wear and heat resistance.



- Excellent welding resistance due to a low coefficient of friction.
- PVD accumulated coating.
- Special cemented carbide substrate.

FH7020

CVD coated grade for long tool life and high resistance to thermal cracking.



- Vapor deposited by the newly developed even coating technology, the surface texture of the special titanium compound layers is very smooth and chemically stable. It enables a reliable cutting performance without chipping.
- Flat alumina (fine gained aluminium oxide with a smooth surface) is used as the outer layer. It has superior strength at high temperatures and prevents crater wear usually associated with high speed cutting.
- The newly developed cemented carbide base metal has improved resistance to heat-cracking and fracturing.

CHIPBREAKER RECOMMENDATION

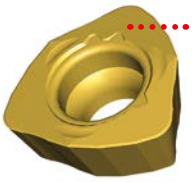
GENERAL USE TYPE

First recommended chipbreaker for general cutting.

An optimum balance of sharpness and fracture resistance. Versatile type for a wide range of materials and cutting conditions.

STRONG CUTTING EDGE TYPE

Stability even when machining interrupted workpiece surfaces.



With increased fracture resistance during interrupted cutting due to the tougher cutting edges. For increased reliability and higher efficiency machining that reduces costs.

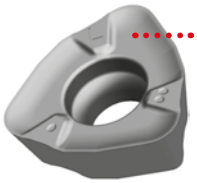
SHARP CUTTING EDGE TYPE

Suitable for use on BT40 and HSK63 machines.

Boosts cutting performance with a large rake angle. Effective for anti-vibration machining for long overhang applications at higher than normal feeds and provides cost saving efficiency.

SHARP CUTTING EDGE TYPE

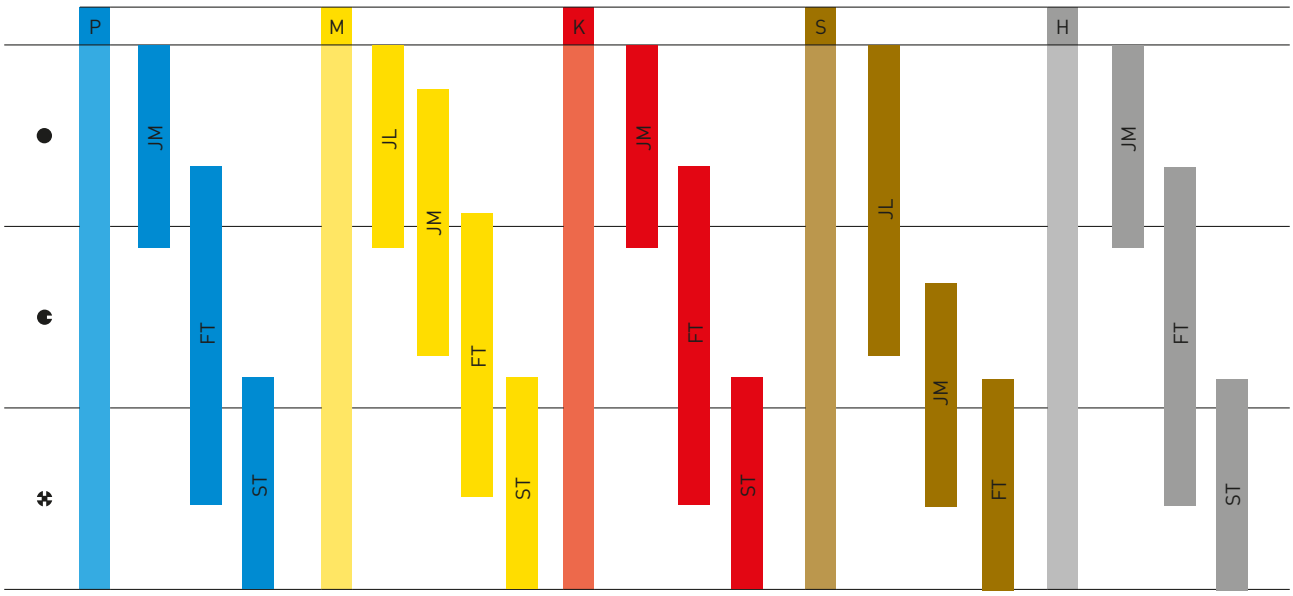
Optimised for difficult-to-cut materials.



The optimised cutting edge of the JL breaker provides the sharpness and low cutting resistance that is ideal for difficult-to-cut materials.

APPLICATION OF CHIPBREAKERS

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



AJX

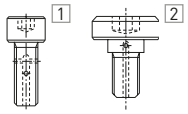
MULTI FUNCTIONAL MILLING

P M K S H

AJX09
GAMP : +8°
GAMF : −6°

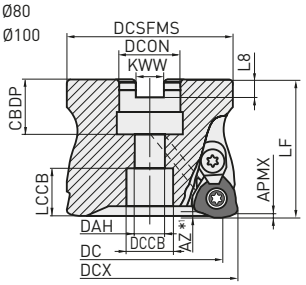
AJX12
GAMP : +8°
GAMF : −5° – -6°

AJX14
GAMP : +8°
GAMF : −3°

DCX	Set bolt		Geometry
Ø 63 (22)	HSC10030H	1	
Ø 63 (27), Ø66. Ø80	HSC12035H		
Ø 100	HSC16040H		
Ø 125. Ø160	MBA20040H	2	

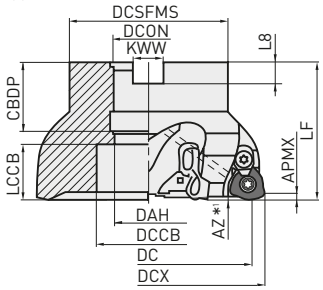
1

Ø50 Ø66
Ø52 Ø80
Ø63 Ø100



2

Ø125
Ø160



Right hand tool holder only.

ARBOR TYPE

Order number	Stock	APMX	DC	DCON	DCX	LF	RMPX	AZ	WT	ZEFP	Type	
AJX12-050A03R	●	2	38.3	22	50	50	2°	1.5	0.4	3	1	JDM○1204
AJX12-050A04R	●	2	38.3	22	50	50	2°	1.5	0.4	4	1	
AJX09-050A05R	●	2	40.0	22	50	50	1.1°	1	0.5	5	1	JDM○09T3
AJX12-052A03R	★	2	40.3	22	52	50	2.1°	1.5	0.4	3	1	JDM○1204
AJX12-052A04R	●	2	40.3	22	52	50	2.1°	1.5	0.4	4	1	
AJX09-052A05R	●	2	42	22	52	50	1°	1	0.4	5	1	JDM○09T3
AJX14-063A03R	★	2	51.1	22	63	50	2.8°	2	0.7	3	1	JDM○1405
AJX14-063X03R	●	2	51.1	27	63	50	2.8	2	0.6	3	1	
AJX14-063A04R	●	2	51.1	22	63	50	2.8°	2	0.7	4	1	
AJX14-063X04R	●	2	51.1	27	63	50	2.8	2	0.6	4	1	
AJX12-063A05R	●	2	51.3	22	63	50	1.5°	1.5	0.7	5	1	JDM○1204
AJX12-063X05R	●	2	51.3	27	63	50	1.5	1.5	0.6	5	1	
AJX14-066A03R	★	2	54.1	22	66	50	2.3°	2	0.7	3	1	JDM○1405
AJX14-066X03R	●	2	54.1	27	66	50	2.6	2	0.6	3	1	
AJX14-066A04R	●	2	54.1	22	66	50	2.3°	2	0.7	4	1	
AJX14-066X04R	●	2	54.1	27	66	50	2.6	2	0.6	4	1	
AJX12-066A05R	●	2	54.3	22	66	50	1.4°	1.5	0.8	5	1	JDM○1204
AJX12-066X05R	●	2	54.3	27	66	50	1.4	1.5	0.7	5	1	
AJX14-080A04R	★	2	68.1	27	80	50	1.8°	2	1.2	4	1	JDM○1405
AJX14-080A05R	●	2	68.1	27	80	50	1.8°	2	1.2	5	1	
AJX12-080A06R	●	2	68.3	27	80	50	1.1°	1.5	1.2	6	1	JDM○1204

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

AJX – ARBOR TYPE

Order number	Stock	APMX	DC	DCON	DCX	LF	RMPX	AZ	WT	ZEFP	Type	
AJX14-100A05R	●	2	88.1	32	100	63	1.2°	2	2.4	5	1	JDM○1405
AJX14-100A06R	●	2	88.1	32	100	63	1.2°	2	2.4	6	1	
AJX12-100A07R	●	2	88.3	32	100	63	0.8°	1.5	2.6	7	1	JDM○1204
AJX14-125B05R	★	2	113.2	40	125	63	0.8°	2	3.3	5	2	JDM○1405
AJX14-125B07R	●	2	113.2	40	125	63	0.8°	2	3.3	7	2	
AJX14-160B06R	★	2	148.2	40	160	63	0.5°	2	5	6	2	
AJX14-160B08R	★	2	148.2	40	160	63	0.5°	2	5	8	2	

1. Please refer to page 152, for maximum depth of cut (APMX) and maximum plunging depth (AZ).

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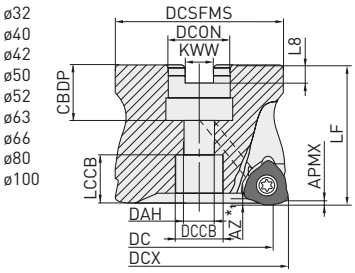
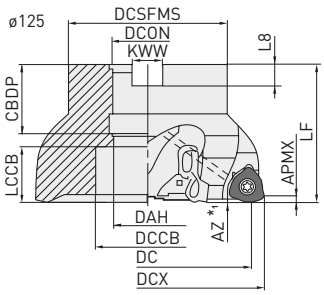
ARBOR TYPE – ULTRA FINE PITCH

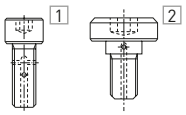
3



4



Right hand tool holder only.

DCX	Set bolt	Geometry	
Ø32, Ø40, Ø42	HSC08025H	1	
Ø50, Ø52, Ø63 Ø66 (DCON=22)	HSC10030H		
Ø63 Ø66 (DCON=27), Ø80	HSC12035H		
Ø 100	HSC16040H		
Ø 125. Ø160	MBA20040H	2	

Order number	Stock	APMX	DC	DCON	DCX	LF	RMPX	AZ	WT	ZEFP	Type	
AJX06-032A05R	●	1	24.9	16	32	40	0.5°	0.3	0.1	5	3	JOM○06T2
AJX06-032A06R	●	1	24.9	16	32	40	0.5°	0.3	0.1	6	3	JOM○06T2
AJX08-040A06R	●	1.5	31.4	16	40	40	1°	0.5	0.2	6	3	JOM○0803
AJX08-042A06R	●	1.5	33.4	16	42	40	0.9°	0.5	0.2	6	3	JOM○0803
AJX09-050A06R	●	2	39.3	22	50	50	1.1°	1	0.4	6	3	JDM○09T3
AJX08-050A07R	●	1.5	41.4	22	50	50	0.7°	0.5	0.4	7	3	JOM○0803
AJX09-052A06R	●	2	41.9	22	52	50	1°	1	0.4	6	3	JDM○09T3
AJX08-052A07R	●	1.5	43.4	22	52	50	0.7°	0.5	0.5	7	3	JOM○0803
AJX12-063A06R	●	2	51.3	22	63	50	1.5°	1.5	0.7	6	3	JDM○1204
AJX09-063A07R	●	2	52.9	22	63	50	0.8°	1	0.7	7	3	JDM○09T3
AJX12-063X06R	●	2	51.3	27	63	50	1.5°	1.5	0.6	6	3	JDM○1204
AJX09-063X07R	●	2	52.9	27	63	50	0.8°	1	0.7	7	3	JDM○09T3
AJX12-066A06R	●	2	54.3	22	66	50	1.4°	1.5	0.7	6	3	JDM○1204
AJX09-066A07R	●	2	55.9	22	66	50	0.8°	1	0.8	7	3	JDM○09T3
AJX12-066X06R	●	2	54.3	27	66	50	1.4°	1.5	0.7	6	3	JDM○1204
AJX09-066X07R	●	2	55.9	27	66	50	0.8°	1	0.8	7	3	JDM○09T3
AJX12-080A08R	●	2	68.3	27	80	50	1.1°	1.5	1.1	8	3	JDM○1204
AJX12-100A09R	●	2	88.3	32	100	63	0.8°	1.5	2.5	9	3	JDM○1204
AJX14-125B09R	●	2	113.2	40	125	63	0.8°	2	3.0	9	4	JDM○1405

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

AJX – ARBOR TYPE

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCON	DCSFMS	DCX	KWW	LCCB	L8	Type
AJX12-050A03R	20	11	17	22	47	50	10.4	17.28	6.3	1
AJX12-050A04R	20	11	17	22	47	50	10.4	17.28	6.3	1
AJX09-050A05R	20	11	17	22	47	50	10.4	17.31	6.3	1
AJX12-052A03R	20	11	17	22	47	52	10.4	17.28	6.3	1
AJX12-052A04R	20	11	17	22	47	52	10.4	17.28	6.3	1
AJX09-052A05R	20	11	17	22	47	52	10.4	17.31	6.3	1
AJX14-063A03R	20	11	17	22	60	63	10.4	17.16	6.3	1
AJX14-063A04R	20	11	17	22	60	63	10.4	17.16	6.3	1
AJX12-063A05R	20	11	17	22	60	63	10.4	17.28	6.3	1
AJX14-066A03R	20	11	17	22	60	66	10.4	17.16	6.3	1
AJX14-066A04R	20	11	17	22	60	66	10.4	17.16	6.3	1
AJX12-066A05R	20	11	17	22	60	66	10.4	17.28	6.3	1
AJX09-063X	23	13	20	27	60	63	12.4	16.3	7.0	3
AJX12-063X	23	13	20	27	60	63	12.4	16.3	7.0	3
AJX14-063X	23	13	20	27	60	63	12.4	16.3	7.0	1
AJX09-066X	23	13	20	27	60	66	12.4	16.3	7.0	3
AJX12-066X	23	13	20	27	60	66	12.4	16.3	7.0	1, 3
AJX14-066X	23	13	20	27	60	66	12.4	16.2	7.0	1
AJX14-080A04R	23	13	19	27	76	80	12.4	16.16	7	1
AJX14-080A05R	23	13	19	27	76	80	12.4	16.16	7	1
AJX12-080A06R	23	13	19	27	76	80	12.4	16.28	7	1
AJX14-100A05R	26	17	26	32	96	100	14.4	26.16	8	1
AJX14-100A06R	26	17	26	32	96	100	14.4	26.16	8	1
AJX12-100A07R	26	17	26	32	96	100	14.4	26.28	8	1
AJX14-125B05R	40	—	56	40	100	125	16.4	22.14	9	2
AJX14-125B07R	40	—	56	40	100	125	16.4	22.14	9	2
AJX14-160B06R	40	—	56	40	100	160	16.4	22.14	9	2
AJX14-160B08R	40	—	56	40	100	160	16.4	22.14	9	2

SPARE PARTS

Tool holder					
	Clamp screw	**Clamp bridge**	**Clamp bridge screw**	**Spring**	**Wrench**
AJX09	TS351	AMS3	AJS3010T10	ASS2	TKY10**D**
AJX12	TS43	AMS4	AJS4012T15	ASS2	TKY15**T**
AJX14	TS54	AMS5	AJS5014T25	ASS3	TKY25**T**

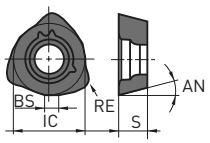
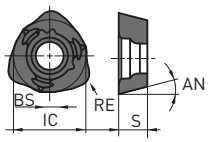
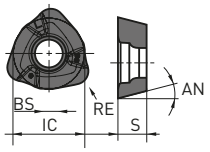
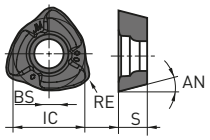
1. Clamp torque (N • m) : **TS351=2.5. TS43=3.5. TS54=7.5. AJS3010T10=2.5. AJS4012T15=3.5. AJS5014T25=7.5**

AJX

INSERTS

		FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT
P	Steel	◐	◐	✣						◐	✣
M	Stainless steel				◐	✣				◐	✣
K	Cast iron		●							✣	
S	Heat resistant alloy, Titanium						◐	✣	✣	◐	
H	Hardened steel									◐	

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

Order number	Class	FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT	IC	S	BS	RE	AN	Geometry *Right hand insert only.*
JOMW06T215ZZSR-FT	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
JOMW080320ZZSR-FT	M	●	●	●	●	●	●	●		●	●	8.0	3.18	1.4	2.0	13°	
JDMW09T320ZDSR-FT	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2.0	15°	
JDMW120420ZDSR-FT	M	●	●	●	●	●	●	●		●	●	12.0	4.76	2.5	2.0	15°	
JDMW140520ZDSR-FT	M	●	●	●	●	●	●	●		●	●	14.0	5.56	2.8	2.0	15°	
JDMT120420ZDSR-ST	M	●	●	●	●	●				●	●	12.0	4.76	2.5	2.0	15°	
JDMT140520ZDSR-ST	M	●	●	●	●	●				●	●	14.0	5.56	2.8	2.0	15°	
JOMT06T216ZZER-JL	M				●	●	●	●	●			6.35	2.78	1.2	1.6	13°	
JOMT080322ZZER-JL	M				●	●	●	●	●			8.0	3.18	1.4	2.2	13°	
JDMT09T323ZDER-JL	M				●	●	●	●	●			9.525	3.97	1.8	2.3	15°	
JDMT120423ZDER-JL	M				●	●	●	●	●			12.0	4.76	2.5	2.3	15°	
JDMT140523ZDER-JL	M				●	●	●	●	●			14.0	5.56	2.8	2.3	15°	
JOMT06T215ZZSR-JM	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
JOMT080320ZZSR-JM	M	●	●	●	●	●	●	●		●	●	8.0	3.18	1.4	2.0	13°	
JDMT09T320ZDSR-JM	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2.0	15°	
JDMT120420ZDSR-JM	M	●	●	●	●	●	●	●		●	●	12.0	4.76	2.5	2.0	15°	
JDMT140520ZDSR-JM	M	●	●	●	●	●	●	●		●	●	14.0	5.56	2.8	2.0	15°	

1. When using the ST chipbreaker, please check the height setting as it differs from other chipbreakers.

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

AJX

RECOMMENDED CUTTING CONDITIONS

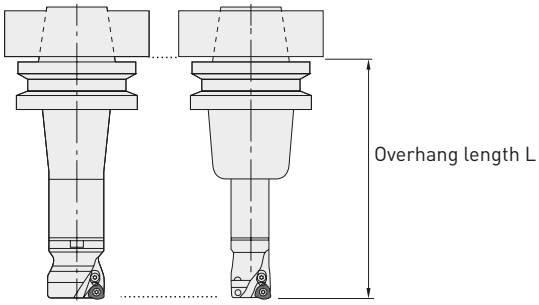
CUTTING SPEED

	Material	Properties	Grade	Vc
P	Mild steel	≤180HB	FH7020	170 (120–220)
			MP6120	150 (100–200)
			MP6130	130 (80–180)
			VP30RT	110 (60–160)
	Carbon steel Alloy steel	180–280HB	FH7020	150 (100–200)
			MP6120	130 (80–180)
			MP6130	110 (60–160)
			VP30RT	90 (40–140)
	Carbon steel Alloy steel	280–350HB	FH7020	130 (80–180)
			MP6120	100 (50–100)
			MP6130	80 (30–130)
			VP30RT	60 (20–110)
	Alloy tool steel	≤350HB (Annealing)	FH7020	130 (80–180)
			MP6120	100 (50–150)
			MP6130	80 (30–120)
			VP30RT	60 (20– 90)
	Pre-hardened steel	35–45HRC	MP6120	100 (70–130)
			MP6130	80 (50–110)
			VP30RT	80 (30– 90)
M	Austenitic stainless steel	≤270HB	MP7130	140 (100–180)
			MP7140	120 (80–160)
K	Gray cast iron	≤350MPa	FH7020	150 (100–200)
	Ductile cast iron	≤800MPa	VP15TF	120 (80–160)
S	Titanium alloy	—	MP9120	50 (40– 60)
			MP9130	45 (30– 55)
			MP9140	40 (30– 50)
	Heat resistant alloy	≤350 HB	MP9120	30 (20– 40)
			MP9130	25 (20– 35)
			MP9140	20 (15– 30)
H	Hardened steel	40–55HRC	VP15TF	70 (50– 90)

AJX

RECOMMENDED CUTTING CONDITIONS

1 Overhang length L



2 Main spindle revolution n(min^{-1})=
(Recommended cutting speed x 1000)÷
(Outer tool diameter x 3.14)

3 Table feed rate Vf (mm/min) = n x feed per tooth x number of teeth

4 Recommended width of cut (ae) is more than 60 % of the cutting edge diameter.

5 The above cutting conditions are guides to cutting on a #50 BT machine. In case of #40 BT and #63 HSK machines, a cutting edge diameter of under 35 mm is recommended. In these cases, also reduce the depth of cut and table feed rate.

6 Use of ST chipbreaker with a tougher cutting edge is recommended for machining parts that require interrupted cutting. First recommended grade for ST chipbreakers is VP30RT, irrespective of the workpiece material.

7 Cutter body with a coarse pitch is recommended for the unstable cutting caused by a long tool overhang.

8 Use the "sharp" JM chipbreaker to lower cutting forces or when long tool overhangs are used.

9 Heavy chips are generated when machining with AJX. To avoid chip jamming related problems, use air blow while machining to discharge chips effectively.

DEPTH OF CUT / FEED PER TOOTH

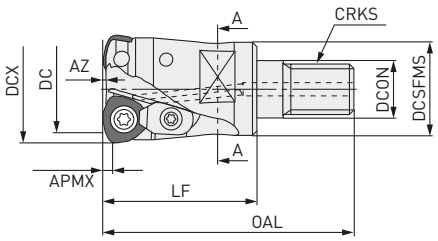
	Material	Properties	DCX=50, 63			DCX=80, 100, 125, 160		
			L	ap	fz	L	ap	fz
P	Mild steel	<180HB	150	1.5	1.5	170	1.5	1.5
			250	1.3	1.3	300	1.3	1.3
			350	1.1	1.1	450	1.0	1.0
	Carbon steel Alloy steel	180–280HB	150	1.5	1.5	170	1.5	1.5
			250	1.3	1.3	300	1.3	1.3
			350	1.1	1.1	450	1.0	1.0
	Carbon steel Alloy steel	280–350HB	150	1.3	1.5	170	1.3	1.5
			250	1.1	1.3	300	1.1	1.3
			350	0.9	1.1	450	0.8	1.0
	Alloy tool steel	≤350 HB	150	1.3	1.5	170	1.3	1.5
			250	1.1	1.3	300	1.1	1.3
			350	0.9	1.1	450	0.8	1.0
	Pre-hardened steel	35–45HRC	150	1.3	1.3	170	1.3	1.3
			250	1.1	1.1	300	1.1	1.1
			350	0.9	0.9	450	0.8	0.8
M	Austenitic stainless steel	<200HB	150	*1.5	1.3	170	*1.5	1.3
			250	*1.3	1.1	300	*1.3	1.1
			350	1.1	0.9	450	1.0	0.8
K	Gray cast iron	<350MPa	150	1.5	1.7	170	1.5	1.7
			250	1.3	1.5	300	1.3	1.5
			350	1.1	1.3	450	1.0	1.2
	Ductile cast iron	<450MPa	150	1.3	1.5	170	1.3	1.5
			250	1.1	1.3	300	1.1	1.3
			350	0.9	1.1	450	0.8	1.0
S	Titanium alloy	—	150	1.2	0.6	170	1.2	0.6
	Heat resistant alloy	≤350 HB	250	1.0	0.4	300	1.0	0.4
			350	0.8	0.3	450	0.8	0.3
H	Hardened steel	40–55HRC	150	0.9	1.1	170	0.9	1.1
			250	0.7	0.9	300	0.7	0.9

* Depth of cut of JL breaker is up to 0.6 mm for the size 06. up to 0.9 mm for the size 08 and up to 1.2 mm for the size 09. 12. 14.

AJX

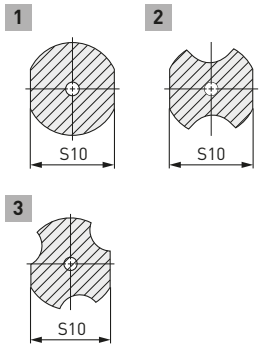
MULTI FUNCTIONAL MILLING

P M K S H



Right hand tool holder only.

A-A



SCREW-IN-TYPE

Order number	Stock	APMX	DC	DCON	DCX	LF	OAL	RMPX	AZ	WT	ZEFP	Type	
AJX06R162AM08	●	1	8.9	8.5	16	25	43	3°	0.3	0.1	2	2	JOM○06 T2○○ZZoR -○○
AJX06R172AM08	●	1	9.9	8.5	17	25	43	2.5°	0.3	0.1	2	2	
AJX06R203AM10	●	1	12.9	10.5	20	28	47	1.5°	0.3	0.1	3	3	
AJX06R223AM10	●	1	14.9	10.5	22	28	47	1°	0.3	0.1	3	3	
AJX06R254AM1235	●	1	17.9	12.5	25	35	57	0.8°	0.3	0.1	4	1	JOM○06T2
AJX06R284AM1235	●	1	20.9	12.5	28	35	57	0.7°	0.3	0.1	4	1	JOM○06T2
AJX08R202AM10	●	1.5	11.4	10.5	20	28	47	3.5°	0.5	0.1	2	2	JOM○080 3○○ZZ○R -○○
AJX08R222AM10	●	1.5	13.4	10.5	22	28	47	3°	0.5	0.1	2	2	
AJX08R253AM12	●	1.5	16.4	12.5	25	36	58	2°	0.5	0.1	3	1	
AJX08R283AM12	●	1.5	19.4	12.5	28	36	58	1.7°	0.5	0.1	3	1	
AJX08R324AM1645	●	1.5	23.4	17.0	32	45	68	1.4°	0.5	0.2	4	1	JOM○0803
AJX08R354AM1645	●	1.5	26.4	17.0	35	45	68	1.2°	0.5	0.2	4	1	JOM○0803
AJX08R406AM1645	●	1.5	31.4	17.0	40	45	68	1°	0.5	0.3	6	1	JOM○0803
AJX09R252AM12	●	2	14.9	12.5	25	36	58	4°	1	0.2	2	2	JDM○09T 3○○ZD○R -○○
AJX09R282AM12	●	2	17.9	12.5	28	36	58	3°	1	0.2	2	2	
AJX09R303AM16	●	2	20.0	17	30	47	70	2.7°	1	0.2	3	1	
AJX09R323AM16	●	2	21.9	17	32	47	70	2.5°	1	0.2	3	1	
AJX09R353AM16	●	2	24.9	17	35	47	70	2°	1	0.2	3	1	
AJX09R404AM16	●	2	29.9	17	40	60	83	1.5°	1	0.2	4	1	
AJX12R302AM16	●	2	18.3	17	30	47	70	4.5°	1.5	0.3	2	2	JDM○ 1204○○ ZD○R -○○
AJX12R322AM16	●	2	20.3	17	32	47	70	4°	1.5	0.3	2	2	
AJX12R352AM16	●	2	23.3	17	35	47	70	3.5°	1.5	0.3	2	2	
AJX12R403AM16	●	2	28.3	17	40	60	83	3°	1.5	0.3	3	2	

148 Vc

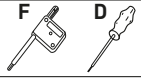
● : Inventory maintained. ★ : Inventory maintained in Japan.

AJX – SCREW-IN-TYPE

MOUNTING DIMENSIONS

Order number	CRKS	S10	DCON	DCSFMS	DCX	Type
AJX06R162AM08	M8	10	8.5	13	16	2
AJX06R172AM08	M8	10	8.5	13	17	2
AJX06R203AM10	M10	15	10.5	18	20	3
AJX06R223AM10	M10	15	10.5	18	22	3
AJX06R254AM1235	M12	19	12.5	23.5	25	1
AJX06R284AM1235	M12	19	12.5	23.5	28	1
AJX08R202AM10	M10	15	10.5	18	20	2
AJX08R222AM10	M10	15	10.5	18	22	2
AJX08R253AM12	M12	17	12.5	21	25	1
AJX08R283AM12	M12	17	12.5	21	28	1
AJX08R324AM1645	M16	24	17	29	32	1
AJX08R354AM1645	M16	24	17	29	35	1
AJX08R406AM1645	M16	24	17	29	40	1
AJX09R252AM12	M12	17	12.5	21	25	2
AJX09R282AM12	M12	17	12.5	21	28	2
AJX09R303AM16	M16	22	17	29	30	1
AJX09R323AM16	M16	22	17	29	32	1
AJX09R353AM16	M16	22	17	29	35	1
AJX09R404AM16	M16	22	17	29	40	1
AJX12R302AM16	M16	22	17	29	30	2
AJX12R322AM16	M16	22	17	29	32	2
AJX12R352AM16	M16	22	17	29	35	2
AJX12R403AM16	M16	22	17	29	40	2

SPARE PARTS

Tool holder					
	Clamp screw	Clamp bridge	Clamp bridge screw	Spring	Wrench
AJX06	TS25	—	—	—	TKY08**F**
AJX08	TS33	—	—	—	TKY08**D**
AJX09	TS351	AMS3	AJS3010T10	ASS2	TKY10**D**
AJX12R302AM16	TS407	AMS4	AJS4012T15	ASS2	TKY15**D**
AJX12	TS43	AMS4	AJS4012T15	ASS2	TKY15**D**

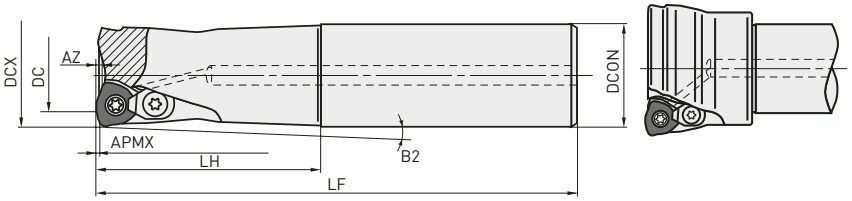
1. Clamp torque (N • m) : **TS25=1.0. TS33=1.0. TS351=2.5. TS407=3.5. TS43=3.5. AJS3010T10=2.5. AJS4012T15=3.5**

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

AJX

MULTI FUNCTIONAL MILLING

P M K S H



Right hand tool holder only.

STRAIGHT SHANK TYPE

Order number	Stock	APMX	DC	DCON	DCX	LF	LH	B2	RMPX	AZ	ZEFP	
AJX06R162SA16ES	●	1	8.9	16	16	70	20	3.5°	3°	0.3	2	
AJX06R172SA16ES	●	1	9.9	16	17	70	20	—	2.5°	0.3	2	
AJX06R162SA16S	●	1	8.9	16	16	110	30	2.25°	3°	0.3	2	
AJX06R172SA16S	●	1	9.9	16	17	110	20	—	2.5°	0.3	2	
AJX06R203SA20S	●	1	12.9	20	20	130	50	1.31°	1.5°	0.3	3	
AJX06R223SA20S	●	1	14.9	20	22	130	30	—	1°	0.3	3	
AJX06R254SA25S	●	1	17.9	25	25	140	60	1.11	0.8°	0.3	4	
AJX06R284SA25S	●	1	20.9	25	28	140	40	—	0.7°	0.3	4	
AJX06R325SA32S	●	1	24.9	32	32	150	70	0.94	0.5°	0.3	5	
AJX06R326SA32S	●	1	24.9	32	32	150	70	0.94	0.5°	0.3	6	JOMO06T2OO ZZOR-OO
AJX06R162SA16L	●	1	8.9	16	16	150	70	0.93°	3°	0.3	2	
AJX06R172SA16L	●	1	9.9	16	17	150	20	—	2.5°	0.3	2	
AJX06R203SA20L	●	1	12.9	20	20	180	100	0.64°	1.5°	0.3	3	
AJX06R223SA20L	●	1	14.9	20	22	180	30	—	1°	0.3	3	
AJX06R254SA25L	●	1	17.9	25	25	200	120	0.54	0.8°	0.3	4	
AJX06R284SA25L	●	1	20.9	25	28	200	40	—	0.7°	0.3	4	
AJX06R325SA32L	●	1	24.9	32	32	200	120	0.54	0.5°	0.3	5	
AJX06R162SA16EL	★	1	8.9	16	16	200	100	0.64°	3°	0.3	2	
AJX06R172SA16EL	★	1	9.9	16	17	200	20	—	2.5°	0.3	2	
AJX08R202SA20S	●	1.5	11.4	20	20	130	50	1.34°	3.5°	0.5	2	
AJX08R222SA20S	●	1.5	13.4	20	22	130	30	—	3°	0.5	2	
AJX08R253SA25S	●	1.5	16.4	25	25	140	60	1.1°	2°	0.5	3	
AJX08R283SA25S	●	1.5	19.4	25	28	140	40	—	1.7°	0.5	3	
AJX08R324SA32S	●	1.5	23.4	32	32	150	70	0.95	1.4°	0.5	4	
AJX08R406SA32S	●	1.5	31.4	32	40	150	50	—	1°	0.5	6	
AJX08R202SA20L	●	1.5	11.4	20	20	180	100	0.65°	3.5°	0.5	2	
AJX08R222SA20L	●	1.5	13.4	20	22	180	30	—	3°	0.5	2	JOMO0803OO ZZOR-OO
AJX08R253SA25L	●	1.5	16.4	25	25	200	120	0.54°	2°	0.5	3	
AJX08R283SA25L	●	1.5	19.4	25	28	200	40	—	1.7°	0.5	3	
AJX08R324SA32L	●	1.5	23.4	32	32	200	120	0.55	1.4°	0.5	4	
AJX08R406SA32L	●	1.5	31.4	32	40	250	50	—	1°	0.5	6	
AJX08R202SA20EL	★	1.5	11.4	20	20	250	130	0.5°	3.5°	0.5	2	
AJX08R222SA20EL	★	1.5	13.4	20	22	250	30	—	3°	0.5	2	

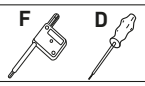
AJX – STRAIGHT SHANK TYPE

Order number	Stock	APMX	DC	DCON	DCX	LF	LH	B2	RMPX	AZ	ZEFP	
AJX09R252SA25S	●	2	14.9	25	25	140	60	1.1°	4°	1	2	
AJX09R282SA25S	●	2	17.9	25	28	140	40	—	3°	1	2	
AJX09R303SA32S	●	2	20.0	32	30	150	70	1.79°	2.7°	1	3	
AJX09R323SA32S	●	2	21.9	32	32	150	70	0.94°	2.5°	1	3	
AJX09R353SA32S	●	2	24.9	32	35	150	50	—	2°	1	3	
AJX09R404SA32S	●	2	29.9	32	40	150	50	—	1.5°	1	4	
AJX09R252SA25L	●	2	14.9	25	25	200	120	0.54°	4°	1	2	JDM○09T3○○ ZD○R-○○
AJX09R282SA25L	●	2	17.9	25	28	200	40	—	3°	1	2	
AJX09R303SA32L	●	2	20.0	32	30	200	120	1.03°	2.7°	1	3	
AJX09R323SA32L	●	2	21.9	32	32	200	120	0.54°	2.5°	1	3	
AJX09R353SA32L	●	2	24.9	32	35	200	50	—	2°	1	3	
AJX09R404SA32L	●	2	29.9	32	40	250	50	—	1.5°	1	4	
AJX09R252SA25EL	★	2	14.9	25	25	300	180	0.36°	4°	1	2	
AJX09R282SA25EL	★	2	17.9	25	28	300	40	—	3°	1	2	
AJX12R302SA32S	●	2	18.3	32	30	150	70	1.82°	4.5°	1.5	2	
AJX12R322SA32S	●	2	20.3	32	32	150	70	0.96°	4°	1.5	2	
AJX12R352SA32S	●	2	23.3	32	35	150	50	—	3.5°	1.5	2	
AJX12R403SA32S	●	2	28.3	32	40	150	50	—	3°	1.5	3	
AJX12R403SA42S	★	2	28.3	42	40	150	70	1.79°	3°	1.5	3	
AJX12R302SA32L	●	2	18.3	32	30	200	120	1.04°	4.5°	1.5	2	
AJX12R322SA32L	●	2	20.3	32	32	200	120	0.55°	4°	1.5	2	
AJX12R352SA32L	●	2	23.3	32	35	200	50	—	3.5°	1.5	2	JDM○1204○ ZD○R-○○
AJX12R403SA32L	●	2	28.3	32	40	250	50	—	3°	1.5	3	
AJX12R403SA42L	★	2	28.3	42	40	250	70	1.79°	3°	1.5	3	
AJX12R302SA32EL	★	2	18.3	32	30	300	180	0.69°	4.5°	1.5	2	
AJX12R322SA32EL	★	2	20.3	32	32	300	180	0.36°	4°	1.5	2	
AJX12R352SA32EL	★	2	23.3	32	35	300	50	—	3.5°	1.5	2	
AJX12R402SA32EL	★	2	28.3	32	40	350	50	—	3°	1.5	2	
AJX12R402SA42EL	★	2	28.3	42	40	350	70	1.79°	3°	1.5	2	
AJX14R503SA42S	★	2	38.2	42	50	150	50	—	4.2°	2	3	
AJX14R503SA42L	★	2	38.1	42	50	250	50	—	4.2°	2	4	JDM○1405○○ ZD○R-○
AJX14R634SA42S	★	2	51.1	42	63	150	50	—	2.8°	2	4	
AJX14R634SA42L	★	2	51.1	42	63	250	50	—	2.8°	2	4	

1. Please refer to page 152, for maximum depth of cut (APMX) and maximum plunging depth (AZ).

148 Vc

SPARE PARTS

Tool holder					
	Clamp screw	Clamp bridge	Clamp bridge screw	Spring	Wrench
AJX06	TS25	—	—	—	TKY08**F**
AJX08	TS33	—	—	—	TKY08**D**
AJX09	TS351	AMS3	AJS3010T10	ASS2	TKY10**D**
AJX12R302	TS407	AMS4	AJS4012T15	ASS2	TKY15**D**
AJX12	TS43	AMS4	AJS4012T15	ASS2	TKY15**D**
AJX14	TS54	AMS5	AJS5014T25	ASS3	TKY25**D**

1. Clamp torque (N • m) : **TS25=1.0. TS33=1.0. TS351=2.5. TS407=3.5. TS43=3.5. TS54=7.5. AJS3010T10=2.5. AJS4012T15=3.5. AJS5014T25=7.5**

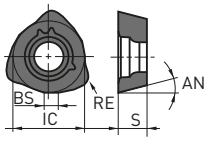
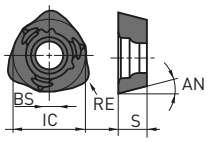
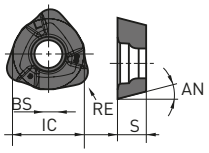
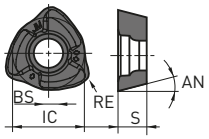
● : Inventory maintained. ★ : Inventory maintained in Japan.

AJX

INSERTS

P	Steel	◐	◐	✣						◐	✣							
M	Stainless steel				◐	✣				◐	✣							
K	Cast iron		●							✣								
S	Heat resistant alloy, Titanium						◐	✣	✣	◐								
H	Hardened steel									◐								

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

Order number	Class	FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT	IC	S	BS	RE	AN	Geometry *Right hand insert only.*
JOMW06T215ZZSR-FT	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
JOMW080320ZZSR-FT	M	●	●	●	●	●	●	●		●	●	8.0	3.18	1.4	2.0	13°	
JDMW09T320ZDSR-FT	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2.0	15°	
JDMW120420ZDSR-FT	M	●	●	●	●	●	●	●		●	●	12.0	4.76	2.5	2.0	15°	
JDMW140520ZDSR-FT	M	●	●	●	●	●	●	●		●	●	14.0	5.56	2.8	2.0	15°	
JDMT120420ZDSR-ST	M	●	●	●	●	●				●	●	12.0	4.76	2.5	2.0	15°	
JDMT140520ZDSR-ST	M	●	●	●	●	●				●	●	14.0	5.56	2.8	2.0	15°	
JOMT06T216ZZER-JL	M				●	●	●	●	●			6.35	2.78	1.2	1.6	13°	
JOMT080322ZZER-JL	M				●	●	●	●	●			8.0	3.18	1.4	2.2	13°	
JDMT09T323ZDER-JL	M				●	●	●	●	●			9.525	3.97	1.8	2.3	15°	
JDMT120423ZDER-JL	M				●	●	●	●	●			12.0	4.76	2.5	2.3	15°	
JDMT140523ZDER-JL	M				●	●	●	●	●			14.0	5.56	2.8	2.3	15°	
JOMT06T215ZZSR-JM	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
JOMT080320ZZSR-JM	M	●	●	●	●	●	●	●		●	●	8.0	3.18	1.4	2.0	13°	
JDMT09T320ZDSR-JM	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2.0	15°	
JDMT120420ZDSR-JM	M	●	●	●	●	●	●	●		●	●	12.0	4.76	2.5	2.0	15°	
JDMT140520ZDSR-JM	M	●	●	●	●	●	●	●		●	●	14.0	5.56	2.8	2.0	15°	

1. When using the ST chipbreaker, please check the height setting as it differs from other chipbreakers.

AJX

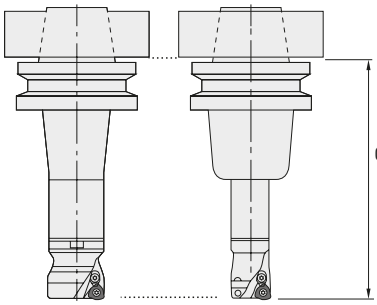
RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Properties	Grade	Vc
P	Mild steel	≤180HB	FH7020	170 (120 – 220)
			MP6120	150 (100 – 200)
			MP6130	130 (80 – 180)
			VP30RT	110 (60 – 160)
	Carbon steel Alloy steel	180–280HB	FH7020	150 (100 – 200)
			MP6120	130 (80 – 180)
			MP6130	110 (60 – 160)
			VP30RT	90 (40 – 140)
	Carbon steel Alloy steel	280–350HB	FH7020	130 (80 – 180)
			MP6120	100 (50 – 100)
			MP6130	80 (30 – 130)
			VP30RT	60 (20 – 110)
	Alloy tool steel	≤350HB (Annealing)	FH7020	130 (80 – 180)
			MP6120	100 (50 – 150)
			MP6130	80 (30 – 120)
			VP30RT	60 (20 – 90)
	Pre-hardened steel	35–45HRC	MP6120	100 (70 – 130)
			MP6130	80 (50 – 110)
			VP30RT	80 (30 – 90)
M	Austenitic stainless steel	≤270HB	MP7130	140 (100 – 180)
			MP7140	120 (80 – 160)
K	Gray cast iron	≤350MPa	FH7020	150 (100 – 200)
	Ductile cast iron	≤800MPa	VP15TF	120 (80 – 160)
S	Titanium alloy	—	MP9120	50 (40 – 60)
			MP9130	45 (30 – 55)
			MP9140	40 (30 – 50)
	Heat resistant alloy	≤350 HB	MP9120	30 (20 – 40)
			MP9130	25 (20 – 35)
			MP9140	20 (15 – 30)
H	Hardened steel	40–55HRC	VP15TF	70 (50 – 90)

AJX

1 Overhang length L



2 Main spindle revolution n (min^{-1})= (Recommended cutting speed x 1000)÷ (Outer tool diameter x 3.14)

3 Table feed rate Vf (mm/min) = n x feed per tooth x number of teeth

4 Recommended width of cut (ae) is more than 60 % of the cutting edge diameter.

5 The above cutting conditions are guides to cutting on a #50 BT machine. In case of #40 BT and #63 HSK machines, a cutting edge diameter of under 35 mm is recommended. In these cases, also reduce the depth of cut and table feed rate.

6 Use of ST chipbreaker with a tougher cutting edge is recommended for machining parts that require interrupted cutting. First recommended grade for ST chipbreakers is VP30RT, irrespective of the workpiece material.

7 Cutter body with a coarse pitch is recommended for the unstable cutting caused by a long tool overhang.

8 Use the "sharp" JM chipbreaker to lower cutting forces or when long tool overhangs are used.

9 Heavy chips are generated when machining with AJX. To avoid chip jamming related problems, use air blow while machining to discharge chips effectively.

DEPTH OF CUT / FEED PER TOOTH

	Material	Properties	DCX=16,17			DCX=20, 22			DCX=25, 28		
			L	ap	fz	L	ap	fz	L	ap	fz
P	Mild steel	≤180HB	140	0.8	0.8	160	1.0	1.0	170	1.0	1.2
			180	0.6	0.6	210	0.8	0.8	230	0.8	1.0
			210	0.4	0.4	240	0.6	0.6	290	0.6	0.8
	Carbon steel Alloy steel	180–280HB	140	0.8	0.8	160	1.0	1.0	170	1.0	1.2
			180	0.6	0.6	210	0.8	0.8	230	0.8	1.0
			210	0.4	0.4	240	0.6	0.6	290	0.6	0.8
	Carbon steel Alloy steel	280–350HB	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
	Alloy tool steel	≤350 HB	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
	Pre-hardened steel	35–45HRC	140	0.7	0.7	160	0.8	0.8	170	0.8	1.0
			180	0.5	0.5	210	0.6	0.6	230	0.6	0.8
			210	0.3	0.3	240	0.4	0.4	290	0.4	0.6
M	Austenitic stainless steel	≤270 HB	140	0.8	0.7	160	1.0	0.8	170	1.0	1.0
			180	0.6	0.5	210	0.8	0.6	230	0.8	0.8
			210	0.4	0.3	240	0.6	0.4	290	0.6	0.6
K	Gray cast iron	≤350 MPa	140	0.8	1.0	160	1.0	1.2	170	1.0	1.4
			180	0.6	0.8	210	0.8	1.0	230	0.8	1.2
			210	0.4	0.6	240	0.6	0.8	290	0.6	1.0
	Ductile cast iron	≤800MPa	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
S	Titanium alloy	—	140	0.6	0.6	160	0.8	0.6	170	1.0	0.6
	Heat resistant alloy	≤350 HB	180	0.4	0.4	210	0.6	0.4	230	0.8	0.4
			210	0.3	0.3	240	0.4	0.3	290	0.6	0.3
H	Hardened steel	40–55HRC	140	0.5	0.5	160	0.5	0.6	170	0.5	0.8
			180	0.4	0.3	210	0.4	0.4	230	0.4	0.6
			210	0.3	0.2	240	0.3	0.2	290	0.3	0.4

AJX

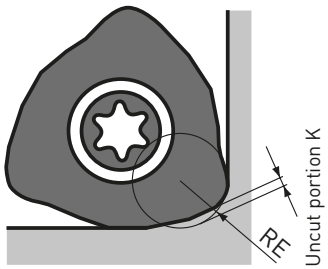
DEPTH OF CUT / FEED PER TOOTH

	Material	Properties	DCX=30, 32, 35			DCX=40, (32 Shank Type)			DCX=40, (42 Shank Type)			DCX=50, 63		
			L	ap	fz	L	ap	fz	L	ap	fz	L	ap	fz
P	Mild steel	≤180HB	180	1.2	1.4	180	1.2	1.4	180	1.2	1.5	180	1.4	1.5
			230	1.0	1.2	240	1.0	1.2	240	1.0	1.3	240	1.2	1.3
			290	0.8	1.0	300	0.8	1.0	300	0.8	1.1	—	—	—
	Carbon steel Alloy steel	180 – 280HB	180	1.2	1.4	180	1.2	1.4	180	1.2	1.5	180	1.4	1.5
			230	1.0	1.2	240	1.0	1.2	240	1.0	1.3	240	1.2	1.3
			290	0.8	1.0	300	0.8	1.0	300	0.8	1.1	—	—	—
	Carbon steel Alloy steel	280 – 350HB	180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5
			230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3
			290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—
	Alloy tool steel	≤350 HB	180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5
			230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3
			290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—
	Pre-hardened steel	35 – 45HRC	180	1.0	1.2	180	1.0	1.2	180	1.0	1.3	180	1.2	1.3
			230	0.8	1.0	240	0.8	1.0	240	0.8	1.1	240	1.0	1.1
			290	0.6	0.8	300	0.6	0.8	300	0.6	0.9	—	—	—
M	Austenitic stainless steel	≤270HB	180	1.2	1.2	180	1.2	1.2	180	1.2	1.3	180	*1.4	1.3
			230	1.0	1.0	240	1.0	1.0	240	1.0	1.1	240	1.2	1.1
			290	0.8	0.8	300	0.8	0.8	300	0.8	0.9	—	—	—
K	Gray cast iron	≤350MPa	180	1.2	1.6	180	1.2	1.6	180	1.2	1.7	180	1.4	1.7
			230	1.0	1.4	240	1.0	1.4	240	1.0	1.5	240	1.2	1.5
			290	0.8	1.2	300	0.8	1.2	300	0.8	1.3	—	—	—
	Ductile cast iron	≤450MPa	180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5
			230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3
			290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—
S	Titanium alloy	—	180	1.2	0.6	180	1.2	0.6	180	1.2	0.6	180	1.2	0.6
	Heat resistant alloy	≤350 HB	230	1.0	0.4	240	1.0	0.4	240	1.0	0.4	240	1.0	0.4
			290	0.8	0.3	300	0.8	0.3	300	0.8	0.3	—	—	—
H	Hardened steel	40 – 55HRC	180	0.6	1.0	180	0.6	1.0	180	0.6	1.1	180	0.8	1.1
			230	0.5	0.8	240	0.5	0.8	240	0.5	0.9	240	0.6	0.9
			290	0.4	0.6	300	0.4	0.6	300	0.4	0.7	—	—	—

* Depth of cut of JL breaker is up to 0.6 mm for the size 06, up to 0.9 mm for the size 08 and up to 1.2 mm for the size 09, 12, 14.

NOTE FOR PROGRAMMING

When using AJX, please programme as an R3 radius cutter.
The approximate uncut portions for the programme are as follows.



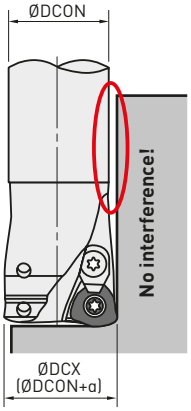
Insert size		Approx. RE	Uncut portion K
06	FT/JM	2.0	0.33
	JL	2.5	0.32
08	FT/JM	2.5	0.46
	JL	2.0	0.40
09	FT/JM	3.0	0.47
	JL	3.0	0.46
12	FT/JM/ST	3.0	0.63
	JL	3.0	0.53
14	FT/JM/ST	3.0	0.64
	JL	3.0	0.55

1. The uncut portion may change slightly depending on cutting conditions.

NO WORKPIECE INTERFERENCE

The shank type AJX is designed with an offset from the cutting diameter for workpiece and chip clearance as shown. It is ideal for deep applications and reduces the need for special long tools.

Shank diameter



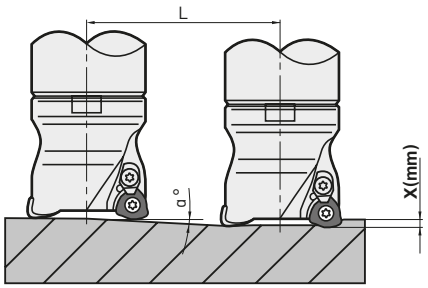
Cutting edge diameter

Order number	DCX	DCON
AJX06R172SA16◌	17	16
AJX06R223SA20◌	22	20
AJX08R222SA20◌	22	20
AJX08R283SA20◌	28	20
AJX09R282SA25◌	28	25
AJX09R353SA32◌	35	32
AJX09R404SA32◌	40	32
AJX12R352SA32◌	35	32
AJX12R40oSA32◌	40	32
AJX14R503SA42◌	50	42
AJX14R634SA42◌	63	42

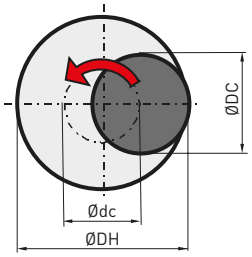
1. Please refer to page 145/146 for details of the holder.

RECOMMENDED CUTTING CONDITIONS

RAMPING



HELICAL DRILLING



- How to derive a locus of the centre of the tool

Ødc	=	ØDH	- ØDC
Locus of the center of the tool		Desired hole diameter	Cutting edge diameter

- 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).
- When drilling, please set the feed in the axial direction at 0.2 mm/rev or less.
- The long chips generated can disperse, so ensure that adequate safety precautions are taken.

Tool holder type	DCX	DC	APMX		RMPX	Ramping				Helical drilling		AZ
			Breaker			L (mm) Required distance for X mm depth				DH		
			FT/JM/ST	JL		X=1	x=1.2	x=1.5	x=2	Min	Max.	
SHANK TYPE/SCREW-IN TYPE												
AJX06	16	8.9	1	0.6	3°	19.1	—	—	—	23	29	0.3
AJX06	17	9.9	1	0.6	2.5°	22.9	—	—	—	25	31	0.3
AJX06	20	12.9	1	0.6	1.5°	38.2	—	—	—	31	37	0.3
AJX06	22	14.9	1	0.6	1°	57.3	—	—	—	35	41	0.3
AJX08	20	11.4	1.5	0.9	3.5°	16.3	19.6	24.5	—	27	36	0.5
AJX08	22	13.4	1.5	0.9	3°	19.1	22.9	28.6	—	31	40	0.5
AJX08	25	16.4	1.5	0.9	2°	28.6	34.4	43	—	37	46	0.5
AJX08	28	19.4	1.5	0.9	1.7°	33.7	40.4	50.5	—	43	52	0.5
AJX09	25	14.9	2	1.2	4°	14.3	17.2	21.5	28.6	33	46	1
AJX09	28	17.9	2	1.2	3°	19.1	22.9	28.6	38.1	39	52	1
AJX09	30	20	2	1.2	2.7°	21.2	25.4	31.8	42.4	43	56	1
AJX09	32	21.9	2	1.2	2.5°	22.9	27.5	34.4	45.8	47	60	1
AJX09	35	24.9	2	1.2	2°	28.6	34.4	43	57.3	53	66	1
AJX09	40	29.9	2	1.2	1.5°	38.2	45.8	57.3	76.4	63	76	1
AJX12	30	18.3	2	1.2	4.5°	12.7	15.2	19	25.4	39	56	1.5
AJX12	32	20.3	2	1.2	4°	14.3	17.2	21.4	28.6	41	60	1.5
AJX12	35	23.3	2	1.2	3.5°	16.3	19.6	24.5	32.7	47	66	1.5
AJX12	40	28.3	2	1.2	3°	19.1	22.9	28.6	38.2	57	76	1.5
AJX14	50	38.2	2	1.2	4.2°	13.6	16.3	20.4	27.2	72	96	2
AJX14	63	51.1	2	1.2	2.8°	20.4	24.5	30.7	40.9	98	122	2
ARBOR TYPE												
AJX09	50	40	2	1.2	1.1°	52.1	62.5	78.1	104.2	83	96	1
AJX12-050	50	38	2	1.2	2°	28.6	34.4	43	57.3	77	96	1.5
AJXR050	50	38	2	1.2	2°	28.6	34.4	43	57.3	77	96	1.5
AJX12-063	63	51	2	1.2	1° 30′	38.2	45.8	57.3	76.4	103	122	1.5
AJXR063	63	51	2	1.2	1° 30′	38.2	45.8	57.3	76.4	103	122	1.5
AJXR080	80	68	2	1.2	1° 06′	52.1	62.5	78.1	104.2	137	156	1.5
AJXR100	100	88	2	1.2	0° 48′	71.6	85.9	107.4	143.2	177	196	1.5
AJX14-063	63	51	2	1.2	2° 48′	20.4	24.5	30.7	40.9	98	122	2
AJXR063	63	51	2	1.2	2° 48′	20.4	24.5	30.7	40.9	98	122	2
AJXR080	80	68	2	1.2	1° 48′	31.8	38.2	47.7	63.6	132	156	2
AJXR100	100	88	2	1.2	1° 12′	47.7	57.3	71.6	95.5	172	196	2
AJXR125	125	113	2	1.2	0° 48′	71.6	85.9	107.4	143.2	222	246	2
AJXR160	160	148	2	1.2	0° 30′	114.6	137.5	171.9	229.2	292	316	2

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

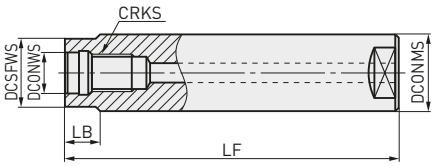
SELECTION REFERENCE TABLE

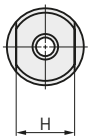
CUTTING EDGE COUNT AND CUTTING CONDITIONS

DCX	Coarse pitch			Fine pitch			Extra fine pitch			Ultra fine pitch					
	Tool holder type	ZEFP	Vf	Tool holder type	ZEFP	Vf	Tool holder type	ZEFP	Vf	Tool holder type	ZEFP	Vf	Tool holder type	ZEFP	Vf
ARBOR TYPE															
32										AJX06	5	7400	AJX06	6	8900
40										AJX08	6	7100			
42										AJX08	6	6800			
50	AJX12	3	3100	AJX12	4	4200	AJX09	5	5200	AJX09	6	6300	AJX08	7	7300
52										AJX09	6	6000	AJX08	7	7000
63	AJX14	3	2500	AJX14	4	3300	AJX12	5	4100	AJX12	6	5000	AJX09	7	5800
63	AJX14	3	2500	AJX14	4	3300	AJX12	5	4100	AJX12	6	5000	AJX09	7	5800
66	AJX14	3	2300	AJX14	4	3100	AJX12	5	3900	AJX12	6	4700	AJX09	7	5500
80	AJX14	4	2300	AJX14	5	2900	AJX12	6	3500	AJX12	8	4700			
100	AJX14	5	2300	AJX14	6	2800	AJX12	7	3300	AJX12	9	4200			
125	AJX14	5	1900	AJX14	7	2600				AJX14	9	3400			
160	AJX14	6	1700	AJX14	8	2300									
SHANK TYPE AND LONG SHANK TYPE															
16	AJX06	2	2300												
17	AJX06	2	2200												
20	AJX08	2	2800	AJX06	3	4200									
22	AJX08	2	2600	AJX06	3	3900									
25	AJX09	2	3000	AJX08	3	4500	AJX06	4	6100						
28	AJX09	2	2700	AJX08	3	4000	AJX06	4	5400						
30	AJX12	2	3100	AJX09	3	4700									
32	AJX12	2	2900	AJX09	3	4400	AJX08	4	5900	AJX06	5	7400	AJX06	6	8900
40 (DCON=40)	AJX12	3	3500	AJX09	4	4700	AJX08	6	7100						
40 (DCON=42)	AJX12	3	3900	AJX09	4	5200									
50	AJX14	3	3700												
63	AJX14	4	3900												
SCREW-IN TYPE															
16	AJX06	2	2300												
17	AJX06	2	2200												
20	AJX08	2	2800	AJX06	3	4200									
22	AJX08	2	2600	AJX06	3	3900									
25	AJX09	2	3000	AJX08	3	4500	AJX06	4	6100						
28	AJX09	2	2700	AJX08	3	4000	AJX06	4	5400						
30	AJX12	2	3100	AJX09	3	4700									
32	AJX12	2	2900	AJX09	3	4400	AJX08	4	5900						
35	AJX12	2	2700	AJX09	3	4000	AJX08	4	5400						
40	AJX12	3	3500	AJX09	4	4700	AJX08	6	7100						

Cutting conditions
Material: SCM440
Insert: FH7020
Vc (m/min): 150
Protrusion amount is calculated based on the maximum value in the table for recommended conditions. (Rounded down to the last two digits.)

STRAIGHT SHANK ARBOR

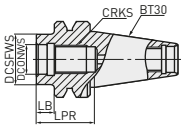




Order number	Stock	DCONWS	DCONMS	DCSFWS	LF	LB	H	CRKS
STEEL SHANK								
SC16M08S100S	★	8.5	16	14.5	100	10	10	M8
SC16M08S200L	★	8.5	16	14.5	200	10	10	M8
SC20M10S120S	★	10.5	20	18.5	120	10	14	M10
SC20M10S220L	★	10.5	20	18.5	220	10	14	M10
SC25M12S125S	★	12.5	25	23.5	125	10	19	M12
SC25M12S245L	★	12.5	25	23.5	245	10	19	M12
SC32M16S140S	★	17.0	32	28.5	140	15	24	M16
SC32M16S280L	★	17.0	32	28.5	280	15	24	M16
CARBIDE SHANK								
SC16M08S100SW	★	8.5	16	14.5	100	10	10	M8
SC16M08S200LW	★	8.5	16	14.5	200	10	10	M8
SC20M10S120SW	★	10.5	20	18.5	120	10	14	M10
SC20M10S220LW	★	10.5	20	18.5	220	10	14	M10
SC25M12S125SW	★	12.5	25	23.5	125	10	19	M12
SC25M12S245LW	★	12.5	25	23.5	245	10	19	M12
SC32M16S140SW	★	17.0	32	28.5	140	15	24	M16
SC32M16S280LW	★	17.0	32	28.5	280	15	24	M16

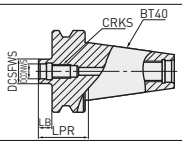
BT30 SHANK ARBOR

Order number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS	Execution
SC16M08S10-BT30	★	8.5	14.5	32	10	M8	
SC20M10S10-BT30	★	10.5	18.5	32	10	M10	
SC25M12S10-BT30	★	12.5	23.5	32	10	M12	
SC32M16S10-BT30	★	17.0	28.5	32	10	M16	



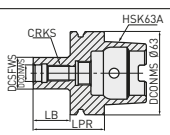
BT40 SHANK ARBOR

Order number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS	Execution
SC16M08S10-BT40	★	8.5	14.5	37	10	M8	
SC20M10S10-BT40	★	10.5	18.5	37	10	M10	
SC25M12S10-BT40	★	12.5	23.5	37	10	M12	
SC32M16S10-BT40	★	17.0	28.5	37	10	M16	



HSK63A SHANK ARBOR

Order number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS	Execution
SC16M08S22-HSK63A	★	8.5	14.5	48	22	M8	
SC20M10S24-HSK63A	★	10.5	18.5	50	24	M10	
SC25M12S27-HSK63A	★	12.5	23.5	53	27	M12	
SC32M16S28-HSK63A	★	17.0	28.5	54	28	M16	



DSAS

SOLID CARBIDE DRILLS FOR HRSA MATERIALS

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DIA EDGE

DSAS

APPLICATION

For successful drilling of HRSA materials in aerospace applications, cutting tools need to follow these important criteria:

- **Reliability**
- **Stable processing**
- **Hole quality**
- **Dimensional accuracy**

DSAS carbide drills are able to meet these requirements, and therefore able to machine high quality holes in HRSA materials such as cobalt chrome, Inconel, nickel & titanium alloys.

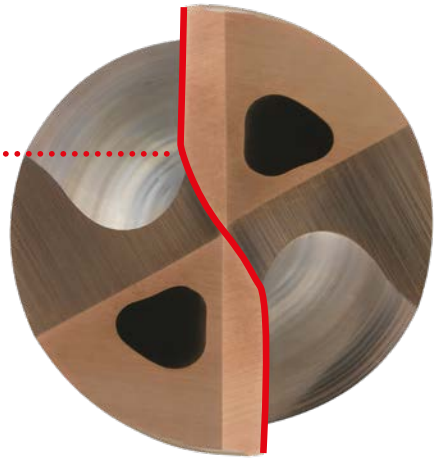
DSAS drills can be used successfully for drilling jet engine, gas turbine, rocket, aircraft and furnace components.

FEATURES

DP9020 GRADE FOR MACHINING HEAT RESISTANT ALLOYS
Tough carbide grade provides high wear and fracture resistance, resulting in extended tool life.

SPECIAL MARGIN
Thin margins reduce the contact area and avoids generation of work hardened layers when machining heat resistant alloys.

STRAIGHT CUTTING EDGE WITH DEDICATED HONING
The tough, straight cutting edge with a dedicated honing provides stable chip formation and prevents chipping at the cutting edge.



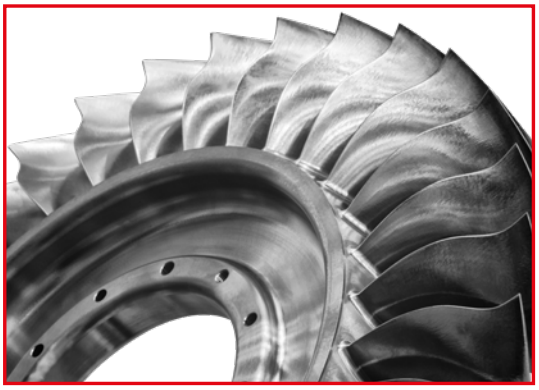
ADVANTAGES

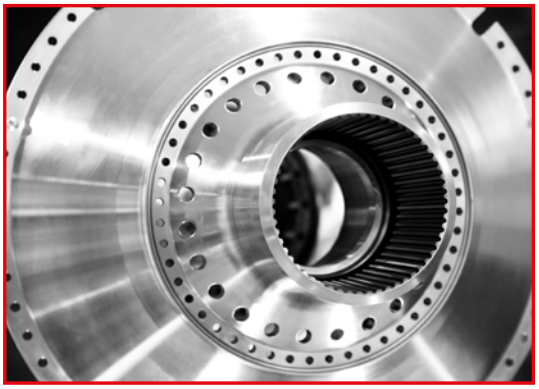
CONSTANT HOLE QUALITY

HIGH REPEATABILITY

PROCESS SECURITY

DRILLING ACCURACY





PRODUCT RANGE

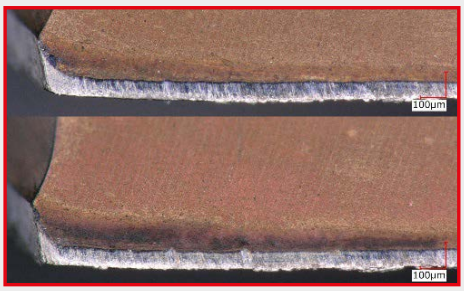
DRILL	DC	L / D	SHANK GEOMETRY	S	
DSAS	Ø 3 mm – 12 mm	3	DIN6535HA	◎	✔

1. Inch diameters are also available.

DSAS

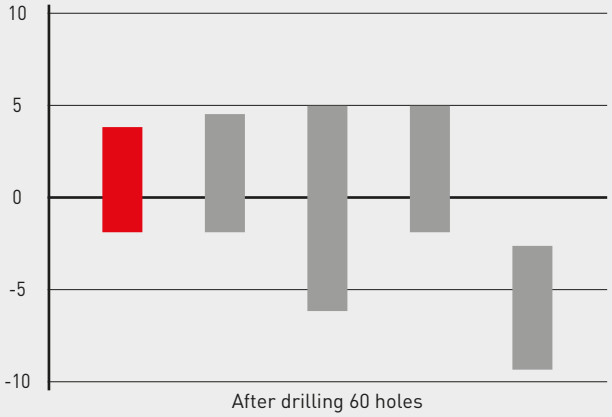
PERFORMANCE COMPARISON

Material	Inconel 718
Tool	DSAS0700X03S080
ap (mm)	12
Vc (m/min)	15
f (mm/rev)	0.10
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC



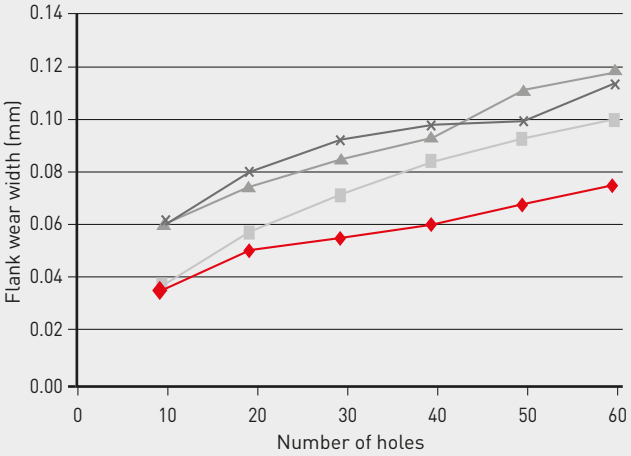
Flank wear width after drilling 60 holes

Ø HOLE OVERSIZE (MM)



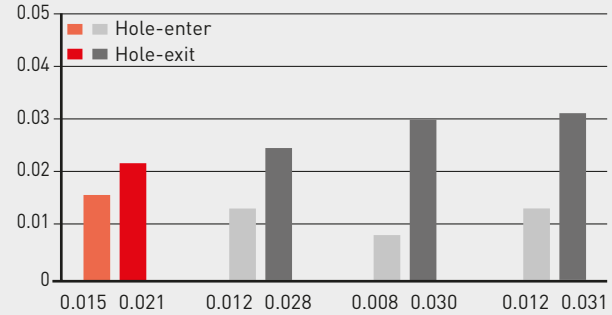
After drilling 60 holes

TOOL LIFE

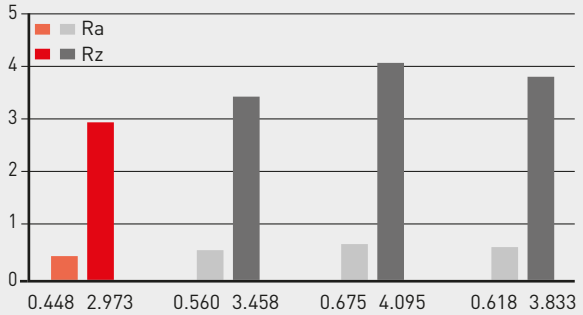


Material	Inconel 718
Tool	DSAS0700X03S080
ap (mm)	10
Vc (m/min)	15
f (mm/rev)	0.10
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC

ROUNDNESS



WALL SURFACE ROUGHNESS (MM)



■ : **Mitsubishi Materials tool** ■ A ■ B ■ C : Conventional tool

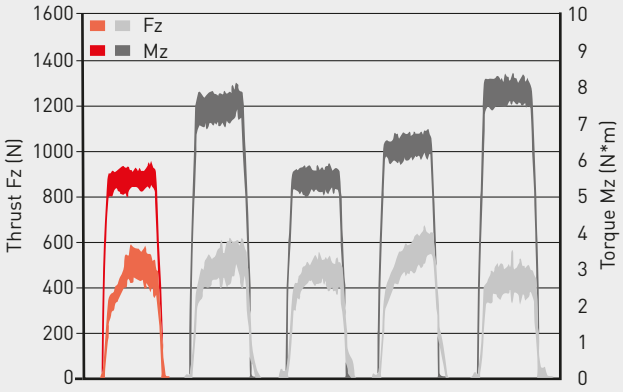
DSAS

CUTTING FORCE COMPARISON

SHARP CUTTING EDGES, LOW THRUST FORCE

Due to the sharper cutting edges, the DSAS drill gave a lower thrust force when drilling titanium compared to conventional products.

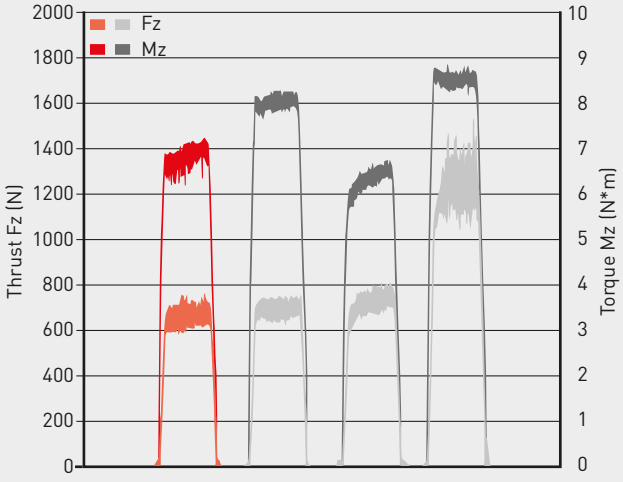
Material	Titanium alloy (Ti-6Al-4V)
Tool	DSAS0700X03S080
ap (mm)	10
Vc (m/min)	40
f (mm/rev)	0.15
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC



LOW CUTTING FORCE, HIGH QUALITY

The cutting resistance companion was carried out when machining RENE 41.
Compared to conventional products, DSAS maintained the lowest cutting force.

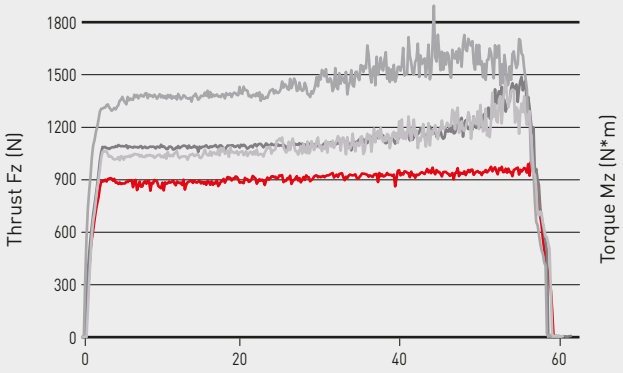
Material	RENE41
Tool	DSAS0700X03S080
ap (mm)	10
Vc (m/min)	15
f (mm/rev)	0.10
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC



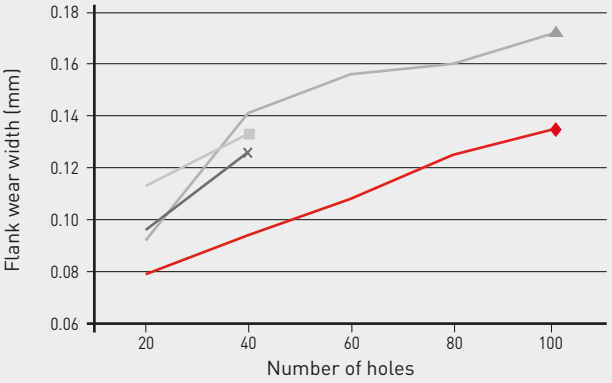
DSAS

CUTTING FORCE COMPARISON

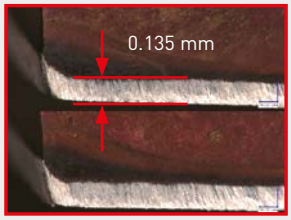
Material	Inconel 718
Tool	DSAS0600X05S060
DC (mm)	6
ap (mm)	30
Vc (m/min)	20
f (mm/rev)	0.16
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC



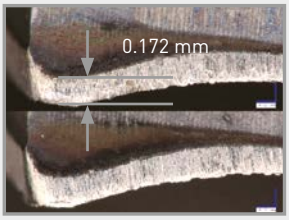
Material	Inconel 718
Tool	DSAS0600X05S060
DC (mm)	6
ap (mm)	30
Vc (m/min)	20
f (mm/rev)	0.10
Coolant	Emulsion (10 %), Internal coolant
Machine	Vertical MC



AFTER 100 HOLES



DSAS



Conventional

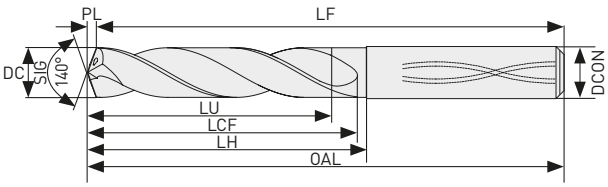
: Mitsubishi Materials tool A B C : Conventional tool

DSAS

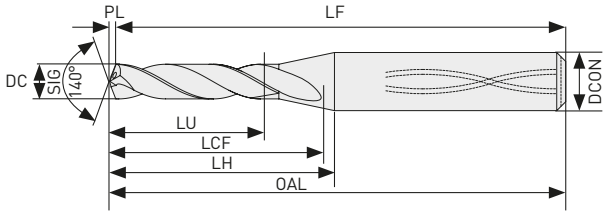
SOLID CARBIDE DRILL WITH INTERNAL COOLANT

S

1



2



DC=3	3<DC≤6	6<DC≤10	10<DC≤12
0 -0.018	0 -0.018	0 -0.022	0 -0.027

DC=3	3<DC≤6	6<DC≤10	10<DC≤12
0 -0.008	0 -0.008	0 -0.009	0 -0.011

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
	DSAS0300X03S060	●	3.00	6	3	70.5	9.5	21.5	23.5	70	0.5	1
NEW	DSAS0300X05S060	●	3.00	6	5	78.5	15.5	28.5	31.5	78	0.5	1
	DSAS0310X03S060	●	3.10	6	3	70.6	9.9	21.6	23.6	70	0.6	1
NEW	DSAS0310X05S060	●	3.10	6	5	78.6	16.1	28.6	31.6	78	0.6	1
	DSAS0318X03S060	●	3.18	6	3	70.6	10.1	21.6	23.6	70	0.6	1
NEW	DSAS0318X05S060	●	3.18	6	5	78.6	16.5	28.6	31.6	78	0.6	1
	DSAS0320X03S060	●	3.20	6	3	70.6	10.2	21.6	23.6	70	0.6	1
NEW	DSAS0320X05S060	●	3.20	6	5	78.6	16.6	28.6	31.6	78	0.6	1
	DSAS0326X03S060	●	3.26	6	3	70.6	10.4	21.6	23.6	70	0.6	1
NEW	DSAS0326X05S060	●	3.26	6	5	78.6	16.9	28.6	31.6	78	0.6	1
	DSAS0330X03S060	●	3.30	6	3	70.6	10.5	21.6	23.6	70	0.6	1
NEW	DSAS0330X05S060	●	3.30	6	5	78.6	17.1	28.6	31.6	78	0.6	1
	DSAS0340X03S060	●	3.40	6	3	70.6	10.8	21.6	23.6	70	0.6	1
NEW	DSAS0340X05S060	●	3.40	6	5	78.6	17.6	28.6	31.6	78	0.6	1
	DSAS0350X03S060	●	3.50	6	3	70.6	11.1	21.6	23.6	70	0.6	1
NEW	DSAS0350X05S060	●	3.50	6	5	78.6	18.1	28.6	31.6	78	0.6	1
	DSAS0357X03S060	●	3.57	6	3	70.7	11.4	22.7	23.7	70	0.7	1
NEW	DSAS0357X05S060	●	3.57	6	5	78.7	18.6	30.7	31.7	78	0.7	1
	DSAS0360X03S060	●	3.60	6	3	70.7	11.5	22.7	23.7	70	0.7	1
NEW	DSAS0360X05S060	●	3.60	6	5	78.7	18.7	30.7	31.7	78	0.7	1

DSAS

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
	DSAS0370X03S060	●	3.70	6	3	70.7	11.8	22.7	23.7	70	0.7	1
NEW	DSAS0370X05S060	●	3.70	6	5	78.7	19.2	30.7	31.7	78	0.7	1
	DSAS0380X03S060	●	3.80	6	3	70.7	12.1	22.7	23.7	70	0.7	1
NEW	DSAS0380X05S060	●	3.80	6	5	78.7	19.7	30.7	31.7	78	0.7	1
	DSAS0390X03S060	●	3.90	6	3	70.7	12.4	22.7	23.7	70	0.7	1
NEW	DSAS0390X05S060	●	3.90	6	5	78.7	20.2	30.7	31.7	78	0.7	1
	DSAS0397X03S060	●	3.97	6	3	70.7	12.6	22.7	23.7	70	0.7	1
NEW	DSAS0397X05S060	●	3.97	6	5	78.7	20.5	30.7	31.7	78	0.7	1
	DSAS0400X03S060	●	4.00	6	3	70.7	12.7	22.7	23.7	70	0.7	1
NEW	DSAS0400X05S060	●	4.00	6	5	78.7	20.7	30.7	31.7	78	0.7	1
	DSAS0410X03S060	●	4.10	6	3	73.7	13.0	24.7	26.7	73	0.7	1
NEW	DSAS0410X05S060	●	4.10	6	5	82.7	21.2	33.7	35.7	82	0.7	1
	DSAS0420X03S060	●	4.20	6	3	73.8	13.4	24.8	26.8	73	0.8	1
NEW	DSAS0420X05S060	●	4.20	6	5	82.8	21.8	33.8	35.8	82	0.8	1
	DSAS0430X03S060	●	4.30	6	3	73.8	13.7	24.8	26.8	73	0.8	1
NEW	DSAS0430X05S060	●	4.30	6	5	82.8	22.3	33.8	35.8	82	0.8	1
	DSAS0437X03S060	●	4.37	6	3	73.8	13.9	24.8	26.8	73	0.8	1
NEW	DSAS0437X05S060	●	4.37	6	5	82.8	22.6	33.8	35.8	82	0.8	1
	DSAS0440X03S060	●	4.40	6	3	73.8	14.0	24.8	26.8	73	0.8	1
NEW	DSAS0440X05S060	●	4.40	6	5	82.8	22.8	33.8	35.8	82	0.8	1
	DSAS0450X03S060	●	4.50	6	3	73.8	14.3	24.8	26.8	73	0.8	1
NEW	DSAS0450X05S060	●	4.50	6	5	82.8	23.3	33.8	35.8	82	0.8	1
	DSAS0460X03S060	●	4.60	6	3	75.8	14.6	25.8	28.8	75	0.8	1
NEW	DSAS0460X05S060	●	4.60	6	5	85.8	23.8	35.8	38.8	85	0.8	1
	DSAS0470X03S060	●	4.70	6	3	75.9	15.0	25.9	28.9	75	0.9	1
NEW	DSAS0470X05S060	●	4.70	6	5	85.9	24.4	35.9	38.9	85	0.9	1
	DSAS0476X03S060	●	4.76	6	3	75.9	15.2	25.9	28.9	75	0.9	1
NEW	DSAS0476X05S060	●	4.76	6	5	85.9	24.7	35.9	38.9	85	0.9	1
	DSAS0480X03S060	●	4.80	6	3	75.9	15.3	25.9	28.9	75	0.9	1
NEW	DSAS0480X05S060	●	4.80	6	5	85.9	24.9	35.9	38.9	85	0.9	1
	DSAS0486X03S060	●	4.86	6	3	75.9	15.5	25.9	28.9	75	0.9	1
NEW	DSAS0486X05S060	●	4.86	6	5	85.9	25.2	35.9	38.9	85	0.9	1
	DSAS0490X03S060	●	4.90	6	3	75.9	15.6	25.9	28.9	75	0.9	1
NEW	DSAS0490X05S060	●	4.90	6	5	85.9	25.4	35.9	38.9	85	0.9	1
	DSAS0500X03S060	●	5.00	6	3	81.9	15.9	28.9	29.9	81	0.9	2
NEW	DSAS0500X05S060	●	5.00	6	5	89.9	25.9	39.9	42.9	89	0.9	2
	DSAS0510X03S060	●	5.10	6	3	81.9	16.2	28.9	29.9	81	0.9	2
NEW	DSAS0510X05S060	●	5.10	6	5	89.9	26.4	39.9	42.9	89	0.9	2
	DSAS0516X03S060	●	5.16	6	3	82.0	16.5	29.0	30.0	81	1.0	2
NEW	DSAS0516X05S060	●	5.16	6	5	90.0	26.8	40.0	43.0	89	1.0	2
	DSAS0520X03S060	●	5.20	6	3	82.0	16.6	29.0	30.0	81	1.0	2
NEW	DSAS0520X05S060	●	5.20	6	5	90.0	27.0	40.0	43.0	89	1.0	2
	DSAS0530X03S060	●	5.30	6	3	82.0	16.9	29.0	30.0	81	1.0	2
NEW	DSAS0530X05S060	●	5.30	6	5	90.0	27.5	40.0	43.0	89	1.0	2
	DSAS0540X03S060	●	5.40	6	3	82.0	17.2	29.0	30.0	81	1.0	2
NEW	DSAS0540X05S060	●	5.40	6	5	90.0	28.0	40.0	43.0	89	1.0	2
	DSAS0550X03S060	●	5.50	6	3	82.0	17.5	29.0	30.0	81	1.0	2
NEW	DSAS0550X05S060	●	5.50	6	5	90.0	28.5	40.0	43.0	89	1.0	2
	DSAS0556X03S060	●	5.56	6	3	82.1	17.8	31.1	31.1	81	1.1	2
NEW	DSAS0556X05S060	●	5.56	6	5	90.1	28.9	43.1	43.1	89	1.1	2

1. The coolant holes will be round in drills of Ø 5 mm or less.

DSAS

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
	DSAS0560X03S060	●	5.60	6	3	82.1	17.9	31.1	31.1	81	1.1	2
NEW	DSAS0560X05S060	●	5.60	6	5	90.1	29.1	43.1	43.1	89	1.1	2
	DSAS0570X03S060	●	5.70	6	3	82.1	18.2	31.1	31.1	81	1.1	2
NEW	DSAS0570X05S060	●	5.70	6	5	90.1	29.6	43.1	43.1	89	1.1	2
	DSAS0580X03S060	●	5.80	6	3	82.1	18.5	31.1	31.1	81	1.1	2
NEW	DSAS0580X05S060	●	5.80	6	5	90.1	30.1	43.1	43.1	89	1.1	2
	DSAS0590X03S060	●	5.90	6	3	82.1	18.8	31.1	31.1	81	1.1	2
NEW	DSAS0590X05S060	●	5.90	6	5	90.1	30.6	43.1	43.1	89	1.1	2
	DSAS0595X03S060	●	5.95	6	3	82.1	19.0	31.1	31.1	81	1.1	2
NEW	DSAS0595X05S060	●	5.95	6	5	90.1	30.9	43.1	43.1	89	1.1	2
	DSAS0600X03S060	●	6.00	6	3	82.1	19.1	31.1	31.1	81	1.1	2
NEW	DSAS0600X05S060	●	6.00	6	5	90.1	31.1	43.1	43.1	89	1.1	2
	DSAS0610X03S080	●	6.10	8	3	87.2	19.5	34.2	37.2	86	1.2	2
NEW	DSAS0610X05S080	●	6.10	8	5	96.2	31.7	47.2	49.2	95	1.2	2
	DSAS0620X03S080	●	6.20	8	3	87.2	19.8	34.2	37.2	86	1.2	2
NEW	DSAS0620X05S080	●	6.20	8	5	96.2	32.2	47.2	49.2	95	1.2	2
	DSAS0630X03S080	●	6.30	8	3	87.2	20.1	34.2	37.2	86	1.2	2
NEW	DSAS0630X05S080	●	6.30	8	5	96.2	32.7	47.2	49.2	95	1.2	2
	DSAS0635X03S080	●	6.35	8	3	87.2	20.3	34.2	37.2	86	1.2	2
NEW	DSAS0635X05S080	●	6.35	8	5	96.2	33.0	47.2	49.2	95	1.2	2
	DSAS0640X03S080	●	6.40	8	3	87.2	20.4	34.2	37.2	86	1.2	2
NEW	DSAS0640X05S080	●	6.40	8	5	96.2	33.2	47.2	49.2	95	1.2	2
	DSAS0650X03S080	●	6.50	8	3	87.2	20.7	34.2	37.2	86	1.2	2
NEW	DSAS0650X05S080	●	6.50	8	5	96.2	33.7	47.2	49.2	95	1.2	2
	DSAS0660X03S080	●	6.60	8	3	91.3	21.1	36.3	38.3	90	1.3	2
NEW	DSAS0660X05S080	●	6.60	8	5	99.3	34.3	50.3	52.3	98	1.3	2
	DSAS0670X03S080	●	6.70	8	3	91.3	21.4	36.3	38.3	90	1.3	2
NEW	DSAS0670X05S080	●	6.70	8	5	99.3	34.8	50.3	52.3	98	1.3	2
	DSAS0675X03S080	●	6.75	8	3	91.3	21.5	36.3	38.3	90	1.3	2
NEW	DSAS0675X05S080	●	6.75	8	5	99.3	35.0	50.3	52.3	98	1.3	2
	DSAS0680X03S080	●	6.80	8	3	91.3	21.7	36.3	38.3	90	1.3	2
NEW	DSAS0680X05S080	●	6.80	8	5	99.3	35.3	50.3	52.3	98	1.3	2
	DSAS0690X03S080	●	6.90	8	3	91.3	22.0	36.3	38.3	90	1.3	2
NEW	DSAS0690X05S080	●	6.90	8	5	99.3	35.8	50.3	52.3	98	1.3	2
	DSAS0695X03S080	●	6.95	8	3	91.3	22.2	36.3	38.3	90	1.3	2
NEW	DSAS0695X05S080	●	6.95	8	5	99.3	36.1	50.3	52.3	98	1.3	2
	DSAS0700X03S080	●	7.00	8	3	91.3	22.3	36.3	38.3	90	1.3	2
NEW	DSAS0700X05S080	●	7.00	8	5	99.3	36.3	50.3	52.3	98	1.3	2
	DSAS0710X03S080	●	7.10	8	3	91.4	22.7	39.4	40.4	90	1.4	2
NEW	DSAS0710X05S080	●	7.10	8	5	104.4	36.9	54.4	57.4	103	1.4	2
	DSAS0714X03S080	●	7.14	8	3	91.4	22.8	39.4	40.4	90	1.4	2
NEW	DSAS0714X05S080	●	7.14	8	5	104.4	37.1	54.4	57.4	103	1.4	2
	DSAS0720X03S080	●	7.20	8	3	91.4	23.0	39.4	40.4	90	1.4	2
NEW	DSAS0720X05S080	●	7.20	8	5	104.4	37.4	54.4	57.4	103	1.4	2
	DSAS0730X03S080	●	7.30	8	3	91.4	23.3	39.4	40.4	90	1.4	2
NEW	DSAS0730X05S080	●	7.30	8	5	104.4	37.9	54.4	57.4	103	1.4	2
	DSAS0740X03S080	●	7.40	8	3	91.4	23.6	39.4	40.4	90	1.4	2
NEW	DSAS0740X05S080	●	7.40	8	5	104.4	38.4	54.4	57.4	103	1.4	2
	DSAS0750X03S080	●	7.50	8	3	91.4	23.9	39.4	40.4	90	1.4	2

1. The coolant holes will be round in drills of Ø 5 mm or less.

DSAS

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
NEW	DSAS0750X05S080	●	7.50	8	5	104.4	38.9	54.4	57.4	103	1.4	2
	DSAS0754X03S080	●	7.54	8	3	91.5	24.1	41.5	41.5	90	1.5	2
NEW	DSAS0754X05S080	●	7.54	8	5	104.5	39.2	57.5	57.5	103	1.5	2
	DSAS0760X03S080	●	7.60	8	3	91.5	24.3	41.5	41.5	90	1.5	2
NEW	DSAS0760X05S080	●	7.60	8	5	104.5	39.5	57.5	57.5	103	1.5	2
	DSAS0770X03S080	●	7.70	8	3	91.5	24.6	41.5	41.5	90	1.5	2
NEW	DSAS0770X05S080	●	7.70	8	5	104.5	40.0	57.5	57.5	103	1.5	2
	DSAS0780X03S080	●	7.80	8	3	91.5	24.9	41.5	41.5	90	1.5	2
NEW	DSAS0780X05S080	●	7.80	8	5	104.5	40.5	57.5	57.5	103	1.5	2
	DSAS0790X03S080	●	7.90	8	3	91.5	25.2	41.5	41.5	90	1.5	2
NEW	DSAS0790X05S080	●	7.90	8	5	104.5	41.0	57.5	57.5	103	1.5	2
	DSAS0794X03S080	●	7.94	8	3	91.5	25.3	41.5	41.5	90	1.5	2
NEW	DSAS0794X05S080	●	7.94	8	5	104.5	41.2	57.5	57.5	103	1.5	2
	DSAS0800X03S080	●	8.00	8	3	91.5	25.5	41.5	41.5	90	1.5	2
NEW	DSAS0800X05S080	●	8.00	8	5	104.5	41.5	57.5	57.5	103	1.5	2
	DSAS0810X03S100	●	8.10	10	3	97.5	25.8	44.5	47.5	96	1.5	2
NEW	DSAS0810X05S100	●	8.10	10	5	114.5	42.0	61.5	63.5	113	1.5	2
	DSAS0820X03S100	●	8.20	10	3	97.5	26.1	44.5	47.5	96	1.5	2
NEW	DSAS0820X05S100	●	8.20	10	5	114.5	42.5	61.5	63.5	113	1.5	2
	DSAS0830X03S100	●	8.30	10	3	97.5	26.4	44.5	47.5	96	1.5	2
NEW	DSAS0830X05S100	●	8.30	10	5	114.5	43.0	61.5	63.5	113	1.5	2
	DSAS0833X03S100	●	8.33	10	3	97.5	26.5	44.5	47.5	96	1.5	2
NEW	DSAS0833X05S100	●	8.33	10	5	114.5	43.2	61.5	63.5	113	1.5	2
	DSAS0840X03S100	●	8.40	10	3	97.5	26.7	44.5	47.5	96	1.5	2
NEW	DSAS0840X05S100	●	8.40	10	5	114.5	43.5	61.5	63.5	113	1.5	2
	DSAS0850X03S100	●	8.50	10	3	97.5	27.0	44.5	47.5	96	1.5	2
NEW	DSAS0850X05S100	●	8.50	10	5	114.5	44.0	61.5	63.5	113	1.5	2
	DSAS0860X03S100	●	8.60	10	3	102.6	27.4	46.6	48.6	101	1.6	2
NEW	DSAS0860X05S100	●	8.60	10	5	117.6	44.6	64.6	66.6	116	1.6	2
	DSAS0870X03S100	●	8.70	10	3	102.6	27.7	46.6	48.6	101	1.6	2
NEW	DSAS0870X05S100	●	8.70	10	5	117.6	45.1	64.6	66.6	116	1.6	2
	DSAS0873X03S100	●	8.73	10	3	102.6	27.8	46.6	48.6	101	1.6	2
NEW	DSAS0873X05S100	●	8.73	10	5	117.6	45.3	64.6	66.6	116	1.6	2
	DSAS0880X03S100	●	8.80	10	3	102.6	28.0	46.6	48.6	101	1.6	2
NEW	DSAS0880X05S100	●	8.80	10	5	117.6	45.6	64.6	66.6	116	1.6	2
	DSAS0890X03S100	●	8.90	10	3	102.6	28.3	46.6	48.6	101	1.6	2
NEW	DSAS0890X05S100	●	8.90	10	5	117.6	46.1	64.6	66.6	116	1.6	2
	DSAS0900X03S100	●	9.00	10	3	102.6	28.6	46.6	48.6	101	1.6	2
NEW	DSAS0900X05S100	●	9.00	10	5	117.6	46.6	64.6	66.6	116	1.6	2
	DSAS0910X03S100	●	9.10	10	3	102.8	29.1	49.8	50.8	101	1.8	2
NEW	DSAS0910X05S100	●	9.10	10	5	122.8	47.3	68.8	71.8	121	1.8	2
	DSAS0920X03S100	●	9.20	10	3	102.8	29.4	49.8	50.8	101	1.8	2
NEW	DSAS0920X05S100	●	9.20	10	5	122.8	47.8	68.8	71.8	121	1.8	2
	DSAS0930X03S100	●	9.30	10	3	102.8	29.7	49.8	50.8	101	1.8	2
NEW	DSAS0930X05S100	●	9.30	10	5	122.8	48.3	68.8	71.8	121	1.8	2
	DSAS0940X03S100	●	9.40	10	3	102.8	30.0	49.8	50.8	101	1.8	2
NEW	DSAS0940X05S100	●	9.40	10	5	122.8	48.8	68.8	71.8	121	1.8	2
	DSAS0950X03S100	●	9.50	10	3	102.8	30.3	49.8	50.8	101	1.8	2
NEW	DSAS0950X05S100	●	9.50	10	5	122.8	49.3	68.8	71.8	121	1.8	2
	DSAS0953X03S100	●	9.53	10	3	102.8	30.4	49.8	50.8	101	1.8	2

1. The coolant holes will be round in drills of Ø 5 mm or less.

DSAS

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
NEW	DSAS0953X05S100	●	9.53	10	5	122.8	49.4	68.8	71.8	121	1.8	2
	DSAS0960X03S100	●	9.60	10	3	102.8	30.6	49.8	50.8	101	1.8	2
NEW	DSAS0960X05S100	●	9.60	10	5	122.8	49.8	68.8	71.8	121	1.8	2
	DSAS0970X03S100	●	9.70	10	3	102.8	30.9	49.8	50.8	101	1.8	2
NEW	DSAS0970X05S100	●	9.70	10	5	122.8	50.3	68.8	71.8	121	1.8	2
	DSAS0980X03S100	●	9.80	10	3	102.8	31.2	51.8	51.8	101	1.8	2
NEW	DSAS0980X05S100	●	9.80	10	5	122.8	50.8	71.8	71.8	121	1.8	2
	DSAS0990X03S100	●	9.90	10	3	102.8	31.5	51.9	51.8	101	1.8	2
NEW	DSAS0990X05S100	●	9.90	10	5	122.8	51.3	71.8	71.8	121	1.8	2
	DSAS0992X03S100	●	9.92	10	3	102.8	31.6	51.8	51.8	101	1.8	2
NEW	DSAS0992X05S100	●	9.92	10	5	122.8	51.4	71.8	71.8	121	1.8	2
	DSAS1000X03S100	●	10.00	10	3	102.8	31.8	51.8	51.8	101	1.8	2
NEW	DSAS1000X05S100	●	10.00	10	5	122.8	51.8	71.8	71.8	121	1.8	2
	DSAS1010X03S120	●	10.10	12	3	112.9	32.2	54.9	57.9	111	1.9	2
NEW	DSAS1010X05S120	●	10.10	12	5	135.9	52.4	75.9	79.9	134	1.9	2
	DSAS1020X03S120	●	10.20	12	3	112.9	32.5	54.9	57.9	111	1.9	2
NEW	DSAS1020X05S120	●	10.20	12	5	135.9	52.9	75.9	79.9	134	1.9	2
	DSAS1030X03S120	●	10.30	12	3	112.9	32.8	54.9	57.9	111	1.9	2
NEW	DSAS1030X05S120	●	10.30	12	5	135.9	53.4	75.9	79.9	134	1.9	2
	DSAS1032X03S120	●	10.32	12	3	112.9	32.9	54.9	57.9	111	1.9	2
NEW	DSAS1032X05S120	●	10.32	12	5	135.9	53.5	75.9	79.9	134	1.9	2
	DSAS1040X03S120	●	10.40	12	3	112.9	33.1	54.9	57.9	111	1.9	2
NEW	DSAS1040X05S120	●	10.40	12	5	135.9	53.9	75.9	79.9	134	1.9	2
	DSAS1050X03S120	●	10.50	12	3	112.9	33.4	54.9	57.9	111	1.9	2
NEW	DSAS1050X05S120	●	10.50	12	5	135.9	54.4	75.9	79.9	134	1.9	2
	DSAS1060X03S120	●	10.60	12	3	112.9	33.7	54.9	57.9	111	1.9	2
NEW	DSAS1060X05S120	●	10.60	12	5	135.9	54.9	75.9	79.9	134	1.9	2
	DSAS1070X03S120	●	10.70	12	3	112.9	34.0	54.9	57.9	111	1.9	2
NEW	DSAS1070X05S120	●	10.70	12	5	135.9	55.4	75.9	79.9	134	1.9	2
	DSAS1072X03S120	●	10.72	12	3	118.0	34.1	57.0	59.0	116	2.0	2
NEW	DSAS1072X05S120	●	10.72	12	5	142.0	55.6	79.0	80.0	140	2.0	2
	DSAS1080X03S120	●	10.80	12	3	118.0	34.4	57.0	59.0	116	2.0	2
NEW	DSAS1080X05S120	●	10.80	12	5	142.0	56.0	79.0	80.0	140	2.0	2
	DSAS1090X03S120	●	10.90	12	3	118.0	34.7	57.0	59.0	116	2.0	2
NEW	DSAS1090X05S120	●	10.90	12	5	142.0	56.5	79.0	80.0	140	2.0	2
	DSAS1100X03S120	●	11.00	12	3	118.0	35.0	57.0	59.0	116	2.0	2
NEW	DSAS1100X05S120	●	11.00	12	5	142.0	57.0	79.0	80.0	140	2.0	2
	DSAS1110X03S120	●	11.10	12	3	118.1	35.4	60.1	61.1	116	2.1	2
NEW	DSAS1110X05S120	●	11.10	12	5	142.1	57.6	83.1	86.1	140	2.1	2
	DSAS1111X03S120	●	11.11	12	3	118.1	35.4	60.1	61.1	116	2.1	2
NEW	DSAS1111X05S120	●	11.11	12	5	142.1	57.7	83.1	86.1	140	2.1	2
	DSAS1120X03S120	●	11.20	12	3	118.1	35.7	60.1	61.1	116	2.1	2
NEW	DSAS1120X05S120	●	11.20	12	5	142.1	58.1	83.1	86.1	140	2.1	2
	DSAS1130X03S120	●	11.30	12	3	118.1	36.0	60.1	61.1	116	2.1	2
NEW	DSAS1130X05S120	●	11.30	12	5	142.1	58.6	83.1	86.1	140	2.1	2
	DSAS1140X03S120	●	11.40	12	3	118.1	36.3	60.1	61.1	116	2.1	2
NEW	DSAS1140X05S120	●	11.40	12	5	142.1	59.1	83.1	86.1	140	2.1	2
	DSAS1150X03S120	●	11.50	12	3	118.1	36.6	60.1	61.1	116	2.1	2
NEW	DSAS1150X05S120	●	11.50	12	5	142.1	59.6	83.1	86.1	140	2.1	2
	DSAS1151X03S120	●	11.51	12	3	118.2	36.7	62.2	62.2	116	2.2	2

1. The coolant holes will be round in drills of Ø 5 mm or less.

DSAS

	Order number	DP9020	DC	DCON	L / D	OAL	LU	LCF	LH	LF	PL	Type
NEW	DSAS1151X05S120	●	11.51	12	5	142.2	59.7	86.2	86.2	140	2.2	2
	DSAS1160X03S120	●	11.60	12	3	118.2	37.0	62.2	62.2	116	2.2	2
NEW	DSAS1160X05S120	●	11.60	12	5	142.2	60.2	86.2	86.2	140	2.2	2
	DSAS1170X03S120	●	11.70	12	3	118.2	37.3	62.2	62.2	116	2.2	2
NEW	DSAS1170X05S120	●	11.70	12	5	142.2	60.7	86.2	86.2	140	2.2	2
	DSAS1180X03S120	●	11.80	12	3	118.2	37.6	62.2	62.2	116	2.2	2
NEW	DSAS1180X05S120	●	11.80	12	5	142.2	61.2	86.2	86.2	140	2.2	2
	DSAS1190X03S120	●	11.90	12	3	118.2	37.9	62.2	62.2	116	2.2	2
NEW	DSAS1190X05S120	●	11.90	12	5	142.2	61.7	86.2	86.2	140	2.2	2
	DSAS1200X03S120	●	12.00	12	3	118.2	38.2	62.2	62.2	116	2.2	2
NEW	DSAS1200X05S120	●	12.00	12	5	142.2	62.2	86.2	86.2	140	2.2	2

1. The coolant holes will be round in drills of Ø 5 mm or less.

167 Vc

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

DSAS

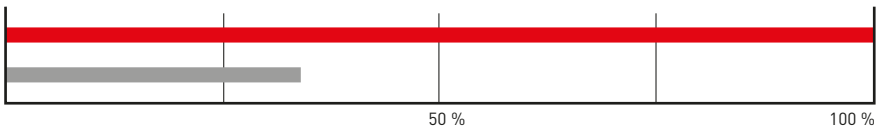
RECOMMENDED CUTTING CONDITIONS

	Material	DC	L / D	Vc	n	f
S	Heat-resistant alloy	3	≤5	10	1000	0.06 (0.04–0.1)
		4		10	790	0.06 (0.04–0.1)
		5		12	760	0.08 (0.06–0.12)
		6		15	790	0.1 (0.08–0.15)
		8		15	590	0.1 (0.08–0.15)
		10		18	570	0.1 (0.08–0.15)
		12		20	530	0.12 (0.08–0.15)
	Titanium alloy	3	≤5	40	4200	0.08 (0.06–0.12)
		4		40	3100	0.1 (0.08–0.16)
		5		40	2500	0.12 (0.08–0.2)
		6		40	2100	0.14 (0.1 –0.2)
		8		42	1600	0.18 (0.15–0.25)
		10		42	1300	0.22 (0.18–0.28)
		12		45	1100	0.24 (0.2 –0.3)

1. Through spindle high pressure coolant is recommended.
2. Emulsion coolant is recommended.
3. When using non water-soluble coolant reduce the cutting speed by 10-20 %.
4. When drilling using an external coolant system, peck / step feed drilling is recommended at every DC x 0.5 depth to promote the breaking of chips.

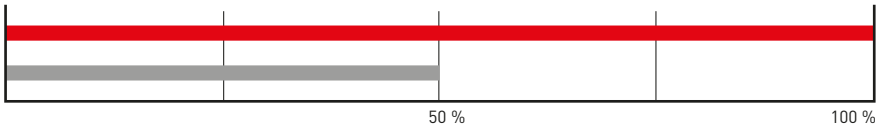
APPLICATION EXAMPLES

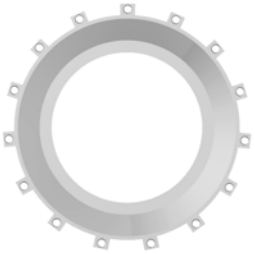
Tool	DSAS0800X03S080
Workpiece material	Jet engine casing – Inconel 718
Vc (m/min)	15
f (mm/rev)	0.10
ap (mm)	5
Coolant	Emulsion internal
Result	12 holes (continued drilling still possible)



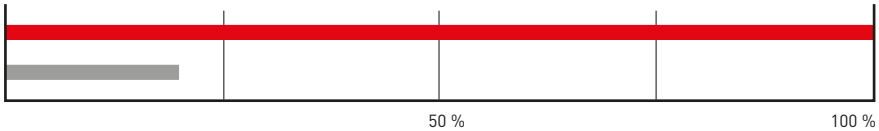
DSAS drill achieved more than 3 times longer tool life and displayed stable drilling with good hole accuracy.

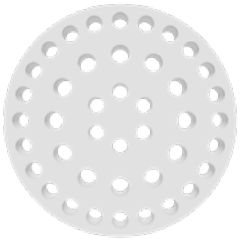
Tool	DSAS0560X03S060
Workpiece material	Inner Seal – HS188
Vc (m/min)	15
f (mm/rev)	0.035
ap (mm)	5
Coolant	Emulsion internal
Result	64 holes (further drilling still possible)



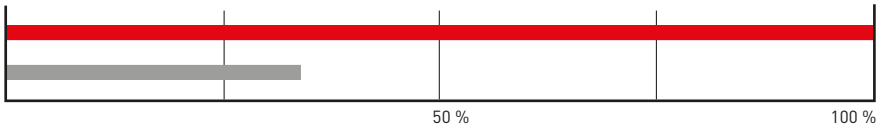


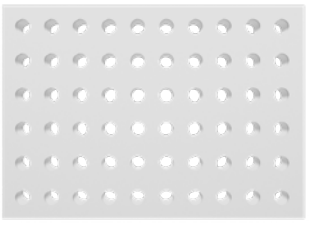
Tool	DSAS0800X03S080
Workpiece material	K-Monel
Vc (m/min)	26
f (mm/rev)	0.1
ap (mm)	32
Coolant	Emulsion internal
Result	50 holes





Tool	DSAS0580X03S060
Workpiece material	Rene41
Vc (m/min)	23.6
f (mm/rev)	0.05
ap (mm)	12
Coolant	Emulsion internal
Result	60 holes





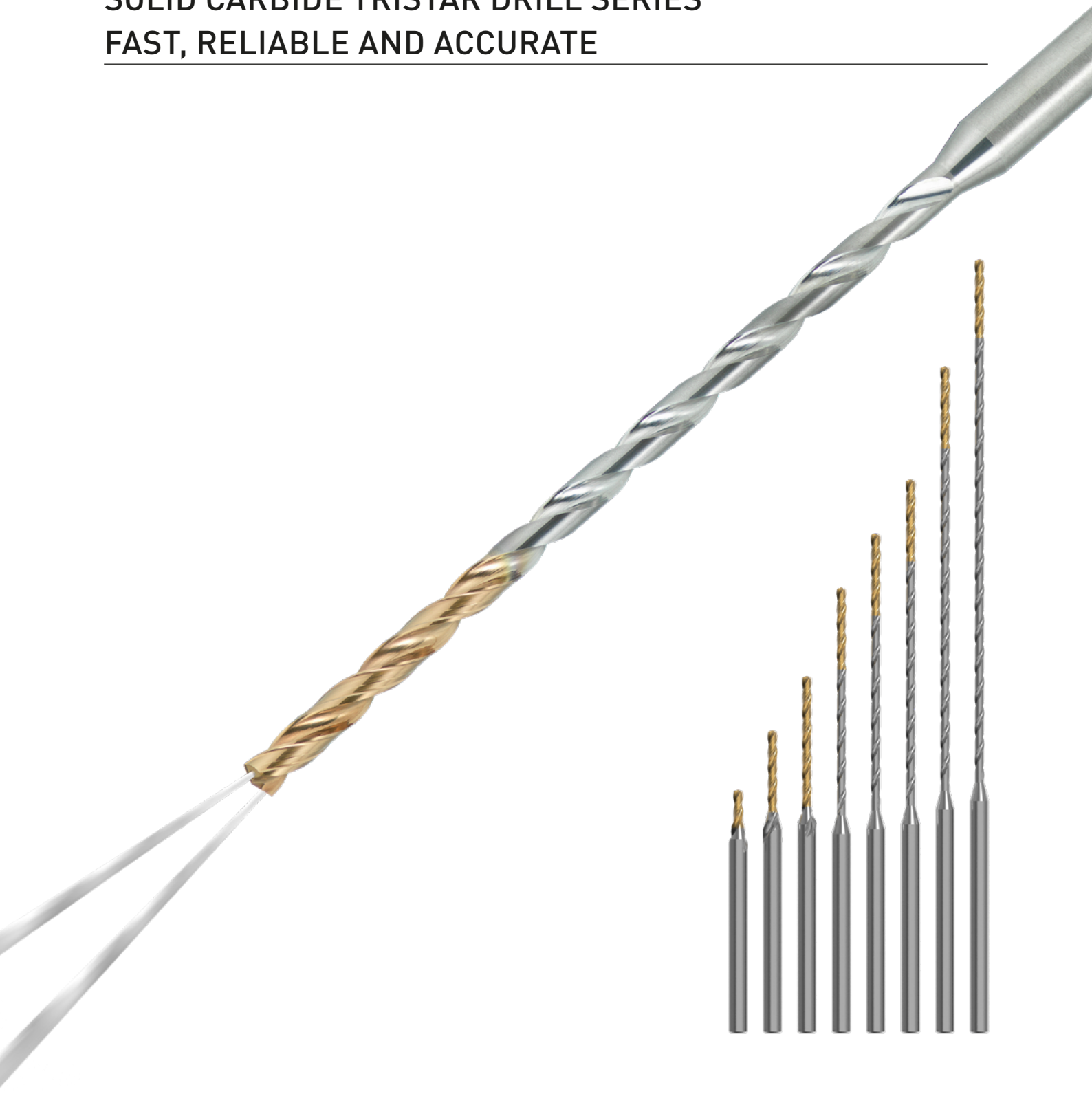
Hole tolerance was mantained.

■ : **DSAS** ■ : Other tools

NEW

MINI DVAS

SOLID CARBIDE TRISTAR DRILL SERIES
FAST, RELIABLE AND ACCURATE



Interested in more...

B267

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DIA EDGE

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.

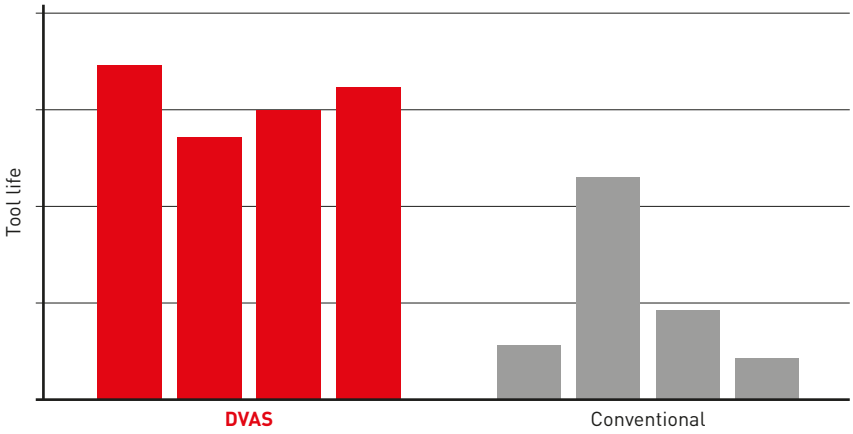
DVAS drills can perform at higher feeds and speeds meaning faster drilling cycles.

Cutting time 8 s/hole

TRISTAR: **RELIABLE**

Breakages, short tool life and lack of coolant can be common with standard tools.

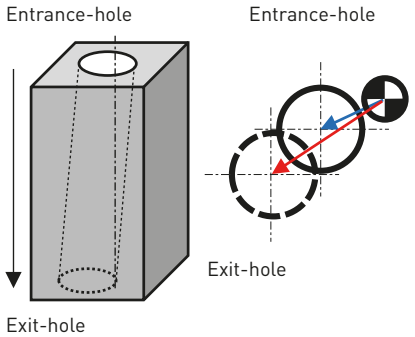
DVAS - Tool life exceeds all normal expectations.

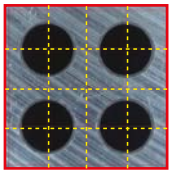


TRISTAR: **ACCURATE**

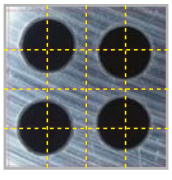
Conventionally drilled holes can wander considerably and have poor positioning.

Straighter holes and improved dimensional accuracy are enabled by using DVAS drills.





DVAS

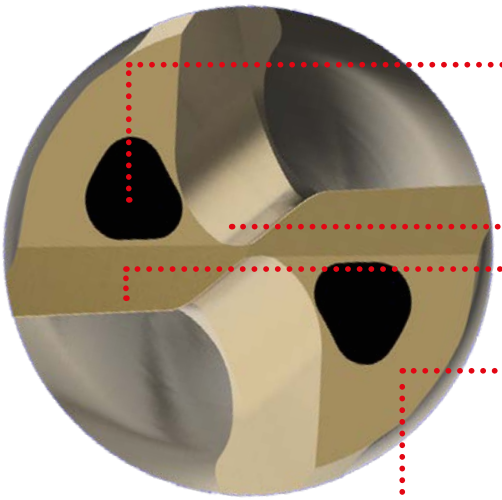


Conventional

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



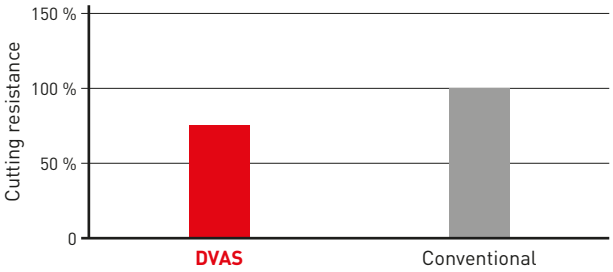
ADVANCED COOLANT HOLE

NEW XR POINT THINNING

TOUGH AND SHARP CUTTING EDGE DESIGN

NEW COATED GRADE DP1120

UNIQUE RIGID FORM

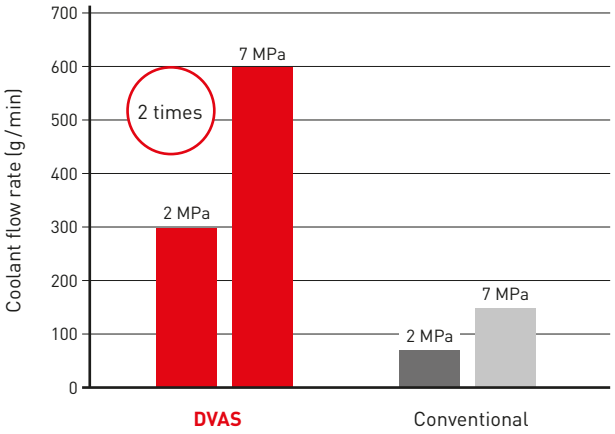


Material	42CrMo4
Tool	DC = Ø 1.0 mm, L/D = 20
Vc (m/min)	70
f (mm/rev)	0.04

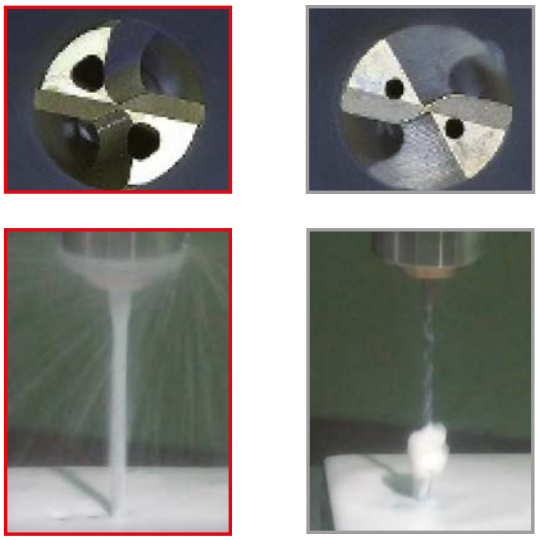
MINI DVAS

COOLANT HOLES WITH TRI-COOLING TECHNOLOGY

TRI-Cooling is optimal for small-diameter drills and can achieve more than double the conventional coolant discharge volume. This can dramatically improve chip discharge and heat dissipation, contributing greatly to tool life stability.



Drill	DC = Ø2 mm, L/D = 20
Coolant	Water-soluble coolants

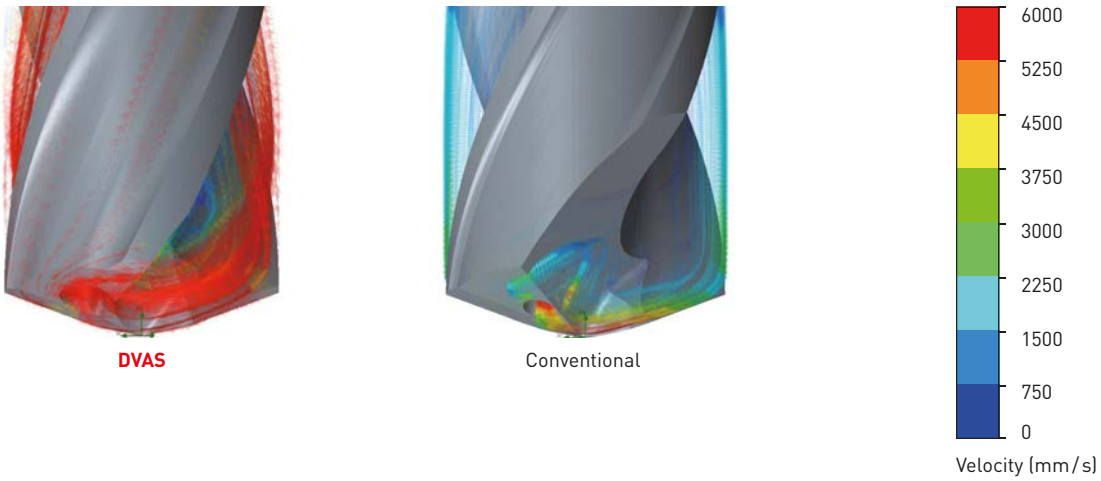


DVAS | Conventional

LARGE COOLANT HOLES IMPROVE COOLING EFFECT, REDUCE DAMAGE AND INCREASE TOOL LIFE

Increased coolant flow provides effective cooling even in difficult applications or when using an oil based cutting fluid.

COOLANT FLOW SPEED SIMULATION



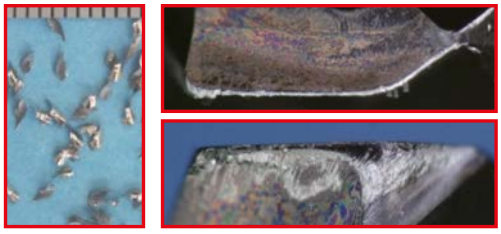
DVAS | Conventional

MINI DVAS

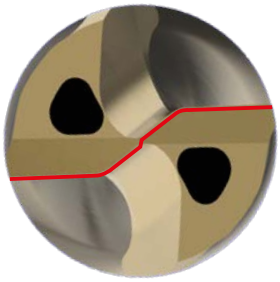
TOUGH, SHARP CUTTING EDGE DESIGN

The straight cutting edge and thinned point are connected by a smooth curved geometry that significantly improves fracture resistance. The geometry of the rake angle and land also improves tool wear and chip disposal.

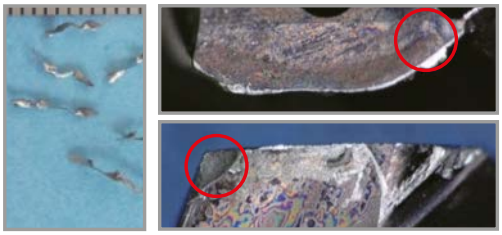
Material	42CrMo4
Tool	DC = Ø2 mm, L/D = 20
Vc (m/min)	50
f (mm/rev)	0.06
Cutting mode	Wet cutting Water-soluble coolants, 2 MPa



DVAS



Large crater wear and fracture of the outer edge.



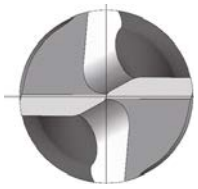
Conventional

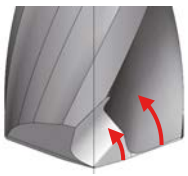
NEW XR POINT THINNING, REDUCES CUTTING LOAD AND OPTIMISES CHIP FLOW

The new point thinning breaks chips into the optimum shape for a streamlined flow and achieves a much lower cutting resistance.

DVAS

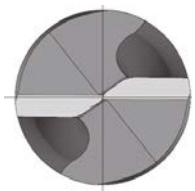
The R shaped space created by the point thinning helps to form compact chips and aid flow.

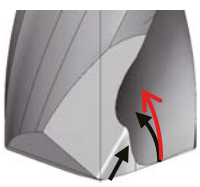


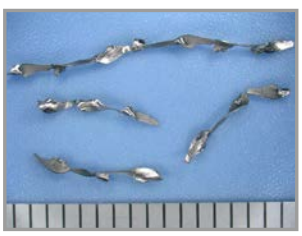


CONVENTIONAL DRILLS

Creates larger chips with a lower rate of flow that can cause chip clogging.





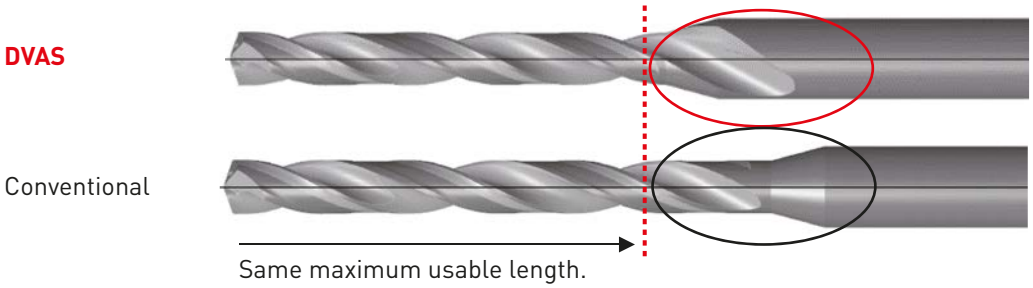


MINI DVAS

UNIQUE FLUTE FORM FOR GREATER RIGIDITY

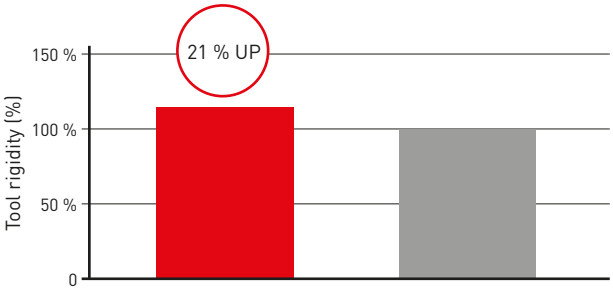
The short drill is designed for high rigidity and good chip evacuation by minimizing the neck length.
A chip discharge area is provided over the taper part, thus increasing tool rigidity by 20 % more than conventional models and in addition the extra strength improves hole position accuracy.

Applies to L/D = 2, 7, 12



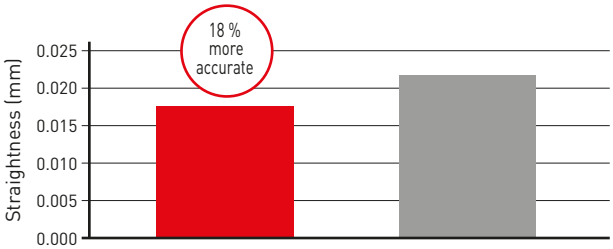
COMPARISON OF TOOL RIGIDITY

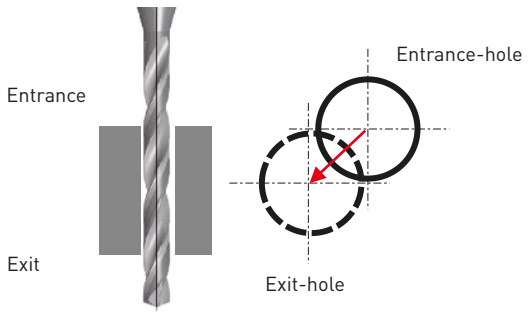
Tool	DC = Ø2 mm, L/D = 7
OAL (mm)	60
Constrained	Shank to tip range of 0-30 mm
Load	Distributed load of 140 N in Z axis direction



COMPARISON OF HOLE STRAIGHTNESS

Material	42CrMo4
Tool	DC = Ø2 mm, L/D = 7
Vc (m/min)	70
f (mm/rev)	0.008
ap (mm)	10
Cutting mode	Wet cutting, water-soluble coolant, 5 MPa Hydro chuck
Number of holes	100





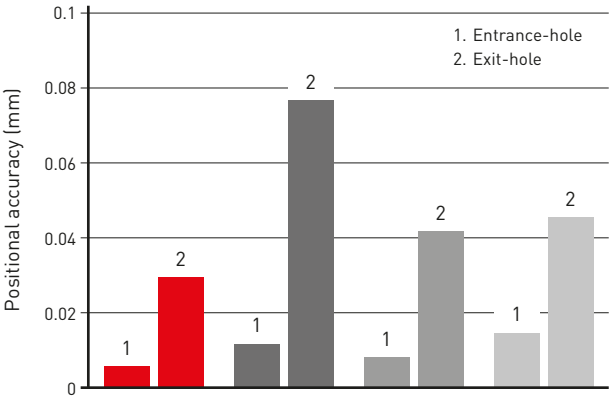
■ : **DVAS** ■ A : Conventional tool

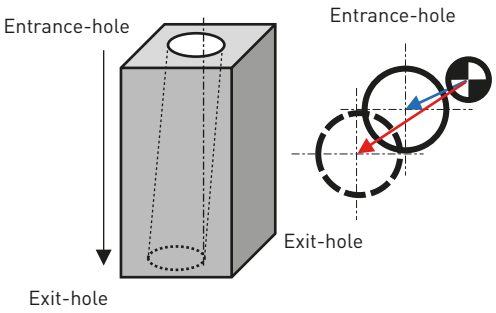
MINI DVAS

DEEP HOLE MACHINING EXAMPLE

For deep holes it is recommended to use a pilot drill to improve hole entry and reduce deviation at the exit point.

Material	42CrMo4
Tool	Pilot drill DC = Ø2 mm, L/D = 2
	Long drill DC = Ø2 mm, L/D = 20
Vc (m/min)	70
f (mm/rev)	0.07
Cutting mode	Wet dutting, water-soluble coolants, 5 MPa Hydro chuck
Number of holes	100



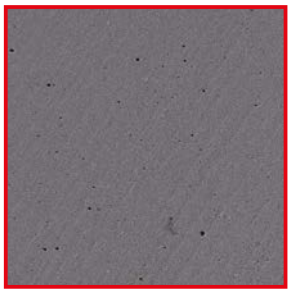


NEW COATED GRADE DP1120

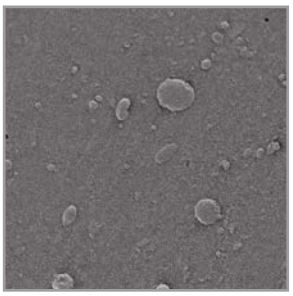
DP1120 has a special multi-layer PVD coating and a micro-grain, cemented carbide substrate. The outstanding surface smoothness prevents chip clogging and reduces breakage. Additionally the excellent crater wear resistance maintains cutting edge sharpness to enable long tool life.

Tool	DC = Ø2 mm, L/D = 20
Vc (m/min)	50
f (mm/rev)	0.06
Cutting mode	Wet cutting, Water-soluble coolants, 2 MPa
Number of holes	500

Enlarged view of the flute surface.



DVAS



Conventional

DVAS

Conventional
Large crater wear

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	4	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 | Ø1.0 mm
0290 | Ø2.9 mm

Type of Shank

S040	Shank diameter 4 mm

MINI DVAS

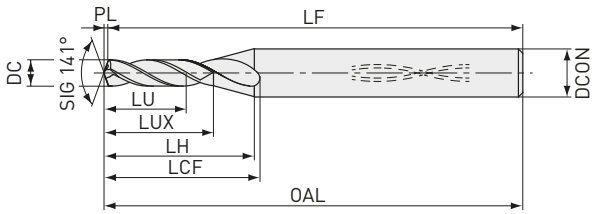
SOLID CARBIDE PILOT DRILLS - TRISTAR DRILLS

P M K N S

DC<3
0.006
-0.004

DCON = 4
0
-0.008

1



Order number	DP1120	DC	DCON	L/D	LU	LUX	LCF	LH	OAL	LF	PL	Type
DVAS0100X02S040	●	1.0	4	2	2.2	3.2	8.6	8.8	50.0	49.8	0.2	1
DVAS0110X02S040	●	1.1	4	2	2.4	3.5	9.0	8.9	50.0	49.8	0.2	1
DVAS0120X02S040	●	1.2	4	2	2.6	3.9	9.4	9.0	50.0	49.8	0.2	1
DVAS0130X02S040	●	1.3	4	2	2.8	4.2	9.9	9.2	50.0	49.8	0.2	1
DVAS0140X02S040	●	1.4	4	2	3.0	4.5	10.3	9.3	50.0	49.8	0.2	1
DVAS0150X02S040	●	1.5	4	2	3.3	4.8	10.7	9.4	50.0	49.7	0.3	1
DVAS0160X02S040	●	1.6	4	2	3.5	5.1	11.1	9.6	50.0	49.7	0.3	1
DVAS0170X02S040	●	1.7	4	2	3.7	5.5	11.6	9.7	50.0	49.7	0.3	1
DVAS0180X02S040	●	1.8	4	2	3.9	5.8	12.0	9.8	50.0	49.7	0.3	1
DVAS0190X02S040	●	1.9	4	2	4.1	6.1	12.4	10.0	50.0	49.7	0.3	1
DVAS0200X02S040	●	2.0	4	2	4.4	6.4	12.9	10.1	50.0	49.6	0.4	1
DVAS0210X02S040	●	2.1	4	2	4.6	6.7	13.3	10.2	50.0	49.6	0.4	1
DVAS0220X02S040	●	2.2	4	2	4.8	7.0	13.7	10.3	50.0	49.6	0.4	1
DVAS0230X02S040	●	2.3	4	2	5.0	7.4	14.1	10.5	55.0	54.6	0.4	1
DVAS0240X02S040	●	2.4	4	2	5.2	7.7	14.6	10.6	55.0	54.6	0.4	1
DVAS0250X02S040	●	2.5	4	2	5.5	8.0	15.0	10.7	55.0	54.6	0.4	1
DVAS0260X02S040	●	2.6	4	2	5.7	8.3	15.4	10.9	55.0	54.5	0.5	1
DVAS0270X02S040	●	2.7	4	2	5.9	8.6	15.8	11.0	55.0	54.5	0.5	1
DVAS0280X02S040	●	2.8	4	2	6.1	8.9	16.3	11.1	55.0	54.5	0.5	1
DVAS0290X02S040	●	2.9	4	2	6.3	9.3	16.7	11.3	55.0	54.5	0.5	1

181 Vc

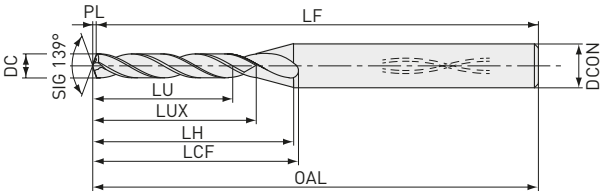
● : Inventory maintained. ★ : Inventory maintained in Japan.

MINI DVAS

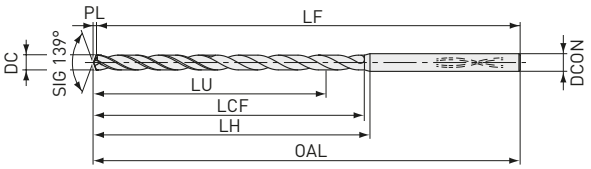
SOLID CARBIDE TRISTAR DRILL

P M K S N

2



3



DC<3
0
-0.010

DCON = 4
0
-0.008

Order number	DP1120	DC	DCON	L/D	LU	LUX	LCF	LH	OAL	LF	PL	Type
DVAS0100X07S040	●	1.0	4	7	7.2	8.2	13.6	13.8	55.0	54.8	0.2	2
DVAS0100X12S040	●	1.0	4	12	12.2	13.2	18.6	18.8	58.0	57.8	0.2	2
DVAS0100X20S040	●	1.0	4	20	20.2	–	23.2	28.8	67.0	66.8	0.2	3
DVAS0100X25S040	●	1.0	4	25	25.2	–	28.2	33.8	73.0	72.8	0.2	3
DVAS0100X30S040	●	1.0	4	30	30.2	–	33.2	38.8	79.0	78.8	0.2	3
DVAS0100X40S040	●	1.0	4	40	40.2	–	43.2	48.8	90.0	89.8	0.2	3
DVAS0100X50S040	●	1.0	4	50	50.2	–	53.2	58.8	102.0	101.8	0.2	3
DVAS0110X07S040	●	1.1	4	7	7.9	9.1	14.5	14.4	55.0	54.8	0.2	2
DVAS0110X12S040	●	1.1	4	12	13.4	14.6	20.0	19.9	58.0	57.8	0.2	2
DVAS0110X20S040	●	1.1	4	20	22.2	–	25.5	30.9	67.0	66.8	0.2	3
DVAS0110X25S040	●	1.1	4	25	27.7	–	31.0	36.4	73.0	72.8	0.2	3
DVAS0110X30S040	●	1.1	4	30	33.2	–	36.5	41.9	79.0	78.8	0.2	3
DVAS0110X40S040	●	1.1	4	40	44.2	–	47.5	52.9	90.0	89.8	0.2	3
DVAS0120X07S040	●	1.2	4	7	8.6	9.9	15.4	15.0	55.0	54.8	0.2	2
DVAS0120X12S040	●	1.2	4	12	14.6	15.9	21.4	21.0	60.0	59.8	0.2	2
DVAS0120X20S040	●	1.2	4	20	24.2	–	27.8	33.0	71.0	70.8	0.2	3
DVAS0120X25S040	●	1.2	4	25	30.2	–	33.8	39.0	77.0	76.8	0.2	3
DVAS0120X30S040	●	1.2	4	30	36.2	–	39.8	45.0	84.0	83.8	0.2	3
DVAS0120X40S040	●	1.2	4	40	48.2	–	51.8	57.0	97.0	96.8	0.2	3
DVAS0130X07S040	●	1.3	4	7	9.3	10.7	16.4	15.7	55.0	54.8	0.2	2
DVAS0130X12S040	●	1.3	4	12	15.8	17.2	22.9	22.2	60.0	59.8	0.2	2
DVAS0130X20S040	●	1.3	4	20	26.2	–	30.1	35.2	71.0	70.8	0.2	3
DVAS0130X25S040	●	1.3	4	25	32.7	–	36.6	41.7	77.0	76.8	0.2	3
DVAS0130X30S040	●	1.3	4	30	39.2	–	43.1	48.2	84.0	83.8	0.2	3
DVAS0130X40S040	●	1.3	4	40	52.2	–	56.1	61.2	97.0	96.8	0.2	3
DVAS0140X07S040	●	1.4	4	7	10.1	11.5	17.3	16.3	55.0	54.7	0.3	2

SOLID CARBIDE TRISTAR DRILL

Order number	DP1120	DC	DCON	L/D	LU	LUX	LCF	LH	OAL	LF	PL	Type
DVAS0140X12S040	●	1.4	4	12	17.1	18.5	24.3	23.3	63.0	62.7	0.3	2
DVAS0140X20S040	●	1.4	4	20	28.3	–	32.5	37.3	75.0	74.7	0.3	3
DVAS0140X25S040	●	1.4	4	25	35.3	–	39.5	44.3	82.0	81.7	0.3	3
DVAS0140X30S040	●	1.4	4	30	42.3	–	46.5	51.3	90.0	89.7	0.3	3
DVAS0140X40S040	●	1.4	4	40	56.3	–	60.5	65.3	105.0	104.7	0.3	3
DVAS0150X07S040	●	1.5	4	7	10.8	12.3	18.2	16.9	55.0	54.7	0.3	2
DVAS0150X12S040	●	1.5	4	12	18.3	19.8	25.7	24.4	63.0	62.7	0.3	2
DVAS0150X20S040	●	1.5	4	20	30.3	–	34.8	39.4	75.0	74.7	0.3	3
DVAS0150X25S040	●	1.5	4	25	37.8	–	42.3	46.9	82.0	81.7	0.3	3
DVAS0150X30S040	●	1.5	4	30	45.3	–	49.8	54.4	90.0	89.7	0.3	3
DVAS0150X40S040	●	1.5	4	40	60.3	–	64.8	69.4	105.0	104.7	0.3	3
DVAS0150X50S040	●	1.5	4	50	75.3	–	79.8	84.4	120.0	119.7	0.3	3
DVAS0160X07S040	●	1.6	4	7	11.5	13.1	19.2	17.6	57.0	56.7	0.3	2
DVAS0160X12S040	●	1.6	4	12	19.5	21.1	27.2	25.6	66.0	65.7	0.3	2
DVAS0160X20S040	●	1.6	4	20	32.3	–	37.1	41.6	79.0	78.7	0.3	3
DVAS0160X25S040	●	1.6	4	25	40.3	–	45.1	49.6	88.0	87.7	0.3	3
DVAS0160X30S040	●	1.6	4	30	48.3	–	53.1	57.6	99.0	98.7	0.3	3
DVAS0160X40S040	●	1.6	4	40	64.3	–	69.1	73.6	113.0	112.7	0.3	3
DVAS0170X07S040	●	1.7	4	7	12.2	14.0	20.1	18.2	57.0	56.7	0.3	2
DVAS0170X12S040	●	1.7	4	12	20.7	22.5	28.6	26.7	66.0	65.7	0.3	2
DVAS0170X20S040	●	1.7	4	20	34.3	–	39.4	43.7	79.0	78.7	0.3	3
DVAS0170X25S040	●	1.7	4	25	42.8	–	47.9	52.2	88.0	87.7	0.3	3
DVAS0170X30S040	●	1.7	4	30	51.3	–	56.4	60.7	99.0	98.7	0.3	3
DVAS0170X40S040	●	1.7	4	40	68.3	–	73.4	77.7	113.0	112.7	0.3	3
DVAS0180X07S040	●	1.8	4	7	12.9	14.8	21.0	18.8	59.0	58.7	0.3	2
DVAS0180X12S040	●	1.8	4	12	21.9	23.8	30.0	27.8	69.0	68.7	0.3	2
DVAS0180X20S040	●	1.8	4	20	36.3	–	41.7	45.8	84.0	83.7	0.3	3
DVAS0180X25S040	●	1.8	4	25	45.3	–	50.7	54.8	94.0	93.7	0.3	3
DVAS0180X30S040	●	1.8	4	30	54.3	–	59.7	63.8	104.0	103.7	0.3	3
DVAS0180X40S040	●	1.8	4	40	72.3	–	77.7	81.8	123.0	122.7	0.3	3
DVAS0190X07S040	●	1.9	4	7	13.7	15.6	21.9	19.5	59.0	58.6	0.4	2
DVAS0190X12S040	●	1.9	4	12	23.2	25.1	31.4	29.0	69.0	68.6	0.4	2
DVAS0190X20S040	●	1.9	4	20	38.4	–	44.1	48.0	84.0	83.6	0.4	3
DVAS0190X25S040	●	1.9	4	25	47.9	–	53.6	57.5	94.0	93.6	0.4	3
DVAS0190X30S040	●	1.9	4	30	57.4	–	63.1	67.0	104.0	103.6	0.4	3
DVAS0190X40S040	●	1.9	4	40	76.4	–	82.1	86.0	123.0	122.6	0.4	3
DVAS0200X07S040	●	2.0	4	7	14.4	16.4	22.9	20.1	62.0	61.6	0.4	2
DVAS0200X12S040	●	2.0	4	12	24.4	26.4	32.9	30.1	73.0	72.6	0.4	2
DVAS0200X20S040	●	2.0	4	20	40.4	–	46.4	50.1	91.0	90.6	0.4	3
DVAS0200X25S040	●	2.0	4	25	50.4	–	56.4	60.1	102.0	101.6	0.4	3
DVAS0200X30S040	●	2.0	4	30	60.4	–	66.4	70.1	113.0	112.6	0.4	3
DVAS0200X40S040	●	2.0	4	40	80.4	–	86.4	90.1	136.0	135.6	0.4	3
DVAS0200X50S040	●	2.0	4	50	100.4	–	106.4	110.1	158.0	157.6	0.4	3
DVAS0210X07S040	●	2.1	4	7	15.1	17.2	23.8	20.7	62.0	61.6	0.4	2
DVAS0210X12S040	●	2.1	4	12	25.6	27.7	34.3	31.2	73.0	72.6	0.4	2
DVAS0210X20S040	●	2.1	4	20	42.4	–	48.7	52.2	91.0	90.6	0.4	3
DVAS0210X25S040	●	2.1	4	25	52.9	–	59.2	62.7	102.0	101.6	0.4	3
DVAS0210X30S040	●	2.1	4	30	63.4	–	69.7	73.2	113.0	112.6	0.4	3
DVAS0210X40S040	●	2.1	4	40	84.4	–	90.7	94.2	136.0	135.6	0.4	3
DVAS0220X07S040	●	2.2	4	7	15.8	18.1	24.7	21.4	62.0	61.6	0.4	2
DVAS0220X12S040	●	2.2	4	12	26.8	29.1	35.7	32.4	73.0	72.6	0.4	2

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

SOLID CARBIDE TRISTAR DRILL

Order number	DP1120	DC	DCON	L/D	LU	LUX	LCF	LH	OAL	LF	PL	Type
DVAS0220X20S040	●	2.2	4	20	44.4	–	51.0	54.4	91.0	90.6	0.4	3
DVAS0220X25S040	●	2.2	4	25	55.4	–	62.0	65.4	102.0	101.6	0.4	3
DVAS0220X30S040	●	2.2	4	30	66.4	–	73.0	76.4	113.0	112.6	0.4	3
DVAS0220X40S040	●	2.2	4	40	88.4	–	95.0	98.4	136.0	135.6	0.4	3
DVAS0230X07S040	●	2.3	4	7	16.5	18.9	25.7	22.0	65.0	64.6	0.4	2
DVAS0230X12S040	●	2.3	4	12	28.0	30.4	37.2	33.5	78.0	77.6	0.4	2
DVAS0230X20S040	●	2.3	4	20	46.4	–	53.3	56.5	98.0	97.6	0.4	3
DVAS0230X25S040	●	2.3	4	25	57.9	–	64.8	68.0	111.0	110.6	0.4	3
DVAS0230X30S040	●	2.3	4	30	69.4	–	76.3	79.5	124.0	123.6	0.4	3
DVAS0230X40S040	●	2.3	4	40	92.4	–	99.3	102.5	150.0	149.6	0.4	3
DVAS0240X07S040	●	2.4	4	7	17.2	19.7	26.6	22.6	65.0	64.6	0.4	2
DVAS0240X12S040	●	2.4	4	12	29.2	31.7	38.6	34.6	78.0	77.6	0.4	2
DVAS0240X20S040	●	2.4	4	20	48.4	–	55.6	58.6	98.0	97.6	0.4	3
DVAS0240X25S040	●	2.4	4	25	60.4	–	67.6	70.6	111.0	110.6	0.4	3
DVAS0240X30S040	●	2.4	4	30	72.4	–	79.6	82.6	124.0	123.6	0.4	3
DVAS0240X40S040	●	2.4	4	40	96.4	–	103.6	106.6	150.0	149.6	0.4	3
DVAS0250X07S040	●	2.5	4	7	18.0	20.5	27.5	23.3	65.0	64.5	0.5	2
DVAS0250X12S040	●	2.5	4	12	30.5	33.0	40.0	35.8	78.0	77.5	0.5	2
DVAS0250X20S040	●	2.5	4	20	50.5	–	58.0	60.8	98.0	97.5	0.5	3
DVAS0250X25S040	●	2.5	4	25	63.0	–	70.5	73.3	111.0	110.5	0.5	3
DVAS0250X30S040	●	2.5	4	30	75.5	–	83.0	85.8	124.0	123.5	0.5	3
DVAS0250X40S040	●	2.5	4	40	100.5	–	108.0	110.8	150.0	149.5	0.5	3
DVAS0250X50S040	●	2.5	4	50	125.5	–	133.0	135.8	176.0	175.5	0.5	3
DVAS0260X07S040	●	2.6	4	7	18.7	21.3	28.4	23.9	65.0	64.5	0.5	2
DVAS0260X12S040	●	2.6	4	12	31.7	34.3	41.4	36.9	78.0	77.5	0.5	2
DVAS0260X20S040	●	2.6	4	20	52.5	–	60.3	62.9	98.0	97.5	0.5	3
DVAS0260X25S040	●	2.6	4	25	65.5	–	73.3	75.9	111.0	110.5	0.5	3
DVAS0260X30S040	●	2.6	4	30	78.5	–	86.3	88.9	124.0	123.5	0.5	3
DVAS0260X40S040	●	2.6	4	40	104.5	–	112.3	114.9	150.0	149.5	0.5	3
DVAS0270X07S040	●	2.7	4	7	19.4	22.2	29.4	24.5	68.0	67.5	0.5	2
DVAS0270X12S040	●	2.7	4	12	32.9	35.7	42.9	38.0	83.0	82.5	0.5	2
DVAS0270X20S040	●	2.7	4	20	54.5	–	62.6	65.0	107.0	106.5	0.5	3
DVAS0270X25S040	●	2.7	4	25	68.0	–	76.1	78.5	122.0	121.5	0.5	3
DVAS0270X30S040	●	2.7	4	30	81.5	–	89.6	92.0	137.0	136.5	0.5	3
DVAS0270X40S040	●	2.7	4	40	108.5	–	116.6	119.0	167.0	166.5	0.5	3
DVAS0280X07S040	●	2.8	4	7	20.1	23.0	30.3	25.2	68.0	67.5	0.5	2
DVAS0280X12S040	●	2.8	4	12	34.1	37.0	44.3	39.2	83.0	82.5	0.5	2
DVAS0280X20S040	●	2.8	4	20	56.5	–	64.9	67.2	107.0	106.5	0.5	3
DVAS0280X25S040	●	2.8	4	25	70.5	–	78.9	81.2	122.0	121.5	0.5	3
DVAS0280X30S040	●	2.8	4	30	84.5	–	92.9	95.2	137.0	136.5	0.5	3
DVAS0280X40S040	●	2.8	4	40	112.5	–	120.9	123.2	167.0	166.5	0.5	3
DVAS0290X07S040	●	2.9	4	7	20.8	23.8	31.2	25.8	68.0	67.5	0.5	2
DVAS0290X12S040	●	2.9	4	12	35.3	38.3	45.7	40.3	83.0	82.5	0.5	2
DVAS0290X20S040	●	2.9	4	20	58.5	–	67.2	69.3	107.0	106.5	0.5	3
DVAS0290X25S040	●	2.9	4	25	73.0	–	81.7	83.8	122.0	121.5	0.5	3
DVAS0290X30S040	●	2.9	4	30	87.5	–	96.2	98.3	137.0	136.5	0.5	3
DVAS0290X40S040	●	2.9	4	40	116.5	–	125.2	127.3	167.0	166.5	0.5	3

MINI DVAS

RECOMMENDED CUTTING CONDITIONS

	Material	DC	L/D	Vc	n	f
P	Mild steel Carbon steel, 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, Ferritic stainless steel Ferritic and martensitic stainless steel 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 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)

MINI DVAS

	Material	DC	L/D	Vc	n	f
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.

OPERATIONAL GUIDANCE

OPERATIONAL GUIDANCE FOR THE DVAS L/D = 2–40

FLAT FACE DRILLING
DRILLING A BLIND HOLE

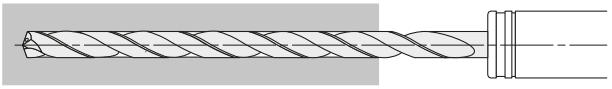
1. Drilling a pilot hole

1. Use a drill with a larger (flatter) point angle than the super long type.Use the shortest flute possible.
   A DVAS drill with L/D = 2 can be machined up to L/D = 3 when drilling pilot holes.
2. Ensure a high precision hole is drilled for the guide.
3. Drill depth: Approx DC×3.
   (Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial cutting with the long type drill

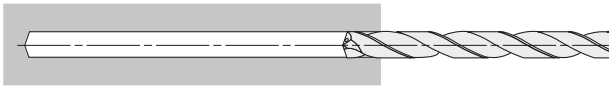
1. Penetrate the guide hole at low revolution.
   (Revolution 500–1000min^{-1} feed rate 1000–2000 mm/min)
2. Stop the long type drill 1–3 mm short of the guide hole bottom.

3. Drill the deep hole



1. Start cutting at the recommended speed and feed with a non–peck (continuous feed) cycle.

4. Drill retraction



1. After drilling, lower the cutting revolution about 0.5–1 mm short of the hole end. (Revolution of around 500–1000min^{-1})
2. Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000 mm/min.
3. Finally, clear the hole at a cutting speed of 20–30m/min and feed rate of 0.2–0.3 mm/rev.

OPERATIONAL GUIDANCE

OPERATIONAL GUIDANCE FOR THE DVAS L/D = 2–40

INTERRUPTED DRILLING
DRILLING AND BREAKING THROUGH ON IRREGULAR FACES OR ANGLES

1. Spot facing

1. Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

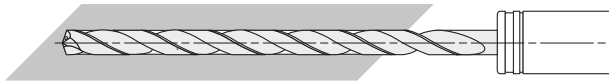
2. Drilling a pilot hole

1. Use a drill with a larger (flatter) point angle than the super long type.Use the shortest flute possible.
2. Ensure a high precision hole is drilled for the guide.
3. Drill depth : Approx DC×2.
   (Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial cutting with the long type drill

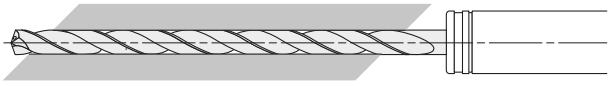
1. Penetrate the guide hole at a low revolution.
   (Revolution 500–1000min^{-1}, feed rate 1000–2000 mm/min)
2. Stop the long type drill 0.5–1 mm short of the guide hole bottom.

4. Drill the deep hole



1. Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



1. When breaking through, the cutting edge can be damaged.
2. Lower the feed rate when penetrating.

6. Drill retraction

1. Finally clear the hole at a feed rate of 0.2–0.3 mm/rev.
   (Revolution of around 500–1000min^{-1})
2. Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000 mm/min.

OPERATIONAL GUIDANCE

OPERATIONAL GUIDANCE FOR THE DVAS L/D = 50

FLAT FACE DRILLING
DRILLING A BLIND HOLE

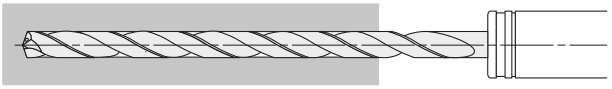
1. Drilling a pilot hole

1. Use a drill with a larger (flatter) point angle than the super long type.
   Use a DVAS drill with L/D = 7.
2. Ensure a high precision hole is drilled for the guide.
3. Drill depth : Approx DC×7.
   (Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial cutting with the long type drill

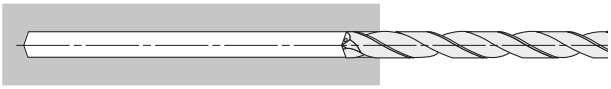
1. Penetrate the guide hole at low revolution.
   (Revolution 500–1000min^{-1} feed rate 1000–2000 mm/min)
2. Stop the long type drill 1–3 mm short of the guide hole bottom.

3. Drill the deep hole



1. Start cutting at the recommended speed and feed with a non–peck (continuous feed) cycle.

4. Drill retraction



1. After drilling, lower the cutting revolution about 0.5–1 mm short of the hole end. (Revolution of around 500–1000min^{-1})
2. Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000 mm/min.
3. Finally, clear the hole at a cutting speed of 20–30m/min and feed rate of 0.2–0.3 mm/rev.

OPERATIONAL GUIDANCE

OPERATIONAL GUIDANCE FOR THE DVAS L/D = 50

INTERRUPTED DRILLING
DRILLING AND BREAKING THROUGH ON IRREGULAR FACES OR ANGLES

1. Spot facing

1. Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

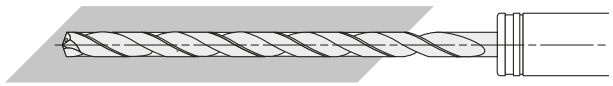
2. Drilling a pilot hole

1. Use a drill with a larger (flatter) point angle than the super long type. Use a DVAS drill with L/D = 7.
2. Ensure a high precision hole is drilled for the guide.
3. Drill depth: Approx DC×7.
   (Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial cutting with the long type drill

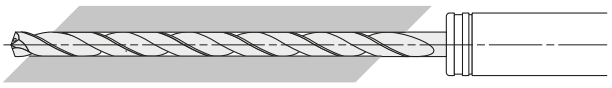
1. Penetrate the guide hole at a low revolution.
   (Revolution 500–1000min^{-1}, feed rate 1000–2000 mm/min)
2. Stop the long type drill 0.5–1 mm short of the guide hole bottom.

4. Drill the deep hole



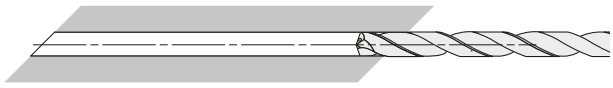
1. Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



1. When breaking through, the cutting edge can be damaged.
2. Lower the feed rate when penetrating.

6. Drill retraction

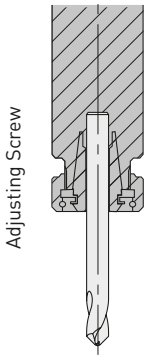


1. Finally clear the hole at a feed rate of 0.2–0.3 mm/rev.
   (Revolution of around 500–1000min^{-1})
2. Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000 mm/min.

MINI DVAS

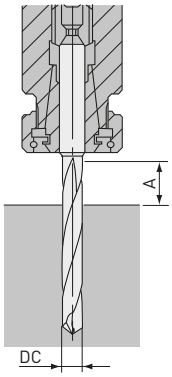
OPERATIONAL GUIDANCE

DRILL HOLDING



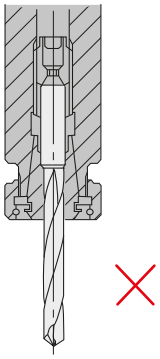
Thrust bearing type collet chuck holds the drill securely.

DRILL LENGTH



A ≥ DC x 2

DRILL INSTALLATION



Do not clamp on the flutes.

COOLANT PRESSURE

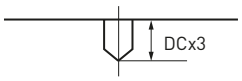
Adjust the coolant pressure according to the type and concentration of coolant.

Drill Dia. DC	Water-soluble	Water-insoluble
DC<2 mm	⩾ 3 MPa	⩾ 7 MPa
DC<3 mm	⩾ 2 MPa	⩾ 5 MPa

PILOT DRILL

For deep hole drilling, refer to the figure below.

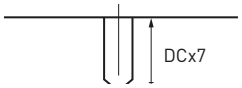
L/D<40



Use DVAS○○○○X02S040

*L/D = 2 can be machined up to DCx3 when drilling pilot holes.

L/D>40



Use DVAS○○○○X07S040

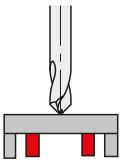
COOLANT HANDLING

Small particles of swarf will jam in the oil hole of small diameter drills.
Always use a fine mesh filter as a preventive measure.

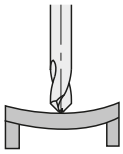
Drill Dia. DC	Fine Mesh Filter
DC<2 mm	⩽ 10μm
DC<3 mm	⩽ 20μm

THIN WORKPIECE

Support the workpiece
OK

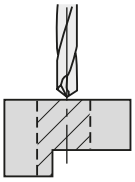


If bending occurs
NG



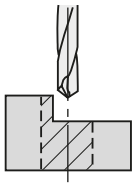
INTERRUPTED CUTTING

One process
OK



1. Lower the feed when drilling the interrupted part.

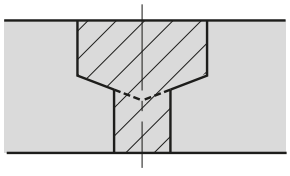
Requires prior machining



1. Spot face with an end mill prior to drilling.

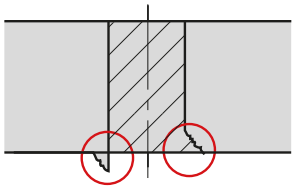
*NG – Displays chatter and vibration

STEPPED HOLES



Divide the two processes.
1. Drill the larger hole first.
2. A tool for machining both chamfer and spot face can be produced to order.

BURRING AND WORKPIECE CHIPPING

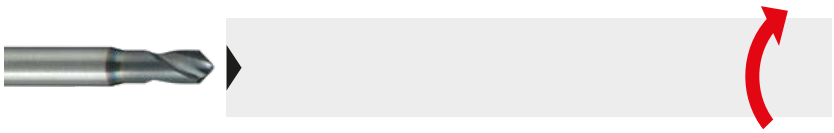


1. Lower the feed rate by 50 % at the end of through cutting.
2. Change the point angle.

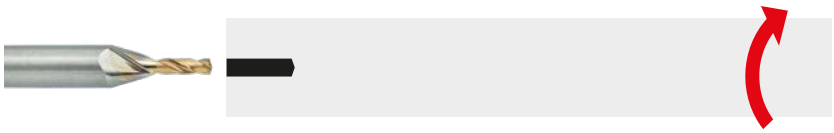
TIPS FOR DRILLING A DEEP HOLE EXCEEDING L/D = 40

WORKPIECE ROTATION METHOD: SMALL AND AUTOMATIC TYPE LATHES

(1) FACE COUNTERSINK (DLE DRILL IS RECOMMENDED)



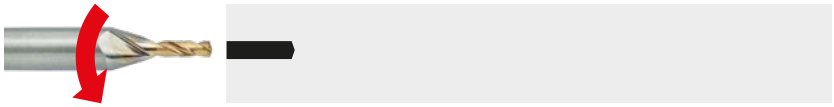
(2) DRILL THE GUIDE HOLE TO A DEPTH OF APPROX. 3D (DVAS DRILL IS RECOMMENDED)



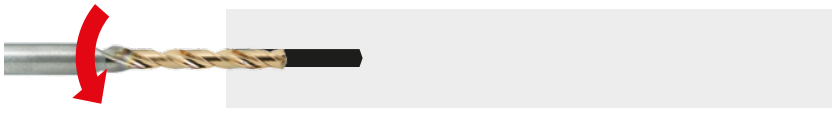
(3) DRILL THE DEEP HOLE USING DVASOOOOX50S040.

TOOL ROTATION METHOD: MACHINING CENTRES AND COMPOSITE TYPE MACHINES

(1) DRILL THE GUIDE HOLE TO A DEPTH OF APPROX. 3D (DVAS DRILL IS RECOMMENDED)



(2) DRILL THE GUIDE HOLE DEEPER TO A APPROX. 7D
IF MORE STABILITY IS REQUIRED, DRILL A GUIDE HOLE DEEPER THAN 7D.



(3) DRILL THE DEEP HOLE USING DVASOOOOX50S040

MINI DVAS

CUTTING EXAMPLE

COMPARISON OF DRILLING EFFICIENCY ON AN AUTOMATIC LATHE

Drilling efficiency is 10 times higher compared to gun drills.
It provides highly efficient and stable machining even when drilling alloy and stainless steels.

DRILLING OF 34CrMo4

GENERAL CUTTING CONDITIONS FOR GUN DRILLS

Cutting time 107.8 sec./hole

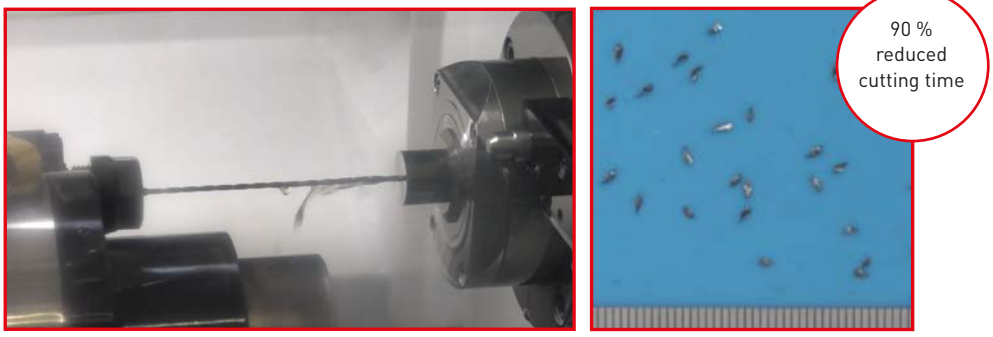
Tool	DC = Ø2 mm, L/D = 50
Vc (m/min)	50
f (mm/rev)	0.007
ap (mm)	100
Cutting mode	Wet cutting, Oil, 15 MPa

DVAS

Cutting time 10.8 sec./hole

Tool	DC = Ø2 mm, L/D = 50
Vc (m/min)	50
f (mm/rev)	0.07
ap (mm)	100
Cutting mode	Wet cutting, Oil, 15 MPa

DVAS DRILL APPLICATION



DRILLING OF X5CrNi18-10

GENERAL CUTTING CONDITIONS FOR GUN DRILLS

Cutting time 188.4 sec./hole

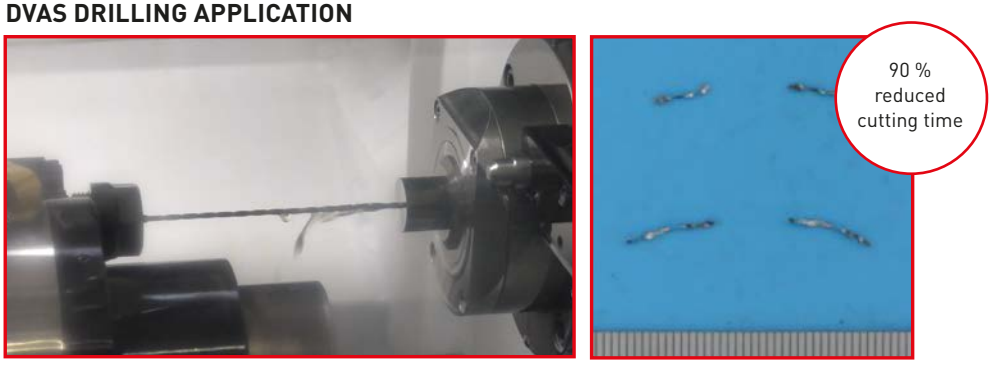
Tool	DC = Ø2 mm, L/D = 50
Vc (m/min)	40
f (mm/rev)	0.005
ap (mm)	100
Cutting mode	Wet cutting, Oil, 15 MPa

DVAS

Cutting time 18.8 sec./hole

Tool	DC = Ø2 mm, L/D = 50
Vc (m/min)	40
f (mm/rev)	0.05
ap (mm)	100
Cutting mode	Wet cutting, Oil, 15 MPa

DVAS DRILLING APPLICATION



MINI DVAS

CUTTING EXAMPLE

EXAMPLE OF IMPROVED DRILLING EFFICIENCY ON AN AUTOMATIC LATHE

DVAS significantly reduces cycle times and ensures consistent drilling.

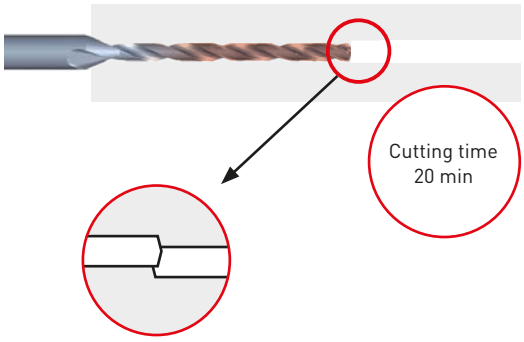
MINI DVAS

Material	C45E
Tool	DC = Ø2 mm, L/D = 50
Vc (m/min)	70
f (mm/rev)	0.09-0.12
ap (mm)	117
Cutting mode	Wet cutting, Oil, 7 MPa

DRILLING PROCESS OF BOTH ENDS MACHINING

1. One side drilled with blind hole.

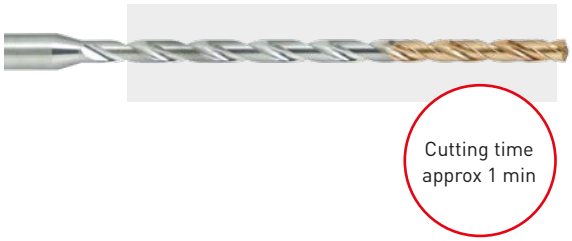
2. Workpiece is inverted for a through hole.



Hole mismatch is likely to occur.

DRILLING PROCESS WITH DVAS DRILL

1. Drilling a through hole from one side at a time.



MINI DVAS

CUTTING PERFORMANCE

COMPARISON OF FRACTURE RESISTANCE WHEN DRILLING SCM440

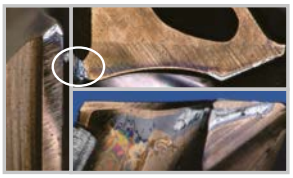
DVAS has excellent fracture resistance and double tool life compared to conventional products.

Material	42CrMo4
Tool	DC = Ø2 mm, L/D = 20
Vc (m/min)	50
f (mm/rev)	0.06
ap (mm)	40
Cutting mode	Wet cutting Water-soluble coolants, 2 MPa
Pilot drills	DC = Ø2 mm L/D = 2 Hole depth 4 mm

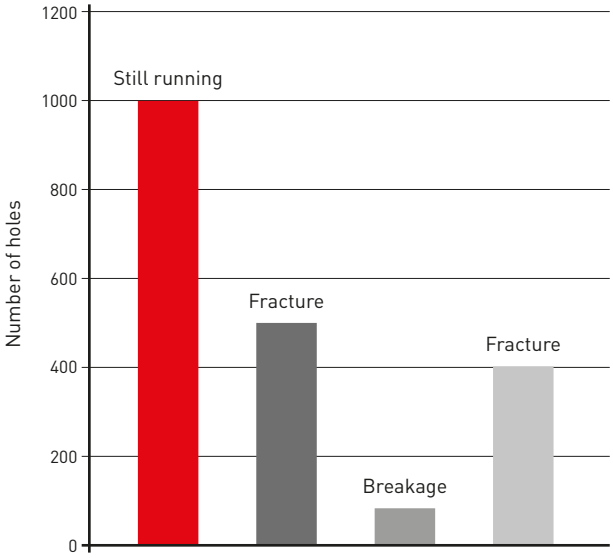
AFTER 400 HOLES

DVAS

AFTER 400 HOLES



Conventional C



COMPARISON OF FRACTURE RESISTANCE DURING HIGH-EFFICIENCY CUTTING OF SCM440

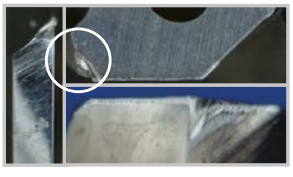
DVAS drill is very stable even under high-efficiency cutting conditions.

Material	42CrMo4
Tool	DC = Ø2 mm, L/D = 20
Vc (m/min)	70
f (mm/rev)	0.07
ap (mm)	40
Cutting mode	Wet cutting Water-soluble coolants, 2 MPa
Pilot drills	DC = Ø2 mm L/D = 2 Hole depth 4 mm/holes

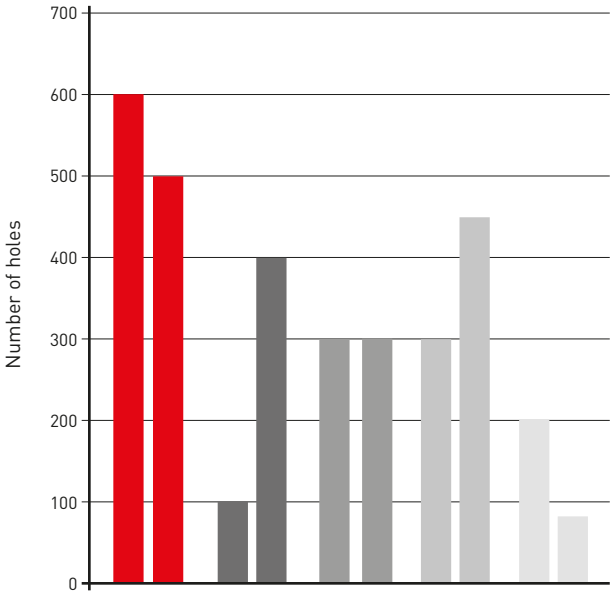
AFTER 300 HOLES

DVAS

AFTER 300 HOLES



Conventional C



MINI DVAS

CUTTING PERFORMANCE

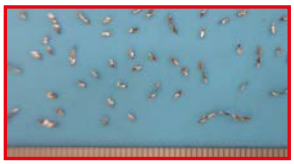
COMPARISON OF WELDING RESISTANCE AND CHIP DISPOSAL DURING HIGH-EFFICIENCY CUTTING OF SUS304

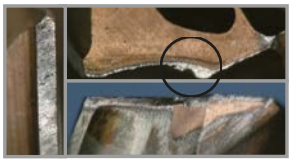
Achieves excellent welding resistance and chip control when drilling stainless steels.

Material	X5CrNi18-10
Tool	Pilot drill DC = Ø2 mm, L/D = 2 Hole depth 4 mm
	Long drill DC = Ø2 mm, L/D = 20 Hole depth 40 mm
Vc (m/min)	50
f (mm/rev)	0.06
Cutting mode	Wet cutting Water-soluble coolants, 2 MPa

After 1200 holes

DVAS

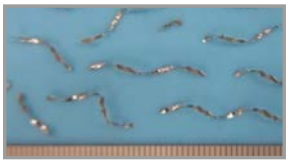




Conventional A

Some continuous chips

Conventional B

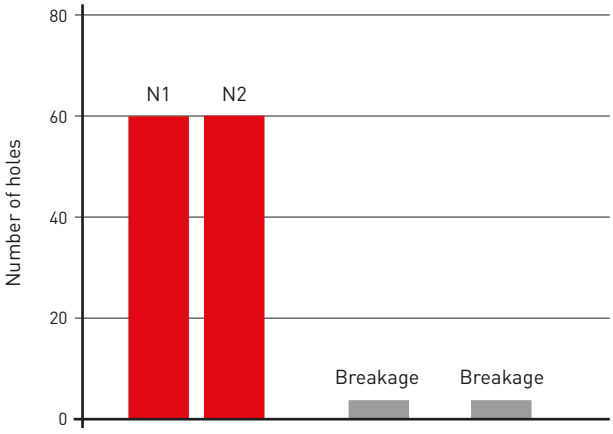


Continuous chips

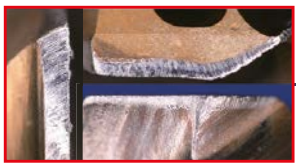
COMPARISON OF BREAKAGE RESISTANCE WHEN DRILLING INCONEL 718

Increased coolant discharge rate achieves stable machining of heat-resistant alloys when compared to conventional products.

Material	Inconel718
Tool	Pilot drill DC = Ø2 mm, L/D = 2 Hole depth 4 mm
	Long drill DC = Ø2 mm, L/D = 12 Hole depth 20 mm
Vc (m/min)	30
f (mm/rev)	0.03
ap (mm)	20
Cutting mode	Wet cutting Water-soluble Coolants, 2 MPa



After 60 Holes



DVAS

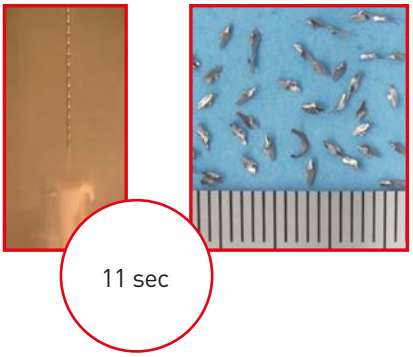
MINI DVAS

CUTTING PERFORMANCE

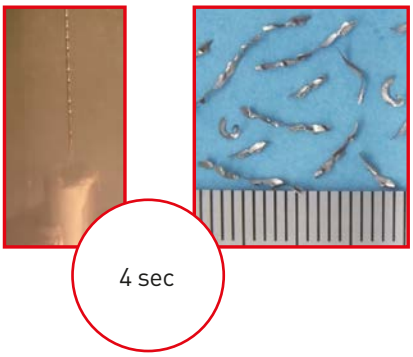
HIGH-EFFICIENCY EXAMPLE OF CUTTING SUS304 L/D = 50

Achieves excellent chip disposal and high efficiency when deep hole drilling in stainless steels.

Material	X5CrNi18-10
Tool	Pilot drill DC = Ø2 mm, L/D = 2 Hole depth 4 mm
	Short drill DC = Ø2 mm, L/D = 7 Hole depth 14 mm
	Long drill DC = Ø2 mm, L/D = 50 Hole depth 100 mm
Vc (m/min)	60
f (mm/rev)	0.05
Cutting mode	Wet cutting Water-soluble coolants, 7 MPa



Material	X5CrNi18-10
Tool	Pilot drill DC = Ø2 mm, L/D = 2 Hole depth 4 mm
	Short drill DC = Ø2 mm, L/D = 7 Hole depth 14 mm
	Long drill DC = Ø2 mm, L/D = 50 Hole depth 100 mm
Vc (m/min)	100
f (mm/rev)	0.08
Cutting mode	Wet cutting Water-soluble coolants, 7 MPa

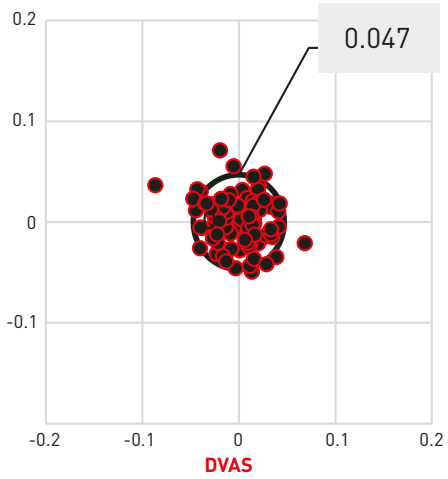


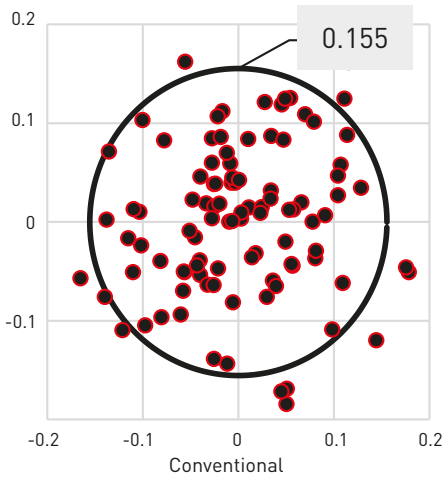
MINI DVAS

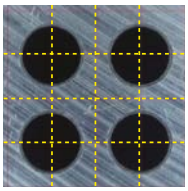
CUTTING PERFORMANCE

COMPARISON OF TRUE STRAIGHTNESS WHEN DRILLING 42CrMo4 L/D = 40

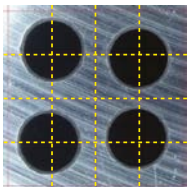
Hole wander is greatly reduced when compared to conventional products.





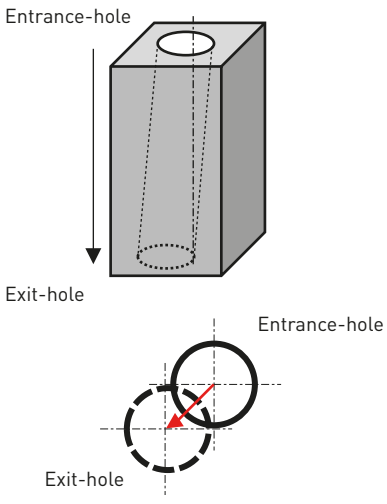


DVAS



Conventional

Material	42CrMo4
Tool	Pilot drill DC = Ø2 mm, L/D = 2 Hole depth 4 mm
	Long drill DC = Ø2 mm, L/D = 40 Hole depth 80 mm
f (mm/rev)	0.07
Cutting mode	Wet cutting Water-soluble coolants, 7 MPa



SYMBOLS

Recommended cutting conditions

NEW New / Product expansion

APPLICATION

Face milling

Chamfer milling

Shoulder milling with R

Face milling near to the 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's 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 Indicates the tolerance of the taper angle.
	R tolerance Indicates the radial tolerance of a ball nose end mill.
	R tolerance Indicates the radial tolerance of the corner radius.
	R tolerance Indicates the radial tolerance of a cutter with a corner radius.
	Outside diameter tolerance Indicates the diameter tolerance of the end mill.
	Peak tolerance 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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