

Chatter resistant boring bars

DIMPLE BAR

Expansion of "MIRACLE" coated insert series.

Highly rigid and lightweight heads prevent vibration and achieve good surface finish.

- Three different-long boring bars with a carbide shank.
- A great variety of lineup of inserts.
- Expansion of "MIRACLE" coated **VP15TF** insert series.

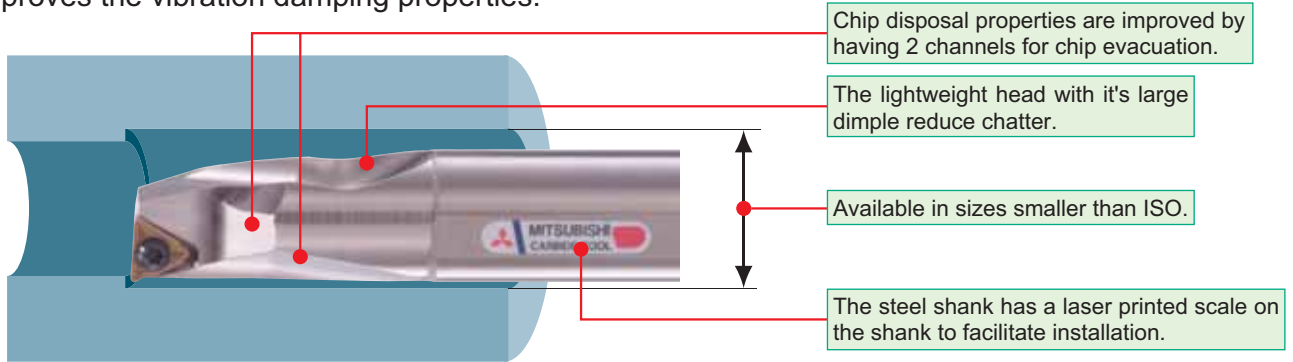


Chatter resistant boring bars

DIMPLE BAR

Features

Using computer simulation a highly rigid & lightweight head configuration has been designed that reduces chattering and improves the vibration damping properties.



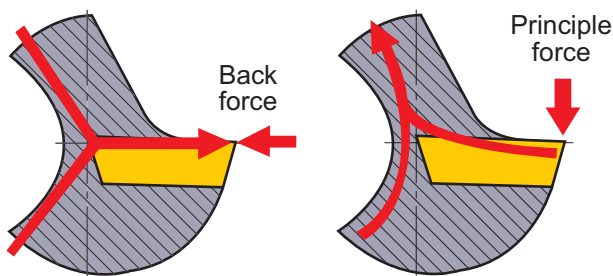
Chip disposal properties are improved by having 2 channels for chip evacuation.

The lightweight head with its large dimple reduce chatter.

Available in sizes smaller than ISO.

The steel shank has a laser printed scale on the shank to facilitate installation.

● Deflection resistance

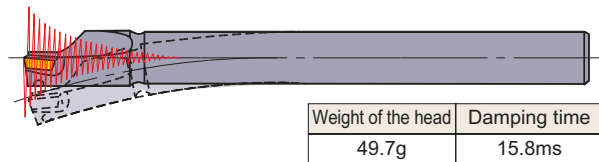


The Dimple bar design effectively balances the principal and back forces, and reduces deflection by up to 17%.

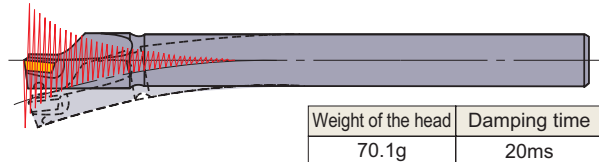
Boring bars	Deflection
Dimple bar	28.3µm
Conventional bar	34µm

● Vibration resistance

■ Dimple bar



■ Conventional bar



By reducing the weight of the head, the damping properties are increased.

Note: The above data was found when using FSCLP1816R-09S holder, under the following conditions; l/d=5, Depth of cut=0.5mm, Feed=0.05mm/rev.

Features of Carbide Shank

● The Dimple Bar carbide shank series uses an internal oil supply system. (Having coolant holes)

Stable coolant is possible even in drilling deep holes.

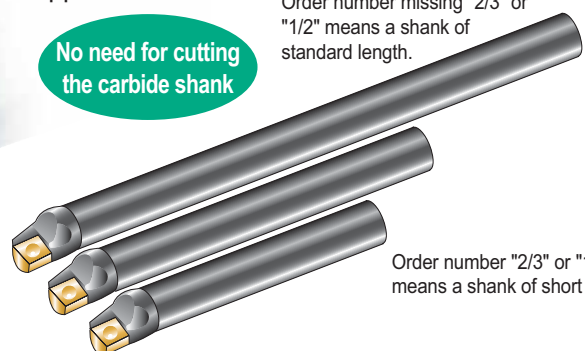


● Three different-long boring bars. (Short shank series)

Able to select the best-long boring bar according to application.

No need for cutting the carbide shank

Order number missing "2/3" or "1/2" means a shank of standard length.



Order number "2/3" or "1/2" means a shank of short length.

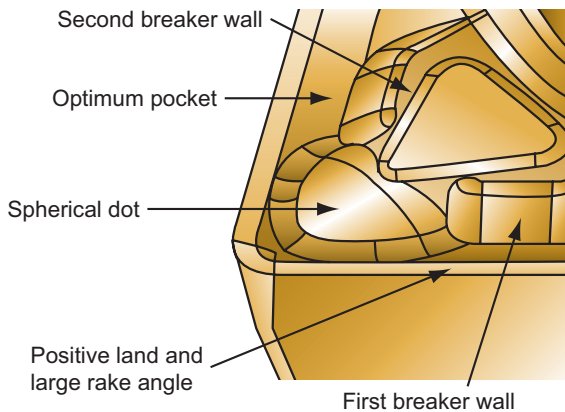
Features of *MV·SV* breaker

Newly developed, new-concept moulded breakers for the Dimple Bars.

Stable chips control and sharp cutting can be applied to wide cutting areas.

● *MV* beaker for medium cutting

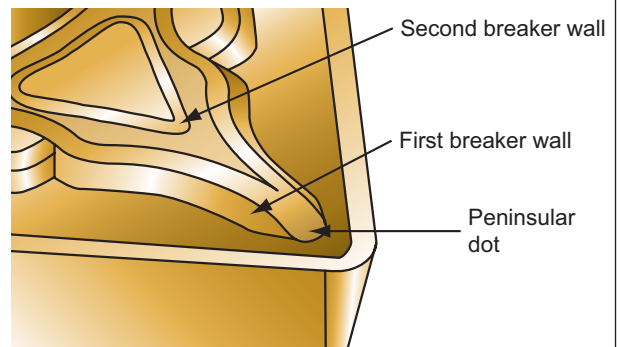
A combination of spherical dots and two-stage breaker walls achieves stable chips control for depth of cut of 0.8mm-2mm.



The large rake angle enables sharp cutting and longer tool life.

● *SV* beaker for light cutting

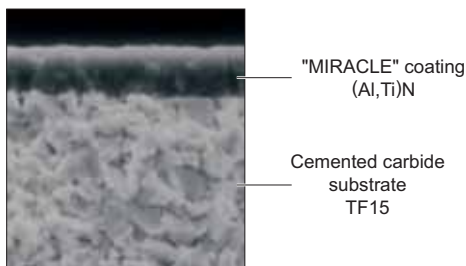
A combination of "peninsular" dots and two-stage breaker walls makes sure of chips control even for depth of cut of 1mm or below.



The large rake angle enables sharp cutting and excellent surface finish.

Features of the Grades

● MIRACLE coating grade *VP15TF*



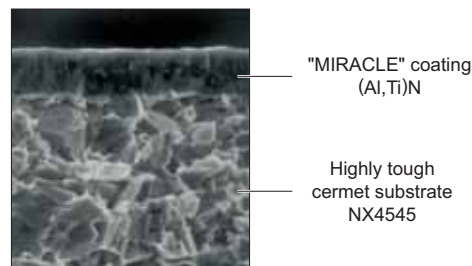
(Al, Ti)N "MIRACLE" coating

Heat resistance and adhesion strength have substantially increased, compared to conventional coatings. Tool life has become much longer.

TF15 micro-grain cemented carbide substrate

Micro-grain cemented carbide with good balance of wear and fracture resistance. TF15 prevents fracturing and achieves stable machining.

● MIRACLE coating grade *VP45N*



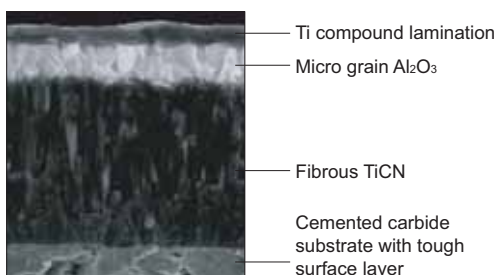
(Al, Ti)N "MIRACLE" coating

Heat resistance and adhesion strength have substantially increased, compared to conventional coatings. Tool life has become much longer.

Highly tough cermet substrate NX4545

Toughness has increased compared with existing cermet. Stable boring.

● CVD coating grade *UE6020*



"Even Coating" Technology

A very smooth and stable structure of a special titanium compound lamination has high resistance to adhesive fracture and peeling.

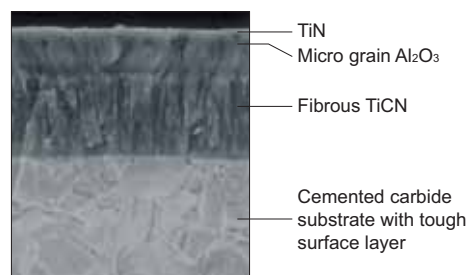
Triple-layer structure

Coating layers, including a surface, are triple-layer structure. An outer layer is a smooth layer of aluminum oxide (Al₂O₃). Al₂O₃ has high-heat resistance and provides high performance in high-speed machining. An inner layer is fibrous crystalline titanium, which has good balance of wear and fracture resistance.

Special cemented carbide substrate

The substrate has a hard core and a very tough surface layer.

● CVD coating grade *US7020*



Thin layer coating of fibrous TiCN + Micrograin Al₂O₃

Thin layer coating with high adhesion strength is less liable to peeling than other grades for cutting steels.

Cemented carbide substrate with tough surface layer



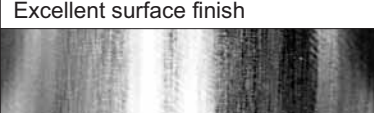
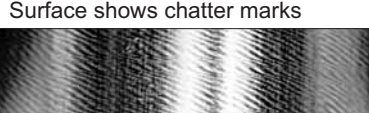
Cemented carbide substrate, which has a hard core and a tougher surface layer than existing grades, has reduced chipping of the cutting edge and plastic deformation in high-speed cutting of stainless steels.

Small honing design

Small honing design enables sharper cutting than other grades for cutting steels, preventing welding of a workpiece to the cutting edge.

DIMPLE BAR

Cutting Performance

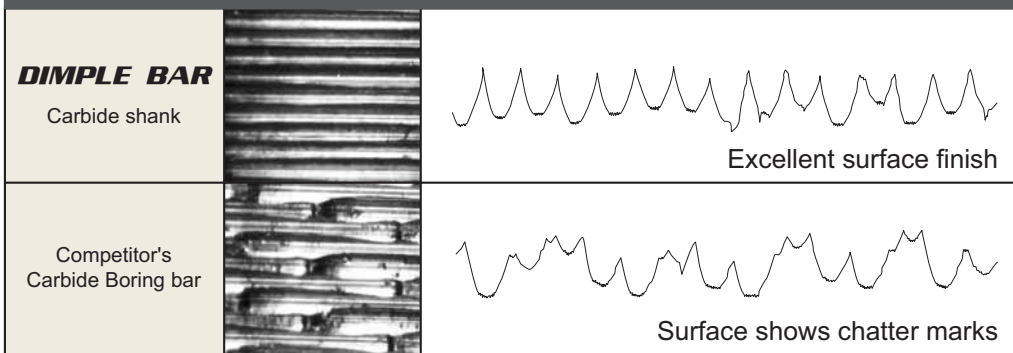
l/d	Cutting speed	DIMPLE BAR	Competitor boring bar (using a cermet grade)
Hole depth = 5 Shank dia.	80m/min	Excellent surface finish 	Poor surface finish 
Hole depth = 4 Shank dia.	160m/min	Excellent surface finish 	Surface shows chatter marks 


Steel shank

Cutting conditions
Workpiece : JIS SCM440 (185HB)
Depth of cut : 0.5mm
Feed : 0.1mm/rev
Wet cutting
DIMPLE BAR
Holder : FSCLP1816R-09S
Insert : CPMH090304-MV
Grade : NX2525

Carbide shank

Cutting conditions
Workpiece : JIS SCM440 (185HB)
Cutting speed : 80m/min
Depth of cut : 0.5mm
Feed : 0.1mm/rev
Overhang : 96mm (l/d=8)
Wet cutting
DIMPLE BAR
Holder : FSTUP1412R-09E
Insert : TPMH090204-MV
Grade : NX2525

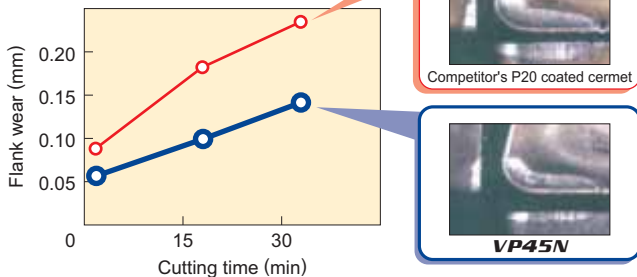


 Dimple Bar carbide shanks can prevent vibration even in drilling deep holes that was difficult for conventional carbide shank boring bars.

Cutting Performance of VP15TF·VP45N·UE6020·US7020

VP45N

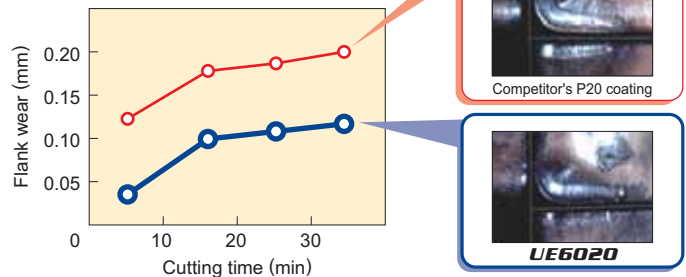
VP45N provides superior wear resistance in cutting of mild steels.



Holder : FSCLP1816L-09S
Insert : CPMH090304-MV
Cutting speed : 160m/min
Feed : 0.1mm/rev
Depth of cut : 1mm
Workpiece : JIS SCM440
Boring : Interrupted facing
Overhang : 64mm (l/d=4)
Wet cutting

UE6020

UE6020 provides superior wear resistance in cutting of general steels.




Holder : FSCLP2220L-09E
Insert : CPMH090304-MV
Cutting speed : 180m/min
Feed : 0.15mm/rev
Depth of cut : 1.0mm
Workpiece : JIS SCM440
Boring : Boring
Overhang : 48mm (l/d=3)
Wet cutting

VP15TF

VP15TF exhibits excellent fracture resistance.

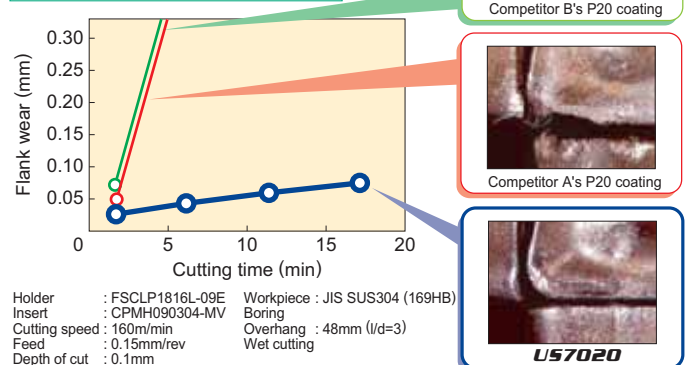
Feed (mm/rev)	Fracture Resistance			
	0.08	0.10	0.20	0.30
VP15TF	○	○	○	○
Competitor's P20 coating	○	×	○	○
Competitor's P20 coated cermet	○	×	○	○



Holder : FSCLP1816R-09E
Insert : CPMH090304-MV
Cutting speed : 120m/min
Feed : Var mm/rev
Depth of cut : 1.0mm
Workpiece : JIS SCM440
Boring : Interrupted facing
Overhang : 48mm (l/d=3)
Wet cutting

US7020

US7020 provides superior wear resistance in cutting of stainless steels.

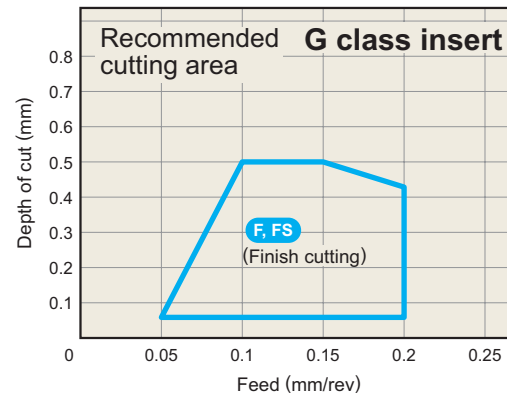
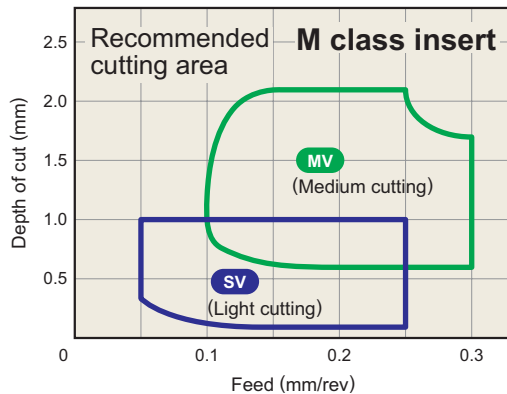


Holder : FSCLP1816L-09E
Insert : CPMH090304-MV
Cutting speed : 160m/min
Feed : 0.15mm/rev
Depth of cut : 0.1mm
Workpiece : JIS SUS304 (169HB)
Boring : Boring
Overhang : 48mm (l/d=3)
Wet cutting

Recommended Use of the Holder

Insert Type	Page	Holder	Lead Angle	Shank Material	Economical	Cutting Edge Strength	Copying	Curved Faces Deep Faces	Internal Coolant
80° Rhombic	5	FSCLC/P...S	95°	Steel		⊙			
		FSCLC/P...E	95°	Carbide		⊙			⊙
Triangular	7	FSTUP...S	93°	Steel	⊙				
		FSTUP...E	93°	Carbide	⊙				⊙
55° Rhombic	9	FSDUC...S	93°	Steel			⊙		
		FSDUC...E	93°	Carbide			⊙		⊙
	11	FSDQC...S	107° 30'	Steel			⊙		
		FSDQC...E	107° 30'	Carbide			⊙		⊙
Trigon	13	FSWUB/P...S	93°	Steel	⊙	⊙			
		FSWUB/P...E	93°	Carbide	⊙	⊙			⊙
35° Rhombic	15	FSVUB/C...S	93°	Steel			⊙		
		FSVPB/C...S	117° 30'	Steel			⊙		
	16	FSVJB/C...S	142°	Steel				⊙	

Recommended Use of the Breakers



Cutting conditions

Insert : CPMH090304-MV, SV Workpiece : JIS SCr420H
Cutting speed : 150m/min Wet cutting

Cutting conditions

Insert : CPMH090304L-F Workpiece : JIS SCM440
Cutting speed : 150m/min Wet cutting

Recommended Cutting Conditions

Workpiece	Cutting Mode	Breaker	Recommendation	Grade	Cutting Speed (m/min)	L/D ≤ 3 (steel shank), L/D ≤ 6 (carbide shank)		L/D = 4 - 5 (steel shank), L/D = 7 - 8 (carbide shank)	
						Feed (mm/rev)	D.O.C. (mm)	Feed (mm/rev)	D.O.C. (mm)
P Mild steel ≤180HB	Finishing	F/FS	①	NX2525	170 (120-220)	0.10 (0.05-0.15)	-0.5	0.10 (0.05-0.15)	-0.5
			②	VP45N	140 (90-190)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
	Light	SV	①	VP15TF	180 (130-230)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
			②	VP15TF	160 (110-210)	0.25 (0.15-0.35)	-2.0	0.20 (0.15-0.25)	-1.5
	Medium	MV	①	VP45N	130 (80-180)	0.25 (0.15-0.35)	-2.0	0.20 (0.15-0.25)	-1.5
			②	VP15TF	160 (110-210)	0.25 (0.15-0.35)	-2.0	0.20 (0.15-0.25)	-1.5
Carbon steel Alloy steel 180 - 280HB	Finishing	F/FS	①	VP15TF	140 (90-190)	0.10 (0.05-0.15)	-0.5	0.10 (0.05-0.15)	-0.5
			②	NX2525	130 (80-180)	0.10 (0.05-0.15)	-0.5	0.10 (0.05-0.15)	-0.5
	Light	SV	①	VP15TF	130 (80-180)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
			②	UE6020	140 (90-190)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
	Medium	MV	①	VP15TF	120 (70-170)	0.25 (0.15-0.35)	-2.0	0.20 (0.15-0.25)	-1.5
			②	UE6020	130 (80-180)	0.25 (0.15-0.35)	-2.0	0.20 (0.15-0.25)	-1.5
M Stainless steel 180 - 280HB	Finishing	F/FS	①	VP15TF	150 (110-190)	0.10 (0.05-0.15)	-0.5	0.10 (0.05-0.15)	-0.5
			②	US7020	150 (110-190)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
	Light	SV	①	VP15TF	130 (90-170)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
			②	VP15TF	130 (90-170)	0.20 (0.10-0.25)	-1.0	0.15 (0.05-0.20)	-1.0
	Medium	MV	①	US7020	140 (100-180)	0.20 (0.15-0.25)	-2.0	0.20 (0.15-0.25)	-1.0
			②	VP15TF	120 (80-160)	0.20 (0.15-0.25)	-2.0	0.20 (0.15-0.25)	-1.0
K Cast iron Tensile strength ≤350N/mm ²	Finishing	F/FS	①	HTi10	130 (90-160)	0.15 (0.10-0.20)	-0.5	0.15 (0.10-0.20)	-0.5
			②	US7020	90 (60-120)	0.20 (0.15-0.25)	-2.0	0.20 (0.15-0.25)	-1.5
H Heat treated steel 35 - 65HRC	Finishing	No breaker	①	MB825	100 (80-200)	0.10 (0.05-0.15)	-0.15	0.10 (0.05-0.15)	-0.1
N Aluminum Alloy	Finishing	F/FS	①	HTi10	300 (200-400)	0.10 (0.05-0.15)	-0.5	0.10 (0.05-0.15)	-0.5
			②	MD220	200 (150-250)	0.10 (0.05-0.15)	-2.0	0.10 (0.05-0.15)	-1.0





* When the DIMPLE BAR vibrates, reduce cutting speed to 70% of the above.

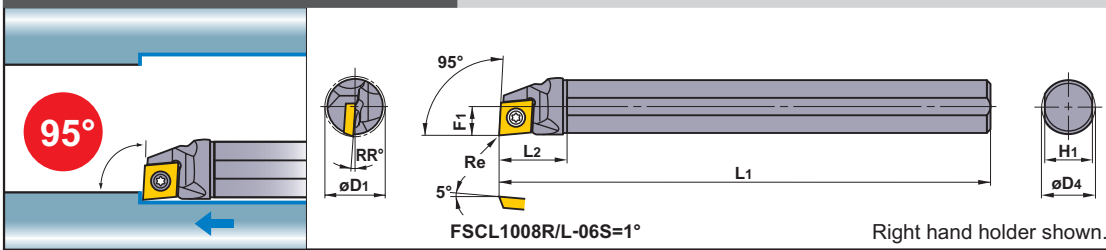
DIMPLE BAR



HOLDERS

FSCLC/P

CC \odot , CP \odot inserts

Finish	Light
R/L-F  (06,08,09)	SV  (06,08,09)
Medium	CBN
MV  (06,08,09)	 (06,08,09)







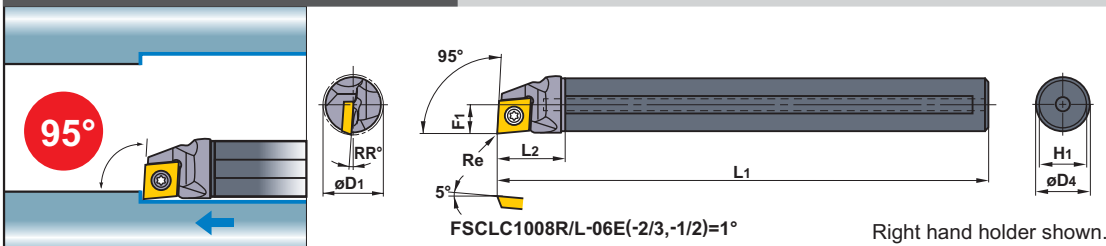
Order Number	Stock		Insert Number	Dimensions (mm)						Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended I/d Ratio			
	R	L		D4	L1	L2	F1	H1	RR°						
FSCLC1008R/L-06S	●	●	CCG/MH NP-CCMH NP-CCMB	0602 \odot	8	125	18	5	7.2	12	10	0.4	-3	TS253	TKY08F
FSCLP1210R/L-08S	●	●	CPMH NP-CPMH NP-CPMB	0802 \odot	10	150	22.5	6	9	5	12	0.4	-3.5	TS3D	TKY10F
1412R/L-08S	●	●		0802 \odot	12	150	27	7	11	4	14	0.4	-4	TS3D	TKY10F
1816R/L-09S	●	●		0903 \odot	16	180	36	9	15	3.5	18	0.4	-5	TS4D	TKY15F
2220R/L-09S	●	●		0903 \odot	20	220	45	11	19	2	22	0.4	-5	TS4D	TKY15F
3025R/L-09S	●	●		0903 \odot	25	250	56.3	15	23.4	0	30	0.4	-5	TS4D	TKY15F



FSCLC/P_E

Carbide shank with oil hole

CC \odot , CP \odot inserts

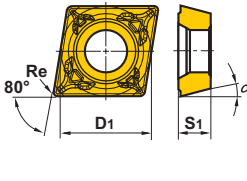
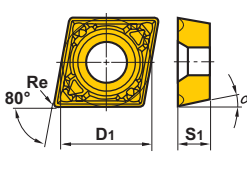
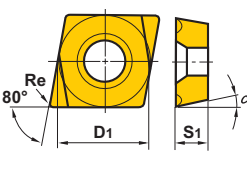
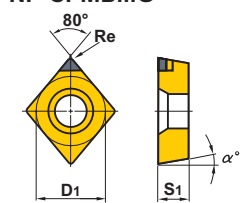
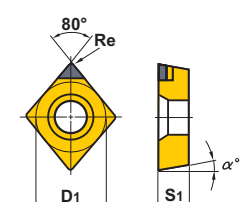
Finish	Light
R/L-F  (06,08,09)	SV  (06,08,09)
Medium	CBN
MV  (06,08,09)	 (06,08,09)



Order Number	Stock		Insert Number	Dimensions (mm)						Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended I/d Ratio*			
	R	L		D4	L1	L2	F1	H1	RR°						
FSCLC1008R/L-06E	●	●	CCGH CCMH NP-CCMH NP-CCMB	0602 \odot	8	140	13.8	5	7.2	12	10	0.4	-7	TS253	TKY08F
1008R-06E-2/3	●	●		0602 \odot	8	90	13.8	5	7.2	12	10	0.4	-7	TS253	TKY08F
1008R-06E-1/2	●	●		0602 \odot	8	70	13.8	5	7.2	12	10	0.4	-7	TS253	TKY08F
FSCLP1210R/L-08E	●	●	CPMH NP-CPMH NP-CPMB	0802 \odot	10	160	16.0	6	9	5	12	0.4	-7.5	TS3D	TKY10F
1210R-08E-2/3	●	●		0802 \odot	10	105	16.0	6	9	5	12	0.4	-7.5	TS3D	TKY10F
1210R-08E-1/2	●	●		0802 \odot	10	80	16.0	6	9	5	12	0.4	-7.5	TS3D	TKY10F
1412R/L-08E	●	●		0802 \odot	12	180	17.8	7	11	4	14	0.4	-8	TS3D	TKY10F
1412R-08E-2/3	●	●		0802 \odot	12	120	17.8	7	11	4	14	0.4	-8	TS3D	TKY10F
1412R-08E-1/2	●	●		0802 \odot	12	90	17.8	7	11	4	14	0.4	-8	TS3D	TKY10F
1816R/L-09E	●	●		0903 \odot	16	220	21.8	9	15	3.5	18	0.4	-8	TS4D	TKY15F
1816R-09E-2/3	●	●		0903 \odot	16	145	21.8	9	15	3.5	18	0.4	-8	TS4D	TKY15F
1816R-09E-1/2	●	●		0903 \odot	16	110	21.8	9	15	3.5	18	0.4	-8	TS4D	TKY15F
2220R/L-09E	●	●		0903 \odot	20	250	24.0	11	19	2	22	0.4	-8	TS4D	TKY15F
2220R-09E-2/3	●	●	0903 \odot	20	165	24.0	11	19	2	22	0.4	-8	TS4D	TKY15F	
2220R-09E-1/2	●	●	0903 \odot	20	125	24.0	11	19	2	22	0.4	-8	TS4D	TKY15F	

* Recommended I/d is for the longest shank. when using a short shank, please pay special attention to the tool clamping depth to the body. When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS


Geometry		Class	Order Number	Dimensions (mm)				Stock Grade											
								Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide	CBN	PCD			
				UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HT10	MB825	MD220						
Molded Breaker Light Cutting	 <p>CCMH...-SV CPMH...-SV</p>	M	CCMH060202-SV	6.35	2.38	0.2	7	●	●	●	○	●	●						
			060204-SV	6.35	2.38	0.4	7	●	●	●	○	●	●						
			CPMH080202-SV	7.94	2.38	0.2	11	●	●	●	●	●	●						
			080204-SV	7.94	2.38	0.4	11	●	●	●	●	●	●						
			090302-SV	9.525	3.18	0.2	11	●	●	●	●	●	●						
			090304-SV	9.525	3.18	0.4	11	●	●	●	●	●	●						
			090308-SV	9.525	3.18	0.8	11	●	●	●	●	●	●						
Molded Breaker Medium Cutting	 <p>CCMH...-MV CPMH...-MV</p>	M	CCMH060202-MV	6.35	2.38	0.2	7	●	●	●	○	●	●	●					
			060204-MV	6.35	2.38	0.4	7	●	●	●	○	●	●	●					
			CPMH080204-MV	7.94	2.38	0.4	11	●	●	●	●	●	●						
			080208-MV	7.94	2.38	0.8	11	●	●	●	●	●	●						
			090304-MV	9.525	3.18	0.4	11	●	●	●	●	●	●						
			090308-MV	9.525	3.18	0.8	11	●	●	●	●	●	●						
Ground / Molded Breaker Finish Cutting	 <p>CCGH...R/L-F CPMH...R/L-F</p> <p>Left hand is shown.</p>	G	CCGH060202R-F	6.35	2.38	0.2	7				●	●	□	●					
			060202L-F	6.35	2.38	0.2	7				●	●	●	●					
			060204R-F	6.35	2.38	0.4	7				●	●	□	●					
			060204L-F	6.35	2.38	0.4	7				●	●	●	●					
		M	CPMH080204R-F	7.94	2.38	0.4	11				●	●	□	●					
			080204L-F	7.94	2.38	0.4	11				●	●	●	●					
			090304R-F	9.525	3.18	0.4	11				●	●	□	●					
			090304L-F	9.525	3.18	0.4	11				●	●	●	●					
CBN (No Breaker) Finish Cutting	 <p>NP-CCMB...G NP-CPMB...G</p> <p>Last letter of insert number G : For General Purpose</p>	M	NP-CCMB060204G	6.35	2.38	0.4	7										●		
			NP-CPMB080204G	7.94	2.38	0.4	11											●	
			090304G	9.525	3.18	0.4	11											●	
PCD (With Breaker) Finish Cutting	 <p>NP-CCMH... NP-CPMH...</p>	M	NP-CCMH060202	6.35	2.38	0.2	7											●	
			060204	6.35	2.38	0.4	7											●	
			NP-CPMH080202	7.94	2.38	0.2	11											●	
			080204	7.94	2.38	0.4	11											●	
			090302	9.525	3.18	0.2	11											●	
			090304	9.525	3.18	0.4	11											●	

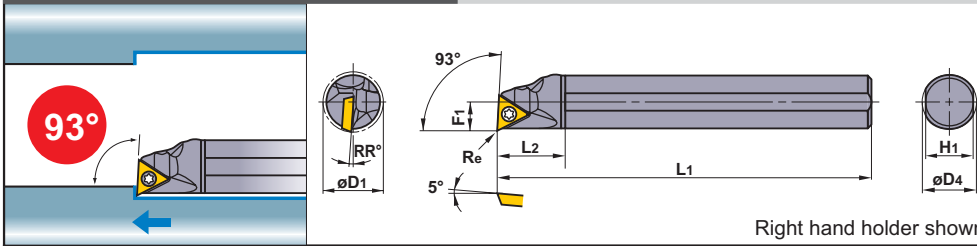
DIMPLE BAR



HOLDERS

FSTUP

TP^oinserts

Finish	Light	Medium
R/L-FS  (08,09,11,16)	SV  (08,09,11,16)	MV  (08,09,11,16)
PCD	CBN	
R/L-F  (08,09,11)	 (08,09,11,16)	



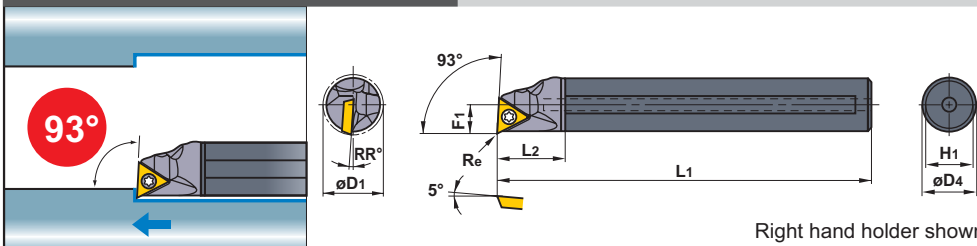
Order Number	Stock		Insert Number	Dimensions (mm)							Min. Cutting Diameter D1	Standard Corner Radius Re	Recom- mended l/d Ratio		
	R	L		D4	L1	L2	F1	H1	RR°						
FSTUP1008R/L-08S	●	●	TPGH TPMH NP-TPMB NP-TPMH	0802 ^o	8	125	18	5	7.2	10	10	0.4	-3	TS2D	TKY06F
1210R/L-09S	●	●		0902 ^o	10	150	22.5	6	9	8	12	0.4	-3.5	TS25D	TKY08F
1412R/L-09S	●	●		0902 ^o	12	150	27	7	11	7	14	0.4	-4	TS25D	TKY08F
1816R/L-11S	●	●		1103 ^o	16	180	36	9	15	4	18	0.4	-5	TS31D	TKY10F
2220R/L-11S	●	●		1103 ^o	20	220	45	11	19	0	22	0.4	-5	TS31D	TKY10F
3225R/L-16S	●	●		1603 ^o	25	270	56.3	16	23.4	0	32	0.8	-5	TS4D	TKY15F



FSTUP_E

Carbide shank with oil hole

TP^oinserts

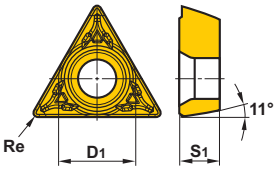
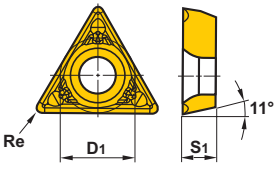
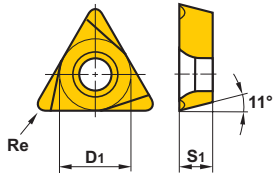
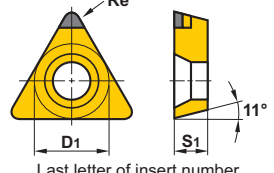
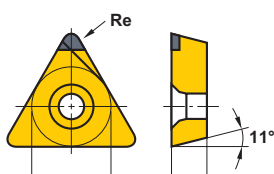
Finish	Light	Medium
R/L-FS  (08,09,11)	SV  (08,09,11)	MV  (08,09,11)
PCD	CBN	
R/L-F  (08,09,11)	 (08,09,11)	



Order Number	Stock		Insert Number	Dimensions (mm)							Min. Cutting Diameter D1	Standard Corner Radius Re	Recom- mended l/d Ratio		
	R	L		D4	L1	L2	F1	H1	RR°						
FSTUP1008R/L-08E	●	●	TPGH TPMH NP-TPMB NP-TPMH	0802 ^o	8	140	13.8	5	7.2	10	10	0.4	-7	TS2D	TKY06F
1008R-08E-2/3	●			0802 ^o	8	90	13.8	5	7.2	10	10	0.4	-7	TS2D	TKY06F
1008R-08E-1/2	●			0802 ^o	8	70	13.8	5	7.2	10	10	0.4	-7	TS2D	TKY06F
1210R/L-09E	●	●		0902 ^o	10	160	16.0	6	9	8	12	0.4	-7.5	TS25D	TKY08F
1210R-09E-2/3	●			0902 ^o	10	105	16.0	6	9	8	12	0.4	-7.5	TS25D	TKY08F
1210R-09E-1/2	●			0902 ^o	10	80	16.0	6	9	8	12	0.4	-7.5	TS25D	TKY08F
1412R/L-09E	●	●		0902 ^o	12	180	17.8	7	11	7	14	0.4	-8	TS25D	TKY08F
1412R-09E-2/3	●			0902 ^o	12	120	17.8	7	11	7	14	0.4	-8	TS25D	TKY08F
1412R-09E-1/2	●			0902 ^o	12	90	17.8	7	11	7	14	0.4	-8	TS25D	TKY08F
1816R/L-11E	●	●		1103 ^o	16	220	21.8	9	15	4	18	0.4	-8	TS31D	TKY10F
1816R-11E-2/3	●			1103 ^o	16	145	21.8	9	15	4	18	0.4	-8	TS31D	TKY10F
1816R-11E-1/2	●			1103 ^o	16	110	21.8	9	15	4	18	0.4	-8	TS31D	TKY10F
2220R/L-11E	●	●		1103 ^o	20	250	24.0	11	19	0	22	0.4	-8	TS31D	TKY10F
2220R-11E-2/3	●			1103 ^o	20	165	24.0	11	19	0	22	0.4	-8	TS31D	TKY10F
2220R-11E-1/2	●			1103 ^o	20	125	24.0	11	19	0	22	0.4	-8	TS31D	TKY10F

* Recommended l/d is for the longest shank. when using a short shank, please pay special attention to the tool clamping depth to the body. When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS

Geometry	Class	Order Number	Dimensions (mm)			Stock Grade										
			D1	S1	Re	Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide	CBN	PCD		
						UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HT10	MB825	MD220	
TPMH...-SV 	M	TPMH080202-SV	4.76	2.38	0.2	●	●	●	●	●						
		080204-SV	4.76	2.38	0.4	●	●	●	●	●						
		090202-SV	5.56	2.38	0.2	●	●	●	●	●						
		090204-SV	5.56	2.38	0.4	●	●	●	●	●						
		110302-SV	6.35	3.18	0.2	●	●	●	●	●						
		110304-SV	6.35	3.18	0.4	●	●	●	●	●						
		110308-SV	6.35	3.18	0.8	●	●	●	●	●						
		160302-SV	9.525	3.18	0.2	●	●	●	●	●						
		160304-SV	9.525	3.18	0.4	●	●	●	●	●						
		160308-SV	9.525	3.18	0.8	●	●	●	●	●						
TPMH...-MV 	M	TPMH080202-MV	4.76	2.38	0.2	●	●	●	●	●	●					
		080204-MV	4.76	2.38	0.4	●	●	●	●	●	●	●				
		090202-MV	5.56	2.38	0.2	●	●	●	●	●	●	●				
		090204-MV	5.56	2.38	0.4	●	●	●	●	●	●	●				
		110302-MV	6.35	3.18	0.2	●	●	●	●	●	●	●				
		110304-MV	6.35	3.18	0.4	●	●	●	●	●	●	●				
		110308-MV	6.35	3.18	0.8	●	●	●	●	●	●	●				
		160304-MV	9.525	3.18	0.4	●	●	●	●	●	●	●				
		160308-MV	9.525	3.18	0.8	●	●	●	●	●	●	●				
		TPGH...R/L-FS  <p>Left hand is shown.</p>	G	TPGH080202R-FS	4.76	2.38	0.2				●		●	□	●	
080202L-FS	4.76			2.38	0.2				●		●	●	●			
080204R-FS	4.76			2.38	0.4				●		●	□	●			
080204L-FS	4.76			2.38	0.4				●		●	●	●			
090202R-FS	5.56			2.38	0.2				●		●	●	●			
090202L-FS	5.56			2.38	0.2				●		●	●	●			
090204R-FS	5.56			2.38	0.4				●		●	□	●			
090204L-FS	5.56			2.38	0.4				●		●	●	●			
110302R-FS	6.35			3.18	0.2				●		●	□	●			
110302L-FS	6.35			3.18	0.2				●		●	●	●			
110304R-FS	6.35			3.18	0.4				●		●	□	●			
110304L-FS	6.35			3.18	0.4				●		●	●	●			
160304R-FS	9.525			3.18	0.4				●		●	□	●			
160304L-FS	9.525			3.18	0.4				●		●	●	●			
160308R-FS	9.525			3.18	0.8				●		●	□	●			
160308L-FS	9.525			3.18	0.8				●		●	●	●			
NP-TPMB...G  <p>Last letter of insert number G : For General Purpose</p>	M	NP-TPMB080204G	4.76	2.38	0.4									●		
		090204G	5.56	2.38	0.4										●	
		110304G	6.35	3.18	0.4										●	
		160304G	9.525	4.76	0.4										●	
NP-TPMH...R/L-F  <p>Left hand is shown.</p>	M	NP-TPMH080202R-F	4.76	2.38	0.2										●	
		080202L-F	4.76	2.38	0.2											●
		080204R-F	4.76	2.38	0.4											●
		080204L-F	4.76	2.38	0.4											●
		090202R-F	5.56	2.38	0.2											●
		090202L-F	5.56	2.38	0.2											●
		090204R-F	5.56	2.38	0.4											●
		090204L-F	5.56	2.38	0.4											●
		110302R-F	6.35	3.18	0.2											●
		110302L-F	6.35	3.18	0.2											●
		110304R-F	6.35	3.18	0.4											●
		110304L-F	6.35	3.18	0.4											●
		110304L-F	6.35	3.18	0.4											●

DIMPLE BAR

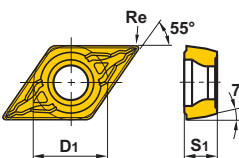
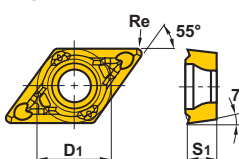
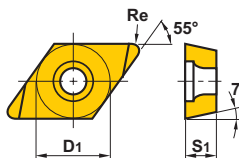
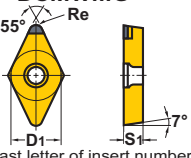
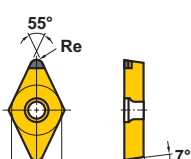
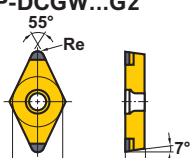
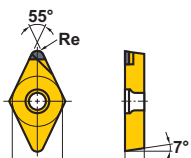
HOLDERS

Order Number		Stock		Insert Number	Dimensions (mm)								Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio	Finish		Light		Medium	
		R	L		D4	L1	L2	F1	F2	H1	RR°	FV				SV	MV	Medium	Standard	R/L-F	PCD
FSDUC1410R/L-07S		●	●	DCMT DCGT NP-DCMT NP-DCMW	0702	10	150	18	8.3	3.3	9	7.5	14	0.4	-3.5	TS25	TKY08F				
1612R/L-07S		●	●		0702	12	150	20	9.3	3.3	11	6	16	0.4	-4	TS25	TKY08F				
2016R/L-07S		●	●		0702	16	180	20	11.3	3.3	15	5	20	0.4	-5	TS25	TKY08F				
3220R/L-11S		●	●		11T3	20	180	22.5	16.1	6.1	19	5	32	0.8	-5	TS43	TKY15F				

Order Number		Stock		Insert Number	Dimensions (mm)								Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio	Finish		Light		Medium	
		R	L		D4	L1	L2	F1	F2	H1	RR°	FV				SV	MV	Medium	Standard	R/L-F	PCD
FSDUC1410R/L-07E		●	●	DCMT DCGT NP-DCMT NP-DCMW	0702	10	160	16.0	8.3	3.3	9	7.5	14	0.4	-7.5	TS25	TKY08F				
1612R/L-07E		●	●		0702	12	180	17.8	9.3	3.3	11	6.0	16	0.4	-8	TS25	TKY08F				
2016R/L-07E		●	●		0702	16	220	21.8	11.3	3.3	16	5.0	20	0.4	-8	TS25	TKY08F				
3220R/L-11E		●	●		11T3	20	250	24.0	16.1	6.1	19	5.0	32	0.8	-8	TS43	TKY15F				

* When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS

Geometry	Class	Order Number	Dimensions (mm)			Stock Grade												
			D1	S1	Re	Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide	CBN		PCD			
						UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HT10	MB825	MB8025	MD220		
DCMT...-SV 	M	DCMT070202-SV	6.35	2.38	0.2	●	●	●	●	●								
		070204-SV	6.35	2.38	0.4	●	●	●	●	●								
		070208-SV	6.35	2.38	0.8	●	●	●	●	●								
		11T302-SV	9.525	3.97	0.2	●	●	●	●	●								
		11T304-SV	9.525	3.97	0.4	●	●	●	●	●								
		11T308-SV	9.525	3.97	0.8	●	●	●	●	●								
DCMT...-MV 	M	DCMT070202-MV	6.35	2.38	0.2	●	●	●	●	●								
		070204-MV	6.35	2.38	0.4	●	●	●	●	●								
		070208-MV	6.35	2.38	0.8	●	●	●	●	●								
		11T302-MV	9.525	3.97	0.2	●	●	●	●	●								
		11T304-MV	9.525	3.97	0.4	●	●	●	●	●								
		11T308-MV	9.525	3.97	0.8	●	●	●	●	●								
DCGT...R/L-F  <p>Left hand is shown.</p>	G	DCGT070202R-F	6.35	2.38	0.2				●	●	□	●						
		070202L-F	6.35	2.38	0.2				●	●	●	●						
		070204R-F	6.35	2.38	0.4				●	●	□	●						
		070204L-F	6.35	2.38	0.4				●	●	●	●						
		11T302R-F	9.525	3.97	0.2				●	●	□	●						
		11T302L-F	9.525	3.97	0.2				●	●	●	●						
		11T304R-F	9.525	3.97	0.4				●	●	□	●						
		11T304L-F	9.525	3.97	0.4				●	●	●	●						
NP-DCMW...G  <p>Last letter of insert number G : For General Purpose</p>	M	NP-DCMW070204G	6.35	2.38	0.4									●				
		11T304G	9.525	3.97	0.4										●			
	NP-DCGW...G/F/T 	G	NP-DCGW070202G	6.35	2.38	0.2										●		
			070204G	6.35	2.38	0.4											●	
			070208G	6.35	2.38	0.8											●	
			11T302G	9.525	3.97	0.2											●	
			11T304G	9.525	3.97	0.4											●	
			11T304F	9.525	3.97	0.4											□	
			11T304T	9.525	3.97	0.4											□	
			11T308G	9.525	3.97	0.8											●	
	11T308F	9.525	3.97	0.8											□			
	11T308T	9.525	3.97	0.8											□			
NP-DCGW...G2 	G	NP-DCGW11T304G2	9.525	3.97	0.4										●			
		11T308G2	9.525	3.97	0.8											●		
NP-DCMT...R/L-F  <p>Left hand is shown.</p>	M	NP-DCMT070202R-F	6.35	2.38	0.2											●		
		070202L-F	6.35	2.38	0.2												●	
		070204R-F	6.35	2.38	0.4												●	
		070204L-F	6.35	2.38	0.4												●	
		11T302R-F	9.525	3.97	0.2												●	
		11T302L-F	9.525	3.97	0.2												●	
11T304R-F	9.525	3.97	0.4												●			
11T304L-F	9.525	3.97	0.4												●			

DIMPLE BAR

HOLDERS

Order Number		Stock		Insert Number	Dimensions (mm)								Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio	Finish		Light		Medium	
		R	L		D4	L1	L2	F1	F2	H1	RR°	D1				Re	Ratio	SV	MV	PCD	CBN
FSDQC1310R/L-07S		●	●	DCMT DCGT NP-DCMT NP-DCMW	0702	10	150	20.5	7.6	2.6	9	8	13	0.4	-3.5	TS25	TKY08F				
1612R/L-07S		●	●		0702	12	150	22.5	8.6	2.6	11	6	16	0.4	-4	TS25	TKY08F				
2016R/L-07S		●	●		0702	16	180	22.5	10.6	2.6	15	5	20	0.4	-5	TS25	TKY08F				
2520R/L-11S		●	●		11T3	20	180	26	13.7	3.7	19	7	25	0.8	-5	TS43	TKY15F				

Order Number		Stock		Insert Number	Dimensions (mm)								Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio	Finish		Light		Medium	
		R	L		D4	L1	L2	F1	F2	H1	RR°	D1				Re	Ratio	SV	MV	PCD	CBN
FSDQC1310R/L-07E		●	●	DCMT DCGT NP-DCMT NP-DCMW	0702	10	162	18.4	7.6	2.6	9	8	13	0.4	-7.5	TS25	TKY08F				
1612R/L-07E		●	●		0702	12	182	20.2	8.6	2.6	11	6	16	0.4	-8	TS25	TKY08F				
2016R/L-07E		●	●		0702	16	222	24.2	10.6	2.6	15	5	20	0.4	-8	TS25	TKY08F				
2520R/L-11E		●	●		11T3	20	254	28.0	13.7	3.7	19	7	25	0.8	-8	TS43	TKY15F				

* When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS

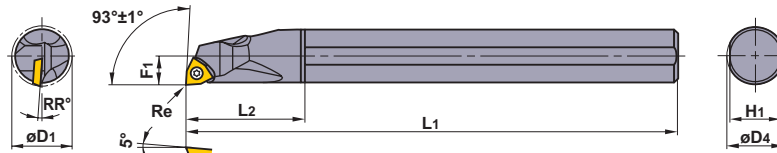
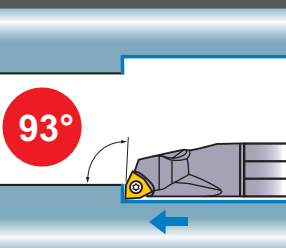
Geometry		Class	Order Number	Dimensions (mm)			Stock Grade											
							Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide	CBN		PCD		
				D1	S1	Re	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HT10	MB825	MB8025	MD220	
Molded Breaker Light Cutting		M	DCMT070202-SV	6.35	2.38	0.2	●	●	●	●	●							
			070204-SV	6.35	2.38	0.4	●	●	●	●	●							
			070208-SV	6.35	2.38	0.8	●	●	●	●	●							
			11T302-SV	9.525	3.97	0.2	●	●	●	●	●							
			11T304-SV	9.525	3.97	0.4	●	●	●	●	●							
			11T308-SV	9.525	3.97	0.8	●	●	●	●	●							
Molded Breaker Medium Cutting		M	DCMT070202-MV	6.35	2.38	0.2	●	●	●	●	●							
			070204-MV	6.35	2.38	0.4	●	●	●	●	●							
			070208-MV	6.35	2.38	0.8	●	●	●	●	●							
			11T302-MV	9.525	3.97	0.2	●	●	●	●	●							
			11T304-MV	9.525	3.97	0.4	●	●	●	●	●							
			11T308-MV	9.525	3.97	0.8	●	●	●	●	●							
Ground Breaker Finish Cutting		G	DCGT070202R-F	6.35	2.38	0.2				●	●	□	●					
			070202L-F	6.35	2.38	0.2				●	●	●	●					
			070204R-F	6.35	2.38	0.4				●	●	□	●					
			070204L-F	6.35	2.38	0.4				●	●	●	●					
			11T302R-F	9.525	3.97	0.2				●	●	□	●					
			11T302L-F	9.525	3.97	0.2				●	●	●	●					
			11T304R-F	9.525	3.97	0.4				●	●	□	●					
			11T304L-F	9.525	3.97	0.4				●	●	●	●					
CBN (No Breaker) Finish Cutting		M	NP-DCMW070204G	6.35	2.38	0.4								●				
			11T304G	9.525	3.97	0.4									●			
		G	NP-DCGW070202G	6.35	2.38	0.2									●			
			070204G	6.35	2.38	0.4										●		
			070208G	6.35	2.38	0.8										●		
			11T302G	9.525	3.97	0.2										●		
			11T304G	9.525	3.97	0.4										●		
			11T304F	9.525	3.97	0.4										□		
			11T304T	9.525	3.97	0.4										□		
			11T308G	9.525	3.97	0.8										●		
	11T308F	9.525	3.97	0.8										□				
	11T308T	9.525	3.97	0.8										□				
	G	NP-DCGW11T304G2	9.525	3.97	0.4									●				
		11T308G2	9.525	3.97	0.8										●			
PCD (With Breaker) Finish Cutting		M	NP-DCMT070202R-F	6.35	2.38	0.2										●		
			070202L-F	6.35	2.38	0.2											●	
			070204R-F	6.35	2.38	0.4												●
			070204L-F	6.35	2.38	0.4												●
			11T302R-F	9.525	3.97	0.2												●
			11T302L-F	9.525	3.97	0.2												●
11T304R-F	9.525	3.97	0.4												●			
11T304L-F	9.525	3.97	0.4												●			

DIMPLE BAR

HOLDERS



FSWUB/P



WB $\odot\odot$, WP $\odot\odot$ inserts



The ø8 and ø10 shanks are 0°.

Right hand holder shown.

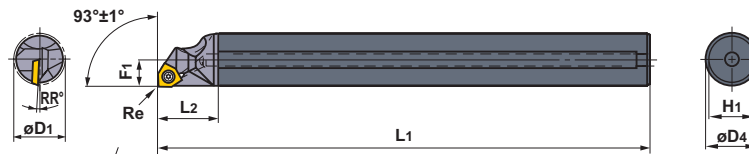
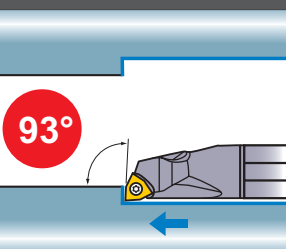
Finish	R/L-F-FS
	
	(L3,04,06)
Medium	
MV	
	(L3,04,06)

Order Number	Stock		Insert Number	Dimensions (mm)						Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio			
	R	L		D4	L1	L2	F1	H1	RR°						
FSWUB1008R/L-L3S	●	●	WBMT WBGT	L302 $\odot\odot$	8	125	18	5	7.2	14	10	0.2	-3	TS2	TKY06F
1210R/L-L3S	●	●		L302 $\odot\odot$	10	150	22.5	6	9	11	12	0.2	-3.5	TS2	TKY06F
FSWUP1412R/L-04S	●	●	WPMT WPGT	0402 $\odot\odot$	12	150	27	7	11	4	14	0.4	-4	TS253	TKY08F
1816R/L-04S	●	●		0402 $\odot\odot$	16	180	36	9	15	1	18	0.4	-5	TS253	TKY08F
2220R/L-06S	●	●		0603 $\odot\odot$	20	220	45	11	19	2	22	0.8	-5	TS4	TKY15F
3025R/L-06S	●	●		0603 $\odot\odot$	25	250	56.3	15	23.4	0	30	0.8	-5	TS4	TKY15F

FSWUB/P_E

Carbide shank with oil hole



WB $\odot\odot$, WP $\odot\odot$ inserts



The ø8 and ø10 shanks are 0°.

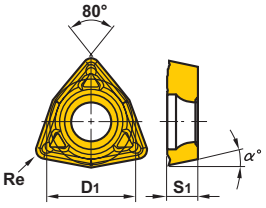
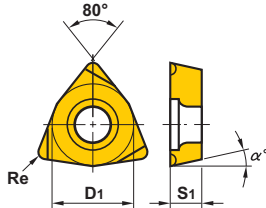
Right hand holder shown.

Finish	R/L-F-FS
	
	(L3,04,06)
Medium	
MV	
	(L3,04,06)

Order Number	Stock		Insert Number	Dimensions (mm)						Min. Cutting Diameter D1	Standard Corner Radius Re	* Recommended l/d Ratio			
	R	L		D4	L1	L2	F1	H1	RR°						
FSWUB1008R/L-L3E	●	●	WBMT WBGT	L302 $\odot\odot$	8	140	13.8	5	7.2	14	10	0.2	-7	TS2	TKY06F
1008R-L3E-2/3	●			L302 $\odot\odot$	8	90	13.8	5	7.2	14	10	0.2	-7	TS2	TKY06F
1008R-L3E-1/2	●			L302 $\odot\odot$	8	70	13.8	5	7.2	14	10	0.2	-7	TS2	TKY06F
1210R/L-L3E	●	●		L302 $\odot\odot$	10	160	16.0	6	9	11	12	0.2	-7.5	TS2	TKY06F
1210R-L3E-2/3	●			L302 $\odot\odot$	10	105	16.0	6	9	11	12	0.2	-7.5	TS2	TKY06F
1210R-L3E-1/2	●			L302 $\odot\odot$	10	80	16.0	6	9	11	12	0.2	-7.5	TS2	TKY06F
FSWUP1412R/L-04E	●	●	WPMT WPGT	0402 $\odot\odot$	12	180	17.8	7	11	4	14	0.4	-8	TS253	TKY08F
1412R-04E-2/3	●			0402 $\odot\odot$	12	120	17.8	7	11	4	14	0.4	-8	TS253	TKY08F
1412R-04E-1/2	●			0402 $\odot\odot$	12	90	17.8	7	11	4	14	0.4	-8	TS253	TKY08F
1816R/L-04E	●	●		0402 $\odot\odot$	16	220	21.8	9	15	1	18	0.4	-8	TS253	TKY08F
1816R-04E-2/3	●			0402 $\odot\odot$	16	145	21.8	9	15	1	18	0.4	-8	TS253	TKY08F
1816R-04E-1/2	●			0402 $\odot\odot$	16	110	21.8	9	15	1	18	0.4	-8	TS253	TKY08F
2220R/L-06E	●	●		0603 $\odot\odot$	20	250	24.0	11	19	2	22	0.8	-8	TS4	TKY15F
2220R-06E-2/3	●			0603 $\odot\odot$	20	165	24.0	11	19	2	22	0.8	-8	TS4	TKY15F
2220R-06E-1/2	●		0603 $\odot\odot$	20	125	24.0	11	19	2	22	0.8	-8	TS4	TKY15F	

* Recommended l/d is for the longest shank. when using a short shank, please pay special attention to the tool clamping depth to the body. When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS





Geometry		Class	Order Number	Dimensions (mm)				Stock Grade						
								Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide
				D1	S1	Re	α°	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N
Molded Breaker Medium Cutting 	M	WBMTL30202R-MV	4.76	2.38	0.2	5	●	●	●	○	●	●	□	
		L30202L-MV	4.76	2.38	0.2	5	●	●	●	○	●	●	□	
		L30204R-MV	4.76	2.38	0.4	5	●	●	●	○	●	●	□	
		L30204L-MV	4.76	2.38	0.4	5	●	●	●	○	●	●	□	
		WPMT040202-MV	6.35	2.38	0.2	11	●	●	●	○	●	●	□	
		040204-MV	6.35	2.38	0.4	11	●	●	●	○	●	●	□	
		060304-MV	9.525	3.18	0.4	11	●	●	●	○	●	●	□	
		060308-MV	9.525	3.18	0.8	11	●	●	●	○	●	●	□	
Ground Breaker Finish Cutting  <p>Left hand is shown.</p>	G	WBGTL302V3L-F	4.76	2.38	0.03	5				●		●		
		L30201L-F	4.76	2.38	0.1	5				●		●		
		L30202R-F	4.76	2.38	0.2	5				●		●	□	●
		L30202L-F	4.76	2.38	0.2	5				●		●	□	●
		L30204R-F	4.76	2.38	0.4	5				●		●	□	●
		L30204L-F	4.76	2.38	0.4	5				●		●	□	●
		WPGT040202R-FS	6.35	2.38	0.2	11				●		●	□	●
		040202L-FS	6.35	2.38	0.2	11				●		●	□	●
		040204R-FS	6.35	2.38	0.4	11				●		●	□	●
		040204L-FS	6.35	2.38	0.4	11				●		●	□	●
		060304R-FS	9.525	3.18	0.4	11				●		●	□	●
		060304L-FS	9.525	3.18	0.4	11				●		●	□	●
		060308R-FS	9.525	3.18	0.8	11				●		●	□	●
		060308L-FS	9.525	3.18	0.8	11				●		●	□	●

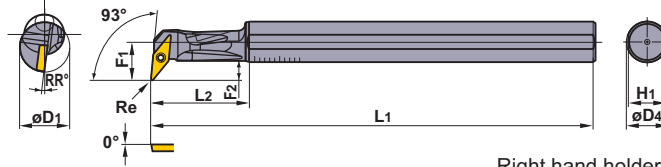
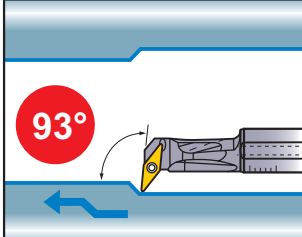
DIMPLE BAR





HOLDERS

FSVUB/C

VC $\circ\circ$, VB $\circ\circ$ inserts




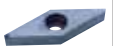
Finish	Medium
R/L-F	MV
	
(08,11,16)	(08,11,16)
Medium	CBN
Standard	
	
(11,16)	(16)

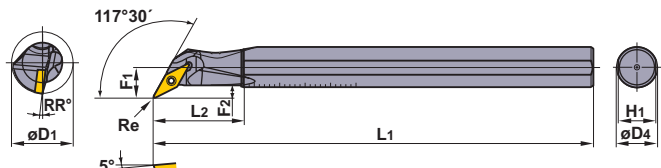
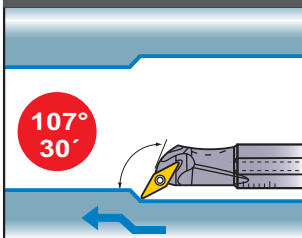






Order Number	Stock		Insert Number	Dimensions (mm)							Min. Cutting Dia. D1	Standard Corner Radius Re	Recommended I/d Ratio					
	R	L		D4	L1	L2	F1	F2	H1	RR°								
FSVUC1612R/L-08S	●	●	VCGT VCMT	0802 $\circ\circ$	12	150	25	11	5.5	11	8	16	0.4	-4	—	—	TS201D	TKY06F
FSVUB2016R/L-11S	●	●	VBGT VBMT NP-VBGW	1103 $\circ\circ$	16	180	32.5	15.5	8	15	8	20	0.4	-5	—	—	TS255	TKY08F
2520R/L-11S	●	●		1103 $\circ\circ$	20	200	40.5	17.5	8	19	7	25	0.4	-5	—	—	TS255	TKY08F
3425R/L-16S	●	●		1604 $\circ\circ$	25	220	40	20.5	8.5	23.4	13	34	0.8	-5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16S	●	●		1604 $\circ\circ$	32	250	84.0	27.5	12	30.4	9	40	0.8	-5	SPSVN32	BCP141	TS35D	TKY15F

FSVPB/C

VC $\circ\circ$, VB $\circ\circ$ inserts

Finish	Medium
R/L-F	MV
	
(08,11,16)	(08,11,16)
Medium	CBN
Standard	
	
(11,16)	(16)






Order Number	Stock		Insert Number	Dimensions (mm)							Min. Cutting Dia. D1	Standard Corner Radius Re	Recommended I/d Ratio					
	R	L		D4	L1	L2	F1	F2	H1	RR°								
FSVPC1610R/L-08S	●	●	VCGT VCMT	0802 $\circ\circ$	10	150	25	8	3	9	8	16	0.4	-3.5	—	—	TS201D	TKY06F
FSVPB2012R/L-11S	●	●	VBGT VBMT NP-VBGW	1103 $\circ\circ$	12	150	28	10	4.5	11	8	20	0.4	-4	—	—	TS255	TKY08F
2516R/L-11S	●	●		1103 $\circ\circ$	16	180	28	12.5	5	15	5	25	0.4	-5	—	—	TS255	TKY08F
3020R/L-11S	●	●		1103 $\circ\circ$	20	200	40	15	5	19	5	30	0.4	-5	—	—	TS255	TKY08F
3425R/L-16S	●	●		1604 $\circ\circ$	25	220	50	17	5	23.4	13	34	0.8	-5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16S	●	●		1604 $\circ\circ$	32	250	55	22	6.5	30.4	9	40	0.8	-5	SPSVN32	BCP141	TS35D	TKY15F

* When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

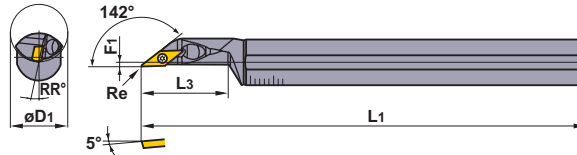
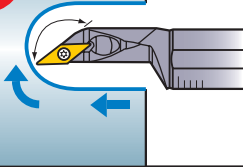
HOLDERS

FSVJB/C



VC $\circ\circ$, VB $\circ\circ$ inserts

Finish	Medium
R/L-F	MV
	
(08,11)	(08,11)
Medium	
Standard	
	
(11)	

142°

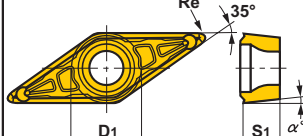
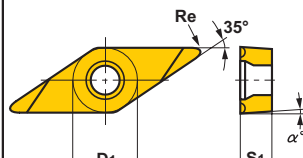
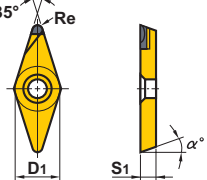


Right hand holder shown.

Order Number	Stock		Insert Number	Dimensions (mm)							Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended I/d Ratio		
	R	L		D4	L1	L3	F1	H1	RR°						
FSVJC1612R/L-08S	●	●	VCGT	0802 $\circ\circ$	12	150	26	2	11	5	16	0.4	-4	TS201D	TKY06F
2016R/L-08S	●	●	VCMT	0802 $\circ\circ$	16	180	36	2	15	5	20	0.4	-5	TS201D	TKY06F
FSVJB2520R/L-11S	●	●	VBGT	1103 $\circ\circ$	20	200	38	2	19	5	25	0.4	-5	TS255	TKY08F
3025R/L-11S	●	●	VBMT	1103 $\circ\circ$	25	250	45	3.5	23.4	5	30	0.4	-5	TS255	TKY08F

* When using an insert with a right and left hand breaker, use a right hand holder with a left hand insert and a left holder with a right hand insert.

INSERTS

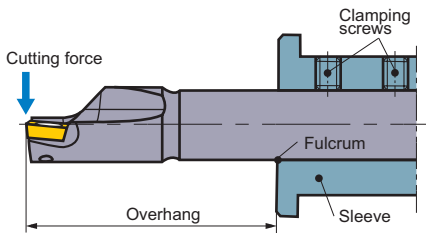
Geometry	Class	Order Number	Dimensions (mm)		Stock Grade													
					Coated			MIRACLE Coated	Cermet	Coated Cermet	Carbide	CBN						
					UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HT10	MB8025					
Molded Breaker Finish - Medium Cutting 	M	VCMT080202-MV	4.76	2.38	0.2	7	●	●	●	●	●	●	●	●	●	●	●	
		080204-MV	4.76	2.38	0.4	7	●	●	●	●	●	●	●	●	●	●	●	
		VBMT110304-MV	6.35	3.18	0.4	5	●	●	●	●	●	●	●	●	●	●	●	●
		110308-MV	6.35	3.18	0.8	5	●	●	●	●	●	●	●	●	●	●	●	●
		160404-MV	9.525	4.76	0.4	5	●	●	●	●	●	●	●	●	●	●	●	●
		160408-MV	9.525	4.76	0.8	5	●	●	●	●	●	●	●	●	●	●	●	●
Ground Breaker Finish Cutting  <p>Left hand is shown.</p>	G	VCGT080202R-F	4.76	2.38	0.2	7				●		●	●	●				
		080202L-F	4.76	2.38	0.2	7				●		●	●	●				
		080204R-F	4.76	2.38	0.4	7				●		●	●	●				
		080204L-F	4.76	2.38	0.4	7				●		●	●	●				
		VBGT110302R-F	6.35	3.18	0.2	5				●		●	●	●				
		110302L-F	6.35	3.18	0.2	5				●		●	●	●				
		110304R-F	6.35	3.18	0.4	5				●		●	●	●				
		110304L-F	6.35	3.18	0.4	5				●		●	●	●				
		160402R-F	9.525	4.76	0.2	5				●		●	●	●				
		160402L-F	9.525	4.76	0.2	5				●		●	●	●				
160404R-F	9.525	4.76	0.4	5				●		●	●	●						
160404L-F	9.525	4.76	0.4	5				●		●	●	●						
CBN (No Breaker) Finish Cutting 	G	NP-VBGW160404G	9.525	4.76	0.4	5										●		
		160408G	9.525	4.76	0.8	5											●	

DIMPLE BAR

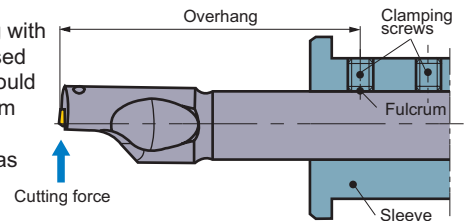
Operational Guidance

● Installation of DIMPLE BAR

(1) If the clamp is not rigid then chattering and vibrations will occur. Use at least 2 clamping screws to ensure that the clamping force is sufficient.



(2) When machining with the holder reversed the overhang should be measured from the tip to the first clamping screw as shown.



● CCG/MT, CPG/MT, CPMX, TPG/MX, TPG/MV inserts

	Order Number	Clamp Screw	Remark
By changing the clamp screw it is possible to use the inserts listed on the right hand side.	CCG/MT0602 (Ø6.35)	Can be used as it is.	If the screw is too long then please grind away the unnecessary material.
	CPG/MT0802 (Ø7.94)	Change to TS3.	
	CPG/MT0903 (Ø9.525)	Change to TS4.	
	CPMX0802 (Ø7.94)	Can be used as it is.	
	CPMX0903 (Ø9.525)	Can be used as it is.	
	TPG/MX0802 (Ø4.76)	Change to CS200T.	
	TPG/MX0902 (Ø5.56)	Change to CS250T.	
	TPG/MX1103 (Ø9.525)	Change to CS300890T.	
	TPG/MV0902 (Ø5.56)	Change to TS25.	
TPG/MV1103 (Ø9.525)	Change to TS3.		

Machining of the FSVJB/C type

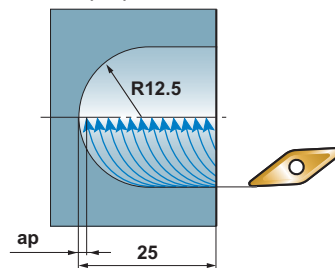
● Curved faces

When machining a prepared hole, the amount of reads is greatly reduced.

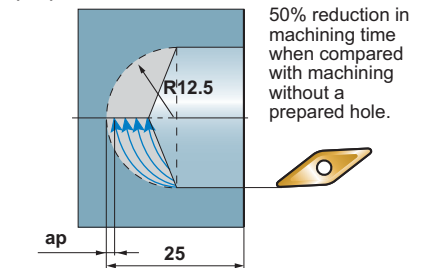
<Cutting conditions>

Workpiece : JIS S55C
 Tool : FSVJB2520R-11S
 Insert : VBMT110304-MV
 Cutting speed : 120m/min
 Feed : 0.05mm/rev
 Depth of cut : 0.3mm
 Coolant : W.S.O

Machining a workpiece without prepared hole.



Machining a workpiece with prepared hole.



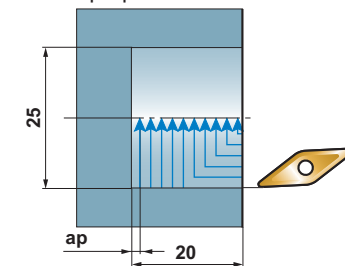
● Deep faces

When machining a prepared hole, the amount of reads is greatly reduced.

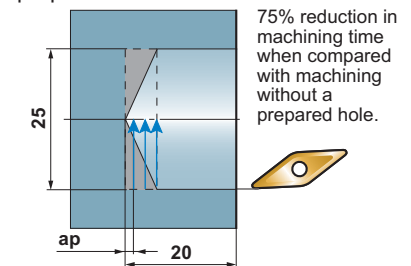
<Cutting conditions>

Workpiece : JIS S55C
 Tool : FSVJB2520R-11S
 Insert : VBMT110304-MV
 Cutting speed : 120m/min
 Feed : 0.05mm/rev
 Depth of cut : 0.3mm
 Coolant : W.S.O

Machining a workpiece without prepared hole.

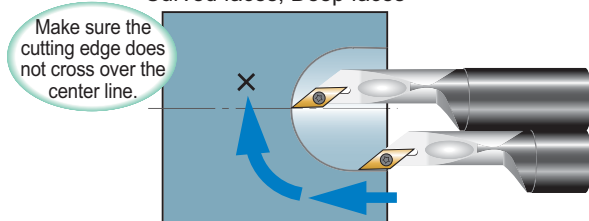


Machining a workpiece with prepared hole.



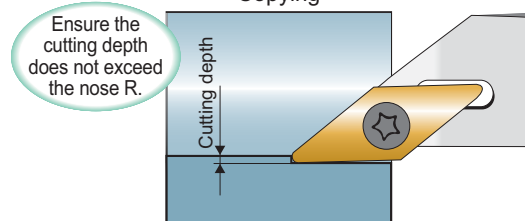
■ Caution when using the FSVJB/C type

<Curved faces, Deep faces>



Crossing over the center line leads to chipping.

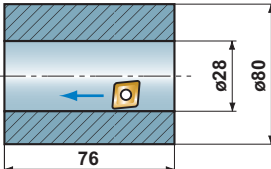
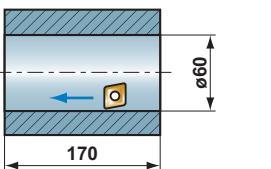
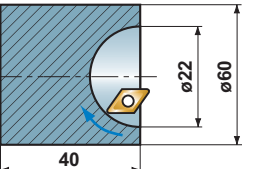
<Copying>



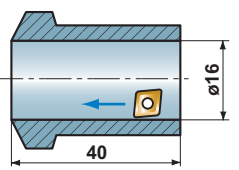
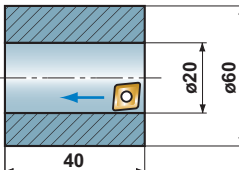
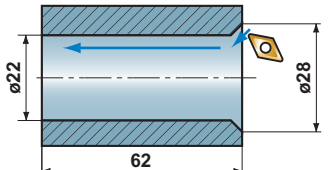
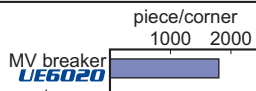
Cutting depths large than nose R lead to burrs developing.

Application Examples

● Chatter resistance

Tool	FSCLP1816R-09S	FSCLP2220R-09E	FSVJC2016R-08S	
Insert (Grade)	CPMH090308-MV (NX2525)	CPMH090304L-F (VP15TF)	VCMT090304-MV (NX2525)	
Overhang	80mm (l/d=5)	175mm (l/d=8.75)	64mm (l/d=4)	
Machine	NC machine	NC machine	NC machine	
Workpiece	JIS S45C (200HB) 	JIS SKD11 (200HB) 	JIS SCM440 (220HB) 	
Cutting Conditions	Cutting Speed (m/min)	80	60	80
	Feed (mm/rev)	0.2	0.18	0.05
	Depth of Cut (mm)	0.5	0.5	0.3
Coolant	WSO	WSO	WSO	
Result	Even with an overhang 1.7 times that of a conventional bar, the surface finish is still of a high standard.	Possible to machine even when the overhang is large with demanding cutting conditions.	Compared with a competitor's bar no vibrations occurred, surface finish was of a high standard. Additionally excellent chip disposal was also achieved.	

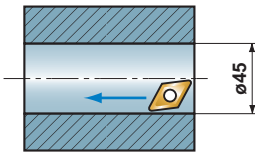
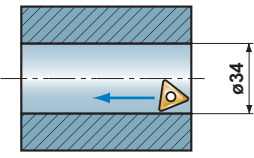
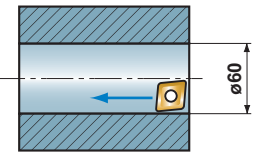
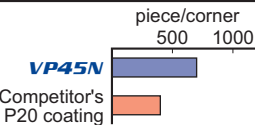
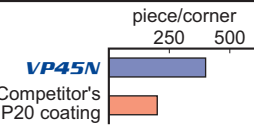
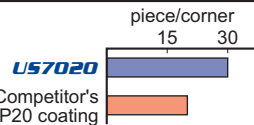
● Chip discharge ability

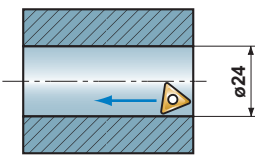
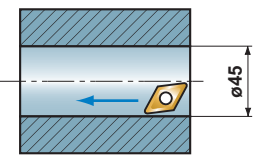
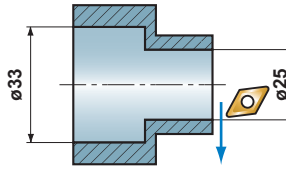
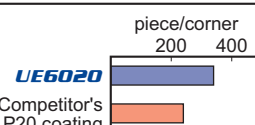
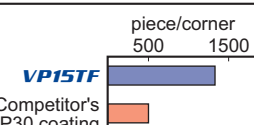
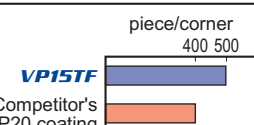
Tool	FSCLP1412R-08S	FSCLP1816R-09S	FSCLP1816L-09S	
Insert (Grade)	CPMH080204-MV (US7020)	CPMH090304-MV (VP45N)	CPMH090304-SV (UE6020)	
Overhang	55mm (l/d=4.58)	60mm (l/d=3.75)	70mm (l/d=4.38)	
Machine	NC machine	NC machine	NC machine	
Workpiece	JIS SUS304 (180HB) 	JIS S10C (100HB) 	JIS SK5 	
Cutting Conditions	Cutting Speed (m/min)	60	140	170
	Feed (mm/rev)	0.15	0.15	0.1
	Depth of Cut (mm)	1	0.8	0.5
Coolant	WSO	WSO	WSO	
Result	Surface finish is improved by using the MV breaker. The MV breaker prevents the chips from gathering at the nose of the insert.	Chips control has become better than a competitor's existing breaker for medium cutting. A better surface finish can be attained because chattering was eliminated.	 <p>piece/corner 1000 2000</p> <p>MV breaker UE6020</p> <p>Competitor's general-purpose breaker P20 coating</p> <p>Chips twining around a holder can be avoided. Tool life has become three times longer than a competitor's conventional breaker.</p>	

DIMPLE BAR

Application Examples

●Wear resistance / Chipping resistance

Tool	FSDUC2016R-07S	FSTUP2220R-11E	FSCLP2220R-09S	
Insert (Grade)	DCMT070204-SV (VP45N)	TPMH110304-SV (VP45N)	CPMH090304-MV (US7020)	
Overhang	72mm (l/d=4.5)	140mm (l/d=7)	80mm (l/d=4)	
Machine	NC machine	NC machine	NC machine	
Workpiece	JIS S45C 	JIS SPHC 	JIS SUS304 	
Cutting Conditions	Cutting Speed (m/min)	185	230	120
	Feed (mm/rev)	0.1	0.25	0.1
	Depth of Cut (mm)	0.35	0.1	0.5
Coolant	WSO	WSO	WSO	
Result	 Compared to a competitor's conventional grade, tool life has become about 1.8 times longer.	 Chips control has become better than and tool life has become about twice as long as a competitor's conventional grade.	 Compared to a competitor's conventional grade, tool life has become about more than 1.5 times longer.	

Tool	FSTUP1816R-11S	FSDUC3220R-11S	FSDUC3220R-11S	
Insert (Grade)	TPMH110308-SV (UE6020)	DCMT11T304-MV (VP15TF)	DCMT11T308-MV (VP15TF)	
Overhang	64mm (l/d=4)	60mm (l/d=3)	60mm (l/d=3)	
Machine	NC machine	NC machine	NC machine	
Workpiece	JIS SCM420 	JIS SCM440 	JIS SPCH 	
Cutting Conditions	Cutting Speed (m/min)	100	170	180
	Feed (mm/rev)	0.25	0.14	0.15
	Depth of Cut (mm)	0.6	0.25	1.0
Coolant	WSO	WSO	WSO	
Result	 Compared to a competitor's conventional grade, tool life has become about 1.4 times longer.	 VP15TF does not experience chipping. This enables stable machining and much longer tool life.	 A combination of a sharp breaker and a high chipping resistance grade lengthens tool life.	

For your safety

●Do not touch cutting or chips without wearing gloves. ●Use tools under recommended cutting conditions, and exchange tools before excessive wear occurs. ●Chips become extremely hot, scattered over and may be stretched. Ensure safety guards and goggles are used. ●In case of using non-water soluble oil, make sure to have a fire prevention countermeasure. ●Use the provided wrench spanner, and ensure the inserts and spare parts are damped securely.

MITSUBISHI MATERIALS CORPORATION



Overseas Operations Center :

Cutting Tools

KFC bldg., 7F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL 81-3-5819-8771 FAX 81-3-5819-8774

MMC HARTMETALL GmbH

Comeniusstr.2, 40670, Meerbusch GERMANY
TEL 49-2159-9189-0 FAX 49-2159-50462

MITSUBISHI MATERIALS U.S.A. CORPORATION

Headquarters

17401, Eastman Street, Irvine, California, 92614, USA
TEL 1-949-862-5100 FAX 1-949-862-5180

MMC METAL SINGAPORE PTE LTD.

10, Arumugam Road, #04-00 Lion Industrial Bldg., 409957, SINGAPORE
TEL 65-6743-9370 FAX 65-6749-1469

Mitsubishi Carbides Home page : <http://www.mitsubishicarbide.com>

(Tools specifications subject to change without notice.)