MITSUBISHI

MITSUBISHI CARBIDE

B047E

"MIRACLE" coated insert series expansion.

Chatter resistant boring bars

DIMPLE BAR

Highly rigid and lightweight head prevents vibration for better surface finishes.

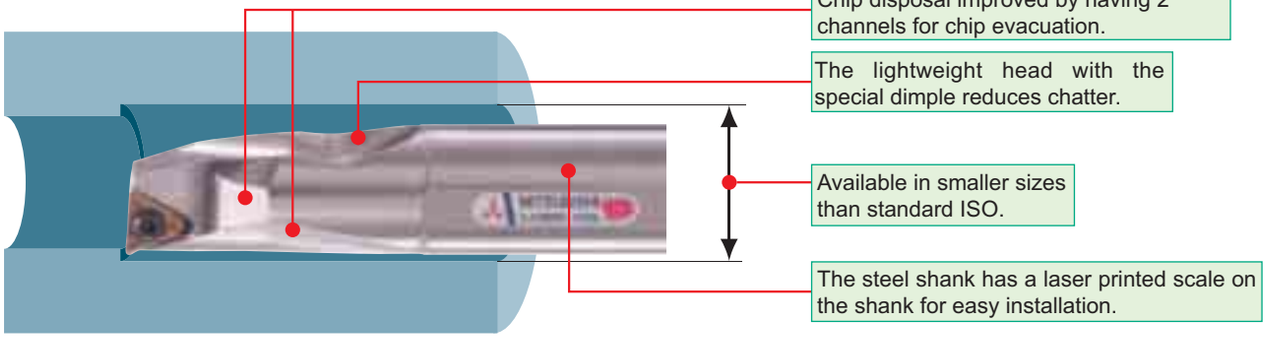
- Three different lengths of carbide shank boring bars available.
- A wide range of inserts.
- Expansion of the "MIRACLE" coated ***VP15TF*** insert series.

Chatter resistant boring bars

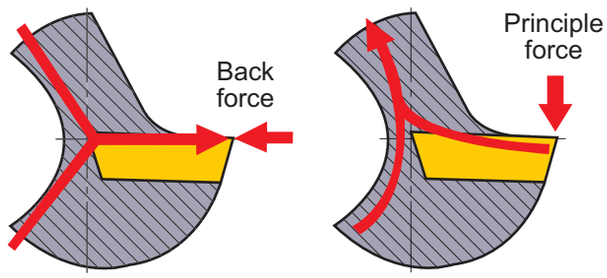
DIMPLE BAR

Features

Using computer simulation a highly rigid & lightweight head configuration has been designed to reduce chatter and improve the vibration damping properties.



● Deflection resistance

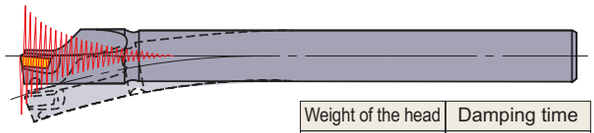


The Dimple bar design effectively balances the principal and back forces, and reduces deflection by up to 17%.

Boring bars	Deflection
Dimple bar	28.3μm
Conventional bar	34μm

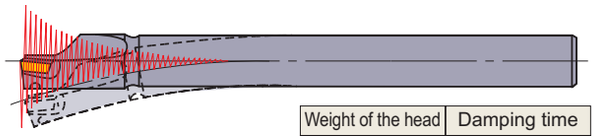
● Vibration resistance

Dimple bar



Weight of the head	Damping time
49.7g	15.8ms

Conventional bar



Weight of the head	Damping time
70.1g	20ms

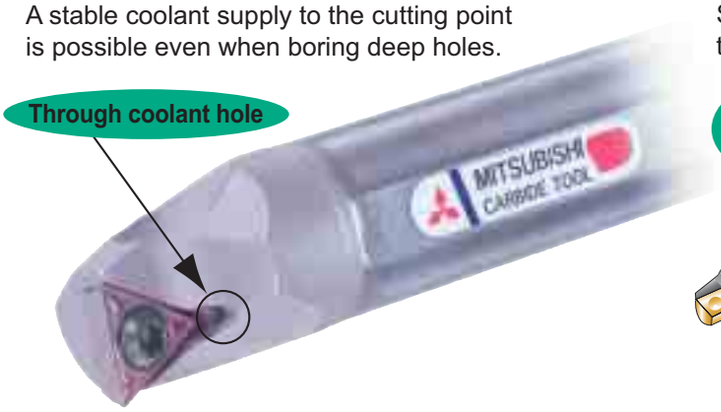
By reducing the weight of the head, the damping properties are increased.

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

Carbide Shank Type

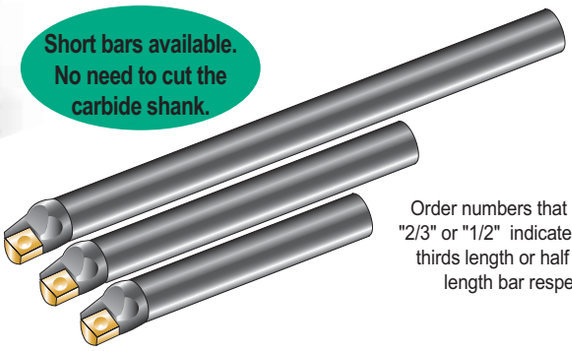
● The carbide shank type Dimple Bar uses through coolant holes.

A stable coolant supply to the cutting point is possible even when boring deep holes.



● Three different lengths of boring bars. (Short shank series)

Selection of the most suitable length bar according to the application.



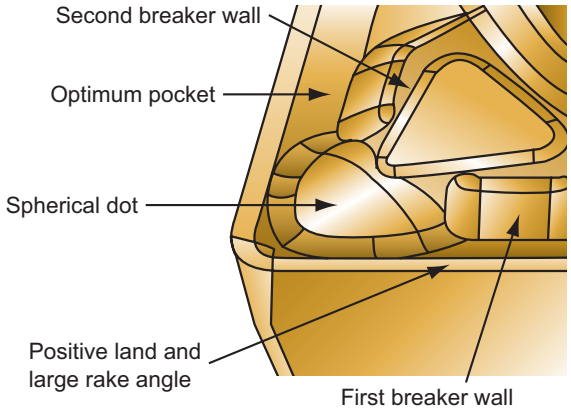
Order numbers that include "2/3" or "1/2" indicates a two thirds length or half normal length bar respectively.

Features of MV/SV breaker

New-concept moulded chip breakers for Dimple Bars.
Stable chip control and sharp cutting for a wide application area.

●MV beaker for medium cutting

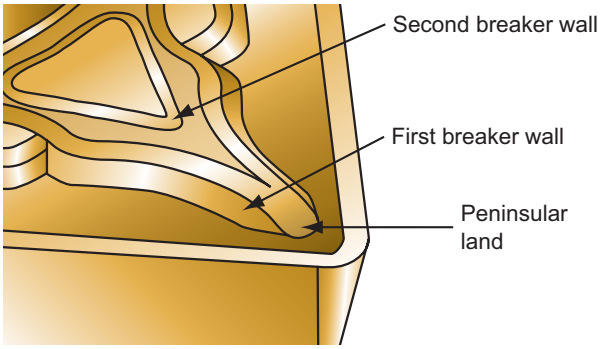
A combination of spherical dots and two-stage breaker wall achieves stable chip control for depths of cut between 0.8mm-2mm.



A large rake angle for sharp cutting and longer tool life.

●SV beaker for light cutting

A combination of a "peninsular" land and a two-stage breaker wall ensures chip control even on smaller depths of cut of 1mm or below.



The rake angle ensures sharp cutting to prevent vibrations and gives an excellent surface finish.

Grade Features

● MIRACLE coated grade VP15TF

(Al, Ti)N "MIRACLE " coating

Heat resistance and adhesion strength have substantially increased compared to conventional coatings enabling longer tool life.

TF15 micro-grain cemented carbide substrate

Micro-grain cemented carbide with a good balance of wear and fracture resistance.

● MIRACLE coated cermet grade VP45N

(Al, Ti)N "MIRACLE " coating

Heat resistance and adhesion strength have substantially increased compared to conventional coatings enabling longer tool life.

Highly tough cermet substrate NX4545

Toughness is increased compared to existing cermet grades for more stable machining.

● CVD coated grade UE6020

"Even Coating" Technology

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

Triple-layer coating structure

The outer layers are a laminated Ti compound over a smooth layer of aluminum oxide (Al_2O_3). This provides the heat resistance needed for high-speed machining. The inner layer a is fibrous crystalline titanium, which has a good balance of wear and fracture resistance.

Special cemented carbide substrate

The substrate has a hard core combined with a very tough surface layer.

● CVD coated grade US7020

Thin coating layer of fibrous TiCN + Micrograin Al_2O_3

A thin coating layer with high adhesion strength is less liable to peeling than other grades for steel cutting.

Cemented carbide substrate with tough surface layer

The cemented carbide substrate has a hard core and a tougher surface layer than existing grades. This reduces plastic deformation and chipping of the cutting edge when cutting stainless steels at high speed.

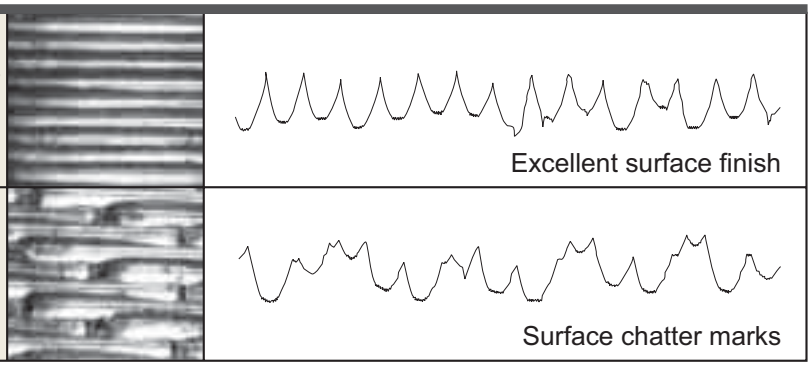
Small honed edge design

The small edge honing enables sharper cutting than other grades to help prevent welding to the cutting edge.

DIMPLE BAR

Cutting Performance

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



Steel shank

Cutting conditions
- Workpiece : ISO 42CrMo4 (185HB)
- Depth of cut : 0.5mm
- Feed : 0.1mm/rev
- Wet cutting

DIMPLE BAR
- Holder : FSCLP1816R-09S
- Insert : CPMH090304-MV
- Grade : NX2525

Carbide shank

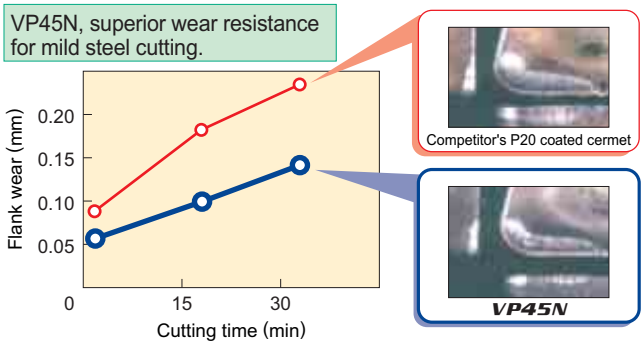
Cutting conditions
- Workpiece : ISO 42CrMo4 (185HB)
- Cutting speed : 80m/min
- Depth of cut : 0.5mm
- Feed : 0.1mm/rev
- Overhang : 96mm (l/d=8)
- Wet cutting

DIMPLE BAR
- Holder : FSTUP1412R-09E
- Insert : TPMH090204-MV
- Grade : NX2525

Cutting Performance of VP15TF VP45N UE6020 US7020

● VP45N

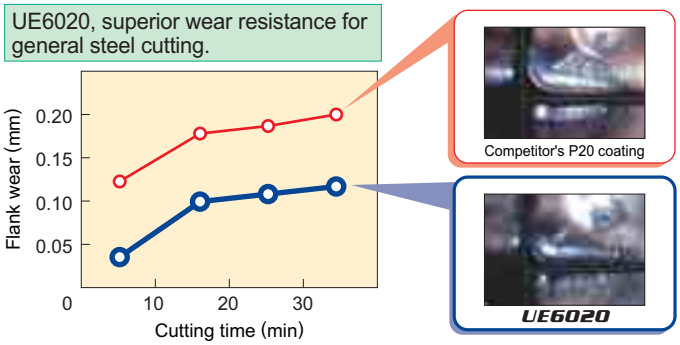
VP45N, superior wear resistance for mild steel cutting.



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

● UE6020

UE6020, superior wear resistance for general steel cutting.



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

● VP15TF

VP15F exhibits excellent fracture resistance.

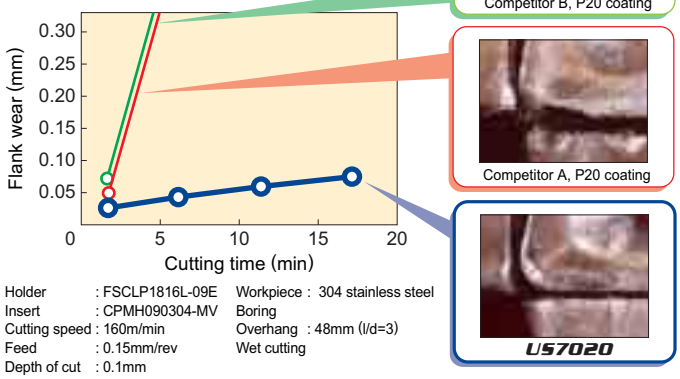
○ Good X Fracture

Feed (mm/rev)	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 : ISO 42CrMo4
Interrupted facing
Overhang : 48mm (l/d=3)
Wet cutting

● US7020

US7020, ideal for stainless steel cutting.

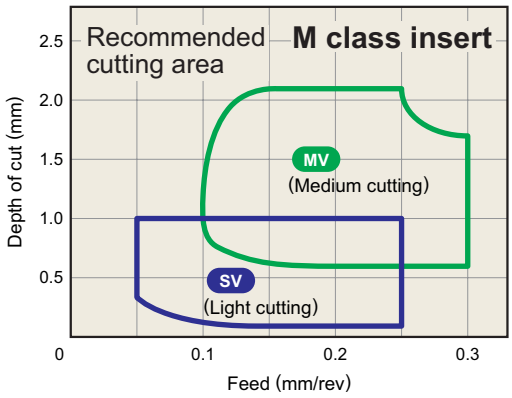


Holder : FSCLP1816L-09E
Insert : CPMH090304-MV
Cutting speed : 160m/min
Feed : 0.15mm/rev
Depth of cut : 0.1mm
Workpiece : 304 stainless steel
Boring
Overhang : 48mm (l/d=3)
Wet cutting

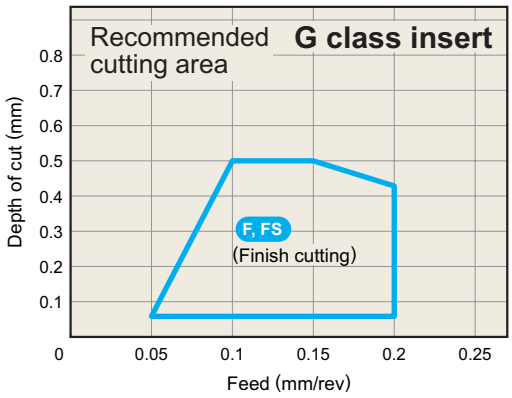
Recommended use of the holder

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 chip breakers



Cutting conditions
Insert : CPMH090304-MV, SV
Cutting speed : 150m/min
Workpiece : DIN 20Cr4
Wet cutting



Cutting conditions
Insert : CPMH090304L-F
Cutting speed : 150m/min
Workpiece : ISO 42CrMo4
Wet cutting

Recommended cutting conditions

	Workpiece	Cutting Mode	Breaker	Recom-mendation	Grade	Cutting Speed (m/min)	L/D<3 (steel shank), L/D<6 under (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
		Light	SV	①	**VP45N**	140 (90−190)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
				②	**VP15TF**	180 (130−230)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
		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
		Light	SV	①	**US7020**	150 (110−190)	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/mm²	Finishing	F/FS	①	**HTi10**	130 (90−160)	0.15 (0.10−0.20)	−0.5	0.15 (0.10−0.20)	−0.5
		Medium	MV	①	**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	Aluminium 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
			No breaker	①	**MD220**	200 (150−250)	0.10 (0.05−0.15)	−2.0	0.10 (0.05−0.15)	−1.0

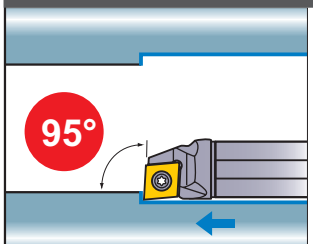
* If vibrations do occur, reduce the cutting speed by 30%.

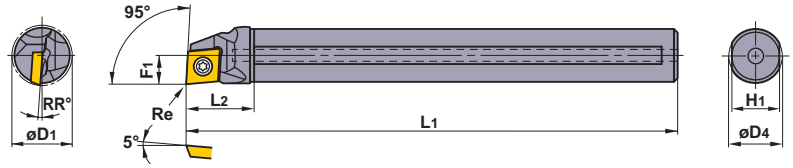
DIMPLE BAR

Holder

FSCLC/P

With oil hole **CC○○inserts, CP○○inserts**





FSCLC1008R/L-06A=1°

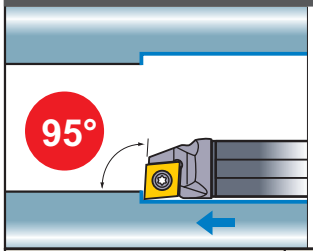
Right hand tool holder shown.

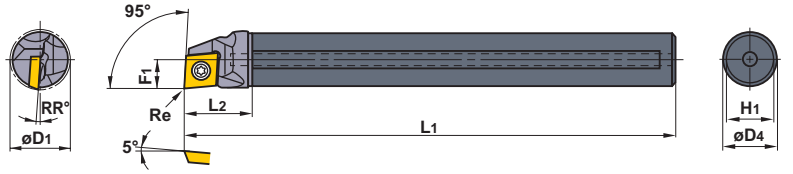
Finish	Light
R/L-F	SV
 (06,08,09)	 (06,08,09)
Medium	**CBN**
MV	
 (06,08,09)	 (06,08,09)

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

FSCLC/P_E

Carbide shank with oil hole **CC○○inserts, CP○○inserts**





FSCLC1008R/L-06E (-2/3, -1/2)=1°

Right hand tool holder shown.

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

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

* Recommended l/d is for the longest shank type. When using a shorter shank, please pay attention to ensure that the tool overhang is sufficient. When using inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left holder with a right hand insert.

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only. ▲ : Inventory maintained. To be replaced by new products.

Inserts

Application		Order Number	Class	Coated					MIRACLE Coated		Cermet	Coated Cermet		Carbide		CBN							PCD		Dimensions (mm)				Geometry
				UE6005	UE6010	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N		HTi10		MB8025	MB810	MB820	MB825	MB835	MB710	MB730	MD220		D_1	S_1	Re	$\alpha°$	
Molded Breaker	Light Cutting	CCMH060202-SV	M			●	●	●	●	●	●														6.35	2.38	0.2	7	CCMH...-SV CPMH...-SV
		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	
	Medium Cutting	CCMH060202-MV	M			●	●	●	●	●	●	●													6.35	2.38	0.2	7	CCMH...-MV CPMH...-MV
		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	CCGH060202R-F	G						●		★	□		★											6.35	2.38	0.2	7	CCGH...R/L-F CPMH...R/L-F
		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	
		CPMH080204R-F	M						●		●	□		★											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	Left hand is shown.
CBN (No Breaker)	Finish Cutting	NP-CCMB060204G	M																▲						6.35	2.38	0.4	7	NP-CCMB...G NP-CPMB...G
		NP-CPMB080204G																	▲						7.94	2.38	0.4	11	
		090304G																	▲						9.525	3.18	0.4	11	Last letter of insert number G : For General Purpose
PCD (With Breaker)	Finish Cutting	NP-CCMH060202	M																				★		6.35	2.38	0.2	7	NP-CCMH... NP-CPMH...
		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	

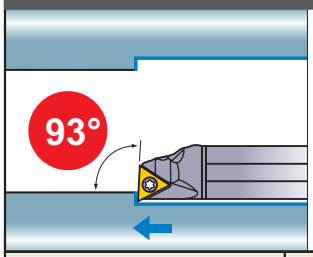
DIMPLE BAR

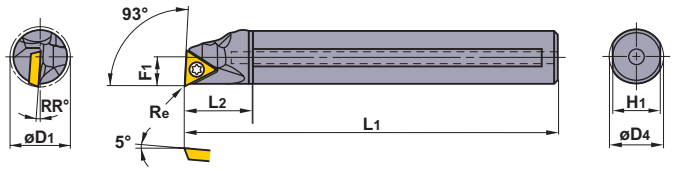
Holder

FSTUP

With oil hole

TP○○inserts





Right hand tool holder shown.

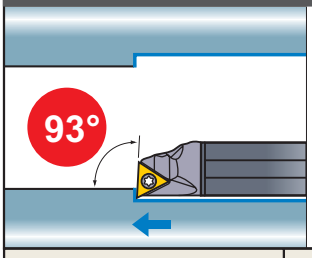
Finish	Light	Medium
R/L-FS	SV	MV
 (08,09,11,16)	 (08,09,11,16)	 (08,09,11,16)
PCD	CBN	
R/L-F		
 (08,09,11)	 (08,09,11,16)	

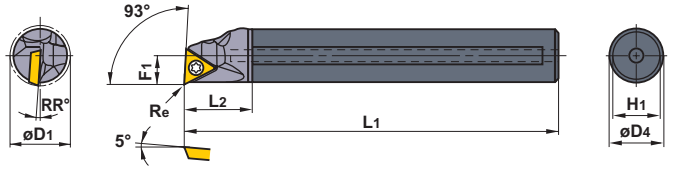
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	H1	RR°	D1	Re			
FSTUP1008R/L-08A	●	●	TPGH TPMH NP-TPMB NP-TPMH	0802○○	8	125	18	5	7.2	10	10	0.4	−3	TS2D	TKY06F
1210R/L-09A	●	●		0902○○	10	150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

FSTUP_E

Carbide shank with oil hole

TP○○inserts





Right hand tool holder shown.

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

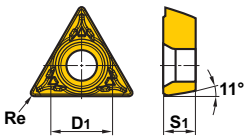
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	H1	RR°	D1	Re			
FSTUP1008R/L-08E	●	●	TPGH TPMH NP-TPMB NP-TPMH	0802○○	8	140	13.8	5	7.2	10	10	0.4	−7	TS2D	TKY06F
1008R-08E-2/3	●			0802○○	8	90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

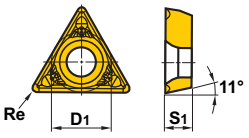
* Recommended l/d is for the longest shank type. When using a shorter shank, please pay attention to ensure that the tool overhang is sufficient.
When using inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left holder with a right hand insert.

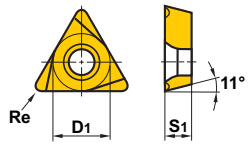
● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

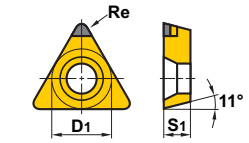
Inserts

Application		Order Number	Class	Coated					MIRACLE Coated			Cermet	Coated Cermet		Carbide		CBN							PCD		Dimensions (mm)			Geometry
				UE6005	UE6010	UE6020	US7020	US735	VP15TF	VP45N		NX2525	AP25N		HTi10		MB8025	MB810	MB820	MB825	MB835	MB710	MB730	MD220		D1	S1	Re	
Molded Breaker	Light Cutting	TPMH080202-SV	M			●	●	●	●	●		●														4.76	2.38	0.2	TPMH...-SV
		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	
	Medium Cutting	TPMH080202-MV	M			●	●	●	●	●		●	●													4.76	2.38	0.2	TPMH...-MV
		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	
Ground Breaker	Finish Cutting	TPGH080202R-FS	G						●	★			□	★												4.76	2.38	0.2	TPGH...R/L-FS
		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	Left hand is shown.
CBN (No Breaker)	Finish Cutting	NP-TPMB080204G	M																	▲						4.76	2.38	0.4	NP-TPMB...G
		090204G																		▲						5.56	2.38	0.4	
		110304G																		▲						6.35	3.18	0.4	
		160304G																		▲						9.525	3.18	0.4	
PCD (With Breaker)	Finish Cutting	NP-TPMH080202R-F	M																						★	4.76	2.38	0.2	NP-TPMH...R/L-F
		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	
		160302R-F																							★	9.525	3.18	0.2	
		160302L-F																							★	9.525	3.18	0.2	
		160304R-F																							★	9.525	3.18	0.4	
		160304L-F																							★	9.525	3.18	0.4	Left hand is shown.

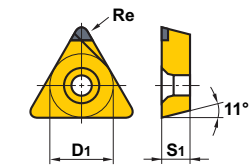








Last letter of insert number
G : For General Purpose



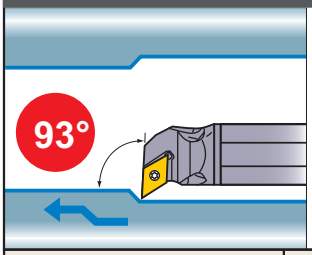
DIMPLE BAR

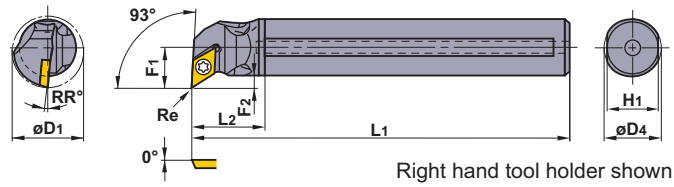
Holders

FSDUC

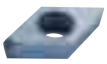
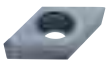
With oil hole

DC○○inserts





Right hand tool holder shown.

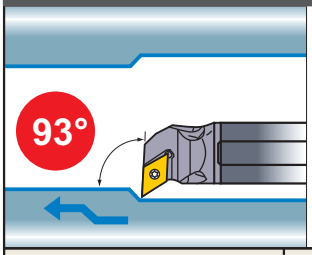
Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

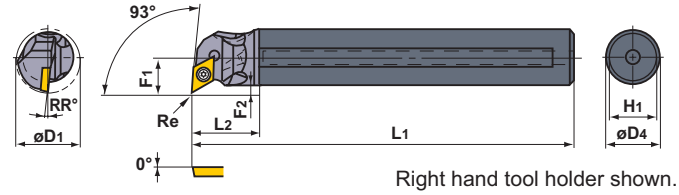
Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D_4	L_1	L_2	F_1	F_2	H_1	RR°	D_1	Re			
FSDUC1410R/L-07A	●	●	DCMT DCGT NP-DCMT NP-DCMW	0702○○	10	150	18	8.3	3.3	9	7.5	**14**	0.4	−3.5	TS25	TKY08F
1612R/L-07A	●	●		0702○○	12	150	20	9.3	3.3	11	6	**16**	0.4	−4	TS25	TKY08F
2016R/L-07A	●	●		0702○○	16	180	20	11.3	3.3	15	5	**20**	0.4	−5	TS25	TKY08F
3220R/L-11A	●	●		11T3○○	20	180	22.5	16.1	6.1	19	5	**32**	0.8	−5	TS43	TKY15F

FSDUC_E

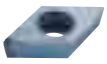
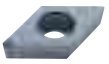
Carbide shank with oil hole

DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D_4	L_1	L_2	F_1	F_2	H_1	RR°	D_1	Re			
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 inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left holder with a right hand insert.

● : Inventory maintained. ★ : Inventory maintained in Japan. ☐ : Non stock, produced to order only.
▲ : Inventory maintained. To be replaced by new products.
△ : Non stock, produced to order only. To be replaced by new products.

Inserts

Application		Order Number	Class	Coated: UE6005	UE6010	UE6020	US7020	US735	MIRACLE Coated: VP15TF	VP45N	Cermet: NX2525	Coated Cermet: AP25N	Carbide: HTi10	CBN: MB8025	MB810	MB820	MB825	MB835	MB710	MB730	PCD: MD220	D1	S1	Re	Geometry
Molded Breaker	Light Cutting	DCMT070202-SV	M	●	●	●	●		●		●											6.35	2.38	0.2	DCMT...-SV
		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	
	Medium Cutting	DCMT070202-MV	M	●	●	●	●		●		●	●										6.35	2.38	0.2	DCMT...-MV
		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	DCGT070202R-F	G						●		●	□	★									6.35	2.38	0.2	DCGT...R/L-F
		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	0.8	Left hand is shown.
CBN (No Breaker)	Finish Cutting	NP-DCMW070204G	M														★					6.35	2.38	0.4	NP-DCMW...G
		11T304G															★					9.525	3.97	0.4	
		11T308													▲	▲						9.525	3.97	0.8	Last letter of insert number G : For General Purpose
		NP-DCGW070202F	G												▲							6.35	2.38	0.2	NP-DCGW...G/F/T
		070202G												▲			▲					6.35	2.38	0.2	
		070202T																▲				6.35	2.38	0.2	
		070204F													▲							6.35	2.38	0.4	
		070204G												▲			▲					6.35	2.38	0.4	
		070204T																▲				6.35	2.38	0.4	
		070208G												▲			▲					6.35	2.38	0.8	
		11T302F													▲							9.525	3.97	0.2	
		11T302G												▲			▲					9.525	3.97	0.2	
		11T302GS																	★	★		9.525	3.97	0.2	
		11T302T																▲				9.525	3.97	0.2	
		11T304F												△	▲				△	△		9.525	3.97	0.4	
		11T304G												▲			▲					9.525	3.97	0.4	
		11T304GS																		★		9.525	3.97	0.4	
		11T304T												△				▲				9.525	3.97	0.4	
		11T308F												△	▲							9.525	3.97	0.8	
		11T308G												▲		△	▲					9.525	3.97	0.8	
		11T308T												△				▲				9.525	3.97	0.8	
		NP-DCGW070204G2	G											▲								6.35	2.38	0.4	NP-DCGW...G2
		11T304G2												▲								9.525	3.97	0.4	
		11T308G2												▲								9.525	3.97	0.8	
PCD (With Breaker)	Finish Cutting	NP-DCMT070202R-F	M																		★	6.35	2.38	0.2	NP-DCMT...R/L-F
		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	Left hand is shown.

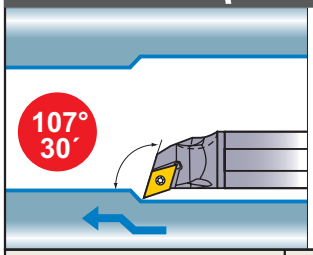
DIMPLE BAR

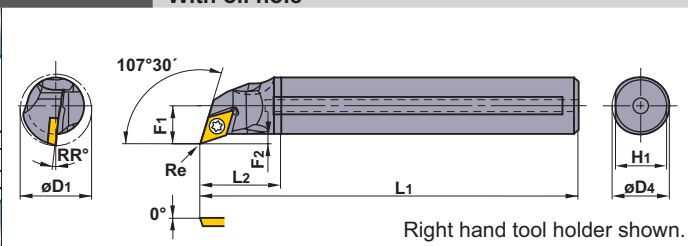
Holders

FSDQC

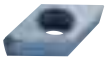
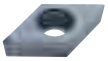
With oil hole

DC○○inserts





Right hand tool holder shown.

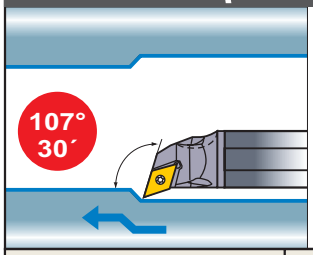
Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

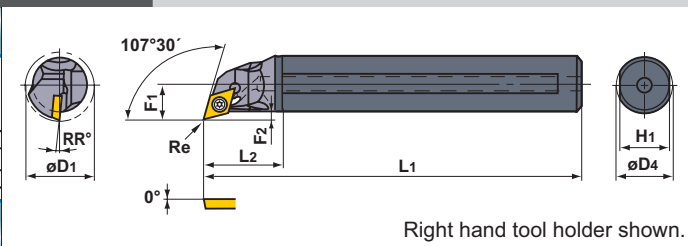
Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D_4	L_1	L_2	F_1	F_2	H_1	RR°	D_1	Re			
FSDQC1310R/L-07A	●	●	DCMT DCGT NP-DCMT NP-DCMW	0702○○	10	150	20.5	7.6	2.6	9	8	**13**	0.4	−3.5	TS25	TKY08F
1612R/L-07A	●	●		0702○○	12	150	22.5	8.6	2.6	11	6	**16**	0.4	−4	TS25	TKY08F
2016R/L-07A	●	●		0702○○	16	180	22.5	10.6	2.6	15	5	**20**	0.4	−5	TS25	TKY08F
2520R/L-11A	●	●		11T3○○	20	180	26	13.7	3.7	19	7	**25**	0.8	−5	TS43	TKY15F

FSDQC_E

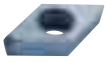
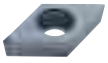
Carbide shank with oil hole

DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D_4	L_1	L_2	F_1	F_2	H_1	RR°	D_1	Re			
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 inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left hand holder with a right hand insert.

● : Inventory maintained. ★ : Inventory maintained in Japan. ☐ : Non stock, produced to order only.
▲ : Inventory maintained. To be replaced by new products.
△ : Non stock, produced to order only. To be replaced by new products.

Inserts

Application		Order Number	Class	Coated					MIRACLE Coated		Cermet	Coated Cermet		Carbide		CBN							PCD		Dimensions (mm)			Geometry
				UE6005	UE6010	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N		HTi10		MB8025	MB810	MB820	MB825	MB835	MB710	MB730	MD220		D1	S1	Re	
Molded Breaker	Light Cutting	DCMT070202-SV	M	●	●	●	●	●	●	●	●														6.35	2.38	0.2	DCMT...-SV
		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	
	Medium Cutting	DCMT070202-MV	M	●	●	●	●	●	●	●	●	●													6.35	2.38	0.2	DCMT...-MV
		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	DCGT070202R-F	G						●		●	□		★											6.35	2.38	0.2	DCGT...R/L-F
		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	0.8	Left hand is shown.
CBN (No Breaker)	Finish Cutting	NP-DCMW070204G	M																★						6.35	2.38	0.4	NP-DCMW...G
		11T304G																	★						9.525	3.97	0.4	
		11T308															▲	▲							9.525	3.97	0.8	Last letter of insert number G : For General Purpose
		NP-DCGW070202F	G													▲									6.35	2.38	0.2	NP-DCGW...G/F/T
		070202G														▲			▲						6.35	2.38	0.2	
		070202T																		▲					6.35	2.38	0.2	
		070204F															▲								6.35	2.38	0.4	
		070204G														▲			▲						6.35	2.38	0.4	
		070204T																		▲					6.35	2.38	0.4	
		070208G														▲			▲						6.35	2.38	0.8	
		11T302F															▲								9.525	3.97	0.2	
		11T302G														▲			▲						9.525	3.97	0.2	
		11T302GS																			★	★			9.525	3.97	0.2	
		11T302T																		▲					9.525	3.97	0.2	
		11T304F														△	▲				△	△			9.525	3.97	0.4	
		11T304G														▲			▲						9.525	3.97	0.4	
		11T304GS																				★			9.525	3.97	0.4	
		11T304T														△				▲					9.525	3.97	0.4	
		11T308F														△	▲								9.525	3.97	0.8	
		11T308G														▲		△	▲						9.525	3.97	0.8	
		11T308T														△				▲					9.525	3.97	0.8	
		NP-DCGW070204G2	G													▲									6.35	2.38	0.4	NP-DCGW...G2
		11T304G2														▲									9.525	3.97	0.4	
		11T308G2														▲									9.525	3.97	0.8	
PCD (With Breaker)	Finish Cutting	NP-DCMT070202R-F	M																				★		6.35	2.38	0.2	NP-DCMT...R/L-F
		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	Left hand is shown.

DIMPLE BAR

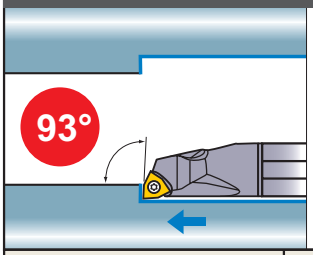
Holders

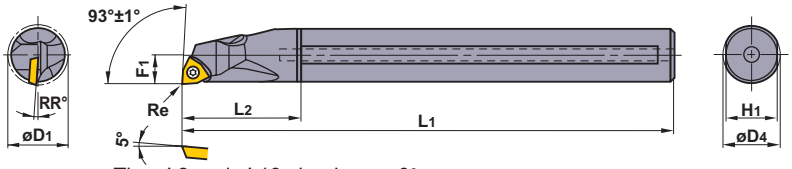
FSWUB/P

With oil hole

WB○○inserts, WP○○inserts

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





The ϕ8 and ϕ10 shanks are 0°

Right hand tool holder shown.

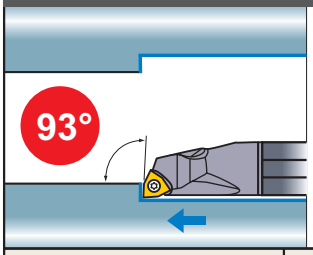
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1	Standard Corner Radius Re	Recommended l/d Ratio	Clamp Screw	Wrench
FSWUB1008R/L-L3A	●	●	WBMT WBGT	L302○○	8	125	18	5	7.2	14	10	0.2	−3	TS2	TKY06F
1210R/L-L3A	●	●		L302○○	10	150	22.5	6	9	11	12	0.2	−3.5	TS2	TKY06F
FSWUP1412R/L-04A	●	●	WPMT WPGT	0402○○	12	150	27	7	11	4	14	0.4	−4	TS253	TKY08F
1816R/L-04A	●	●		0402○○	16	180	36	9	15	1	18	0.4	−5	TS253	TKY08F
2220R/L-06A	●	●		0603○○	20	220	45	11	19	2	22	0.8	−5	TS4	TKY15F
3025R/L-06A	●	●		0603○○	25	250	56.3	15	23.4	0	30	0.8	−5	TS4	TKY15F

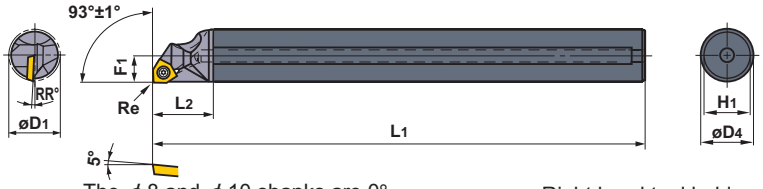
FSWUB/P_E

Carbide shank with oil hole

WB○○inserts, WP○○inserts

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





The ϕ8 and ϕ10 shanks are 0°

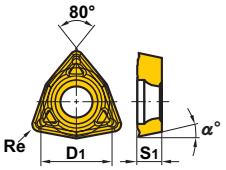
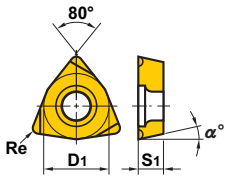
Right hand tool holder shown.

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

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

Inserts

Application		Order Number	Class	Coated					MIRACLE Coated		Cermet	Coated Cermet	Carbide		CBN							PCD		Dimensions (mm)				Geometry
				UE6005	UE6010	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HTi10		MB8025	MB810	MB820	MB825	MB835	MB710	MB730	MD220		D_1	S_1	Re	$\alpha°$	
Molded Breaker	Medium Cutting	**WBMT**L30202R-MV	M			●	●	●	●	●	●	□												4.76	2.38	0.2	5	**WBMTL...R/L-MV** **WPMT...-MV** 
		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	**WBGT**0201V3L-F	G						★		●													3.97	1.59	0.03	5	**WBGTL...R/L-F** **WPGT...R/L-FS** 
		020101L-F							★		●													3.97	1.59	0.1	5	
		020102L-F							★		●													3.97	1.59	0.2	5	
		020104L-F							★		●													3.97	1.59	0.4	5	
		L302V3L-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	Left hand is shown.

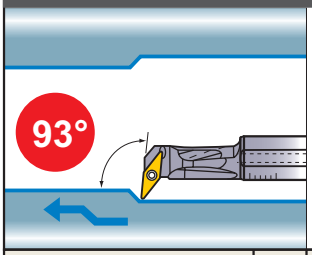
DIMPLE BAR

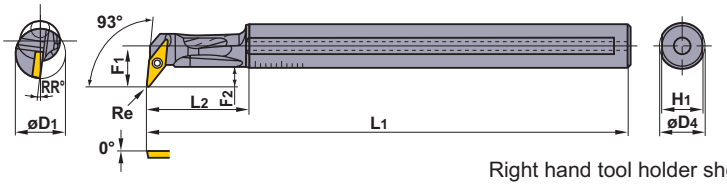
Holders

FSVUB/C

With oil hole

VC○○inserts, VB○○inserts





Right hand tool holder shown.

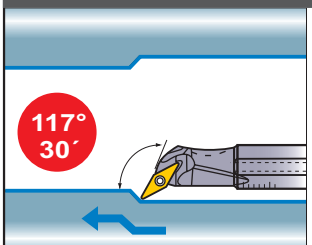
Finish	Medium
R/L-F	MV
(08,11,16)	(08,11,16)
Medium	CBN
Standard	
(11,16)	(16)

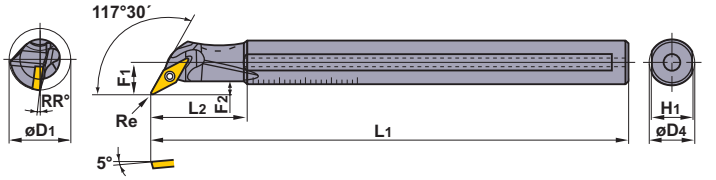
Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Shim	Shim Pin	Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	F2	H1	RR°	D1	Re					
FSVUC1612R/L-08A	●	●	VCGT VCMT	0802○○	12	150	25	11	5.5	11	8	16	0.4	−4	–	–	TS202	TKY06F
FSVUB2016R/L-11A	●	●	VBGT VBMT NP-VBGW	1103○○	16	180	32.5	15.5	8	15	8	20	0.4	−5	–	–	TS255	TKY08F
2520R/L-11A	●	●		1103○○	20	200	40.5	17.5	8	19	7	25	0.4	−5	–	–	TS255	TKY08F
3425R/L-16A	●	●		1604○○	25	220	50	20.5	8.5	23.4	13	34	0.8	−5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16A	●	●		1604○○	32	250	84.0	27.5	12	30.4	9	40	0.8	−5	SPSVN32	BCP141	TS35D	TKY15F

FSVPB/C

With oil hole

VC○○inserts, VB○○inserts





Right hand tool holder shown.

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

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Shim	Shim Pin	Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	F2	H1	RR°	D1	Re					
FSVPC1610R/L-08A	●	●	VCGT VCMT	0802○○	10	150	25	8	3	9	8	16	0.4	−3.5	–	–	TS202	TKY06F
FSVPB2012R/L-11A	●	●	VBGT VBMT NP-VBGW	1103○○	12	150	28	10	4.5	11	8	20	0.4	−4	–	–	TS255	TKY08F
2516R/L-11A	●	●		1103○○	16	180	35	12.5	5	15	5	25	0.4	−5	–	–	TS255	TKY08F
3425R/L-16A	●	●		1604○○	25	220	50	17	5	23.4	13	34	0.8	−5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16A	●	●		1604○○	32	250	55	22	6.5	30.4	9	40	0.8	−5	SPSVN32	BCP141	TS35D	TKY15F

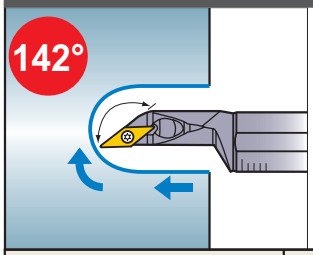
* When using inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left holder with a right hand insert.

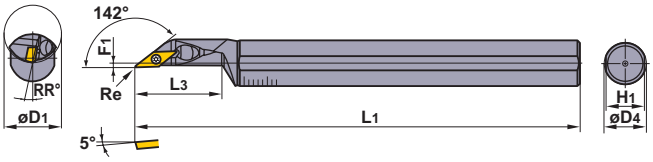
● : Inventory maintained. ★ : Inventory maintained in Japan.

Holders

FSVJB/C

VC○○, VB○○inserts





Right hand tool holder shown.

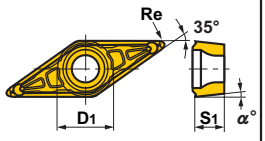
Finish	Medium
R/L-F	MV
	
(08,11)	(08,11)
Medium	
Standard	
	
(11)	

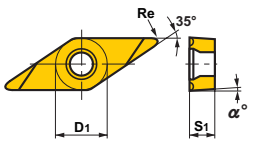
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	Clamp Screw	Wrench
	R	L			D4	L1	L3	F1	H1	RR°	D1	Re			
FSVJC1612R/L-08S	★	★	VCGT VCMT	0802○○	12	150	26	2	11	5	**16**	0.4	−4	TS202	TKY06F
2016R/L-08S	★	★		0802○○	16	180	36	2	15	5	**20**	0.4	−5	TS202	TKY06F
FSVJB2520R/L-11S	★	★	VBGT VBMT	1103○○	20	200	37.5	2	19	5	**25**	0.4	−5	TS255	TKY08F
3025R/L-11S	★	★		1103○○	25	250	45	3.5	23.4	5	**30**	0.4	−5	TS255	TKY08F

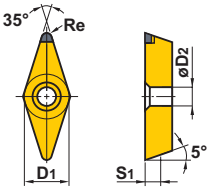
* When using inserts with right and left hand breakers, use a right hand holder with a left hand insert and a left hand holder with a right hand insert.

Inserts

Application		Order Number	Class	Coated					MIRACLE Coated		Cermet	Coated Cermet	Carbide	CBN							PCD		Dimensions (mm)				Geometry
				UE6005	UE6010	UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HTi10	MB8025	MB810	MB820	MB825	MB835	MB710	MB730	MD220		D1	S1	Re	α°	
Molded Breaker	Finish - Medium Cutting	**VCMT080202-MV**	M			●	●	●	●	●	●	●											4.76	2.38	0.2	7	**VCMT...-MV** **VBMT...-MV**
		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	**VCGT080202R-F**	G						●		★	★	★										4.76	2.38	0.2	7	**VCGT...R/L-F** **VBGT...R/L-F**
		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	Left hand is shown.
CBN (No Breaker)	Finish Cutting	**NP-VBGW160404F**	G												▲								9.525	4.76	0.4	3.81	**NP-VBGW...G**
		160404G												★	▲	▲	▲						9.525	4.76	0.4	3.81	
		160404T																▲					9.525	4.76	0.4	3.81	
		160408F													▲								9.525	4.76	0.8	3.81	
		160408G												★	▲	▲	▲						9.525	4.76	0.8	3.81	
		160408T																▲					9.525	4.76	0.8	3.81	





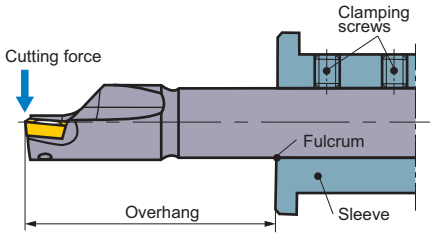


DIMPLE BAR

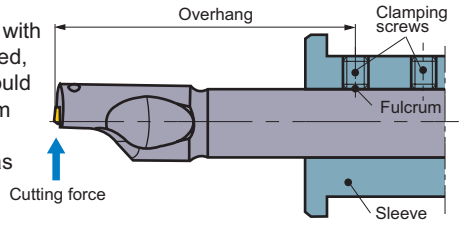
Operational guidance

● Installation of DIMPLE BAR

(1) If clamping of the tool is not sufficient, chattering and vibration will occur. Use at least 2 clamp screws to ensure sufficient clamping.



(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 also possible to use the inserts listed opposite.	**CCG/MT0602**○○ (Ø6.35)	Can be used as it is.	Please shorten the screw if it is too long.
	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

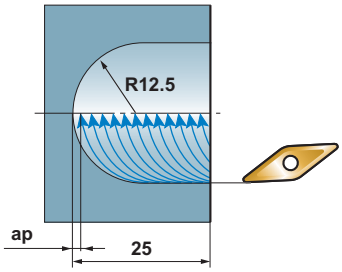
● Curved faces

When machining a prepared hole, number of passes is greatly reduced.

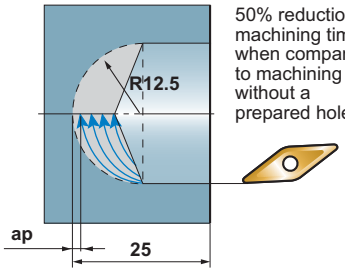
<Cutting conditions>

Workpiece	: Alloy steel
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 a prepared hole.



Machining a workpiece with a prepared hole.



50% reduction in machining time when compared to machining without a prepared hole.

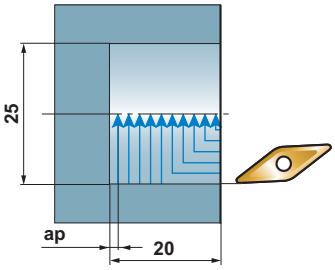
● Deep faces

When machining with a pre-prepared hole, number of passes is greatly reduced.

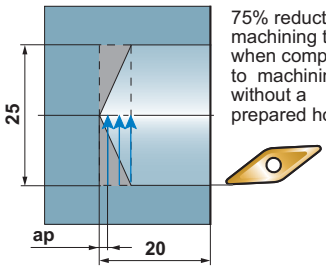
<Cutting conditions>

Workpiece	: Alloy steel
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.



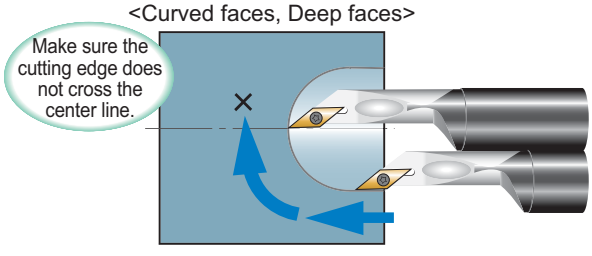
Machining a workpiece with a prepared hole.



75% reduction in machining time when compared to machining without a prepared hole.

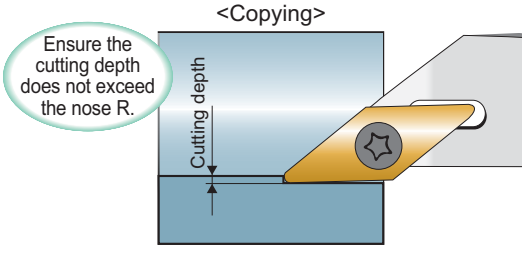
Precautions when using the FSVJB/C type

<Curved faces, Deep faces>



Crossing the center line can chip the insert.

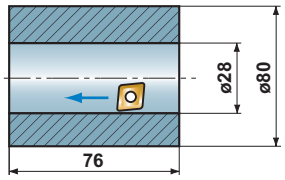
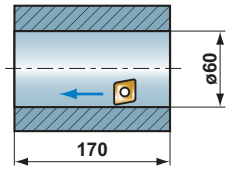
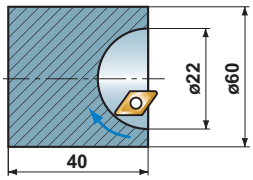
<Copying>



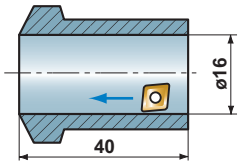
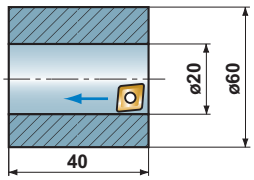
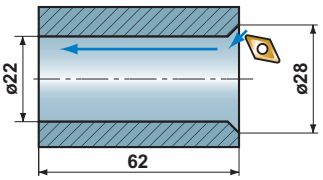
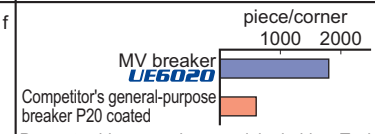
Cutting depths larger than the nose R creates burrs.

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	IS0 C45 (200HB) 	ASTM D2 (200HB) 	ISO 42CrMo4 (220HB) 
Cutting Conditions: Cutting Speed (m/min)	80	60	80
Cutting Conditions: Feed (mm/rev)	0.2	0.18	0.05
Cutting Conditions: Depth of Cut (mm)	0.5	0.5	0.3
Coolant	WSO	WSO	WSO
Result	The surface finish is still of a high standard with 1.7 times conventional overhang length.	Possible to machine under demanding cutting conditions with a long overhang.	Excellent chip control and good surface finish compared to conventional boring bars.

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	304 Stainless steel (180HB) 	DIN C10 (100HB) 	Tool Steel 
Cutting Conditions: Cutting Speed (m/min)	60	140	170
Cutting Conditions: Feed (mm/rev)	0.15	0.15	0.1
Cutting Conditions: Depth of Cut (mm)	1	0.8	0.5
Coolant	WSO	WSO	WSO
Result	Surface finish is improved. The MV breaker prevents the chips from collecting at the nose of the insert.	Better surface finish due to lack of chattering and improved chip control.	 Prevents chips wrapping round the holder. Tool life increased threefold compared to competitor.

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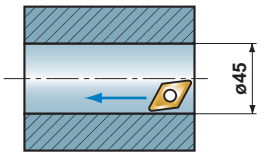
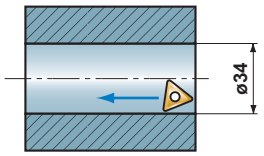
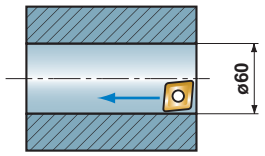
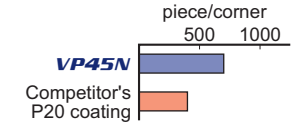
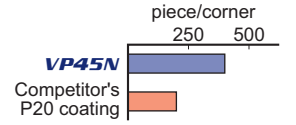
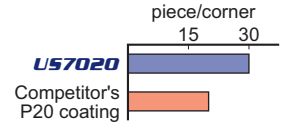
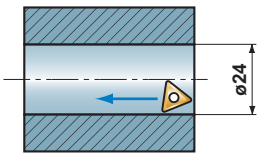
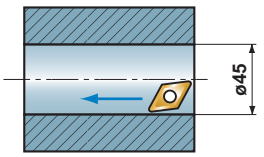
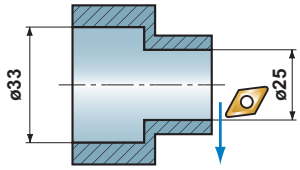
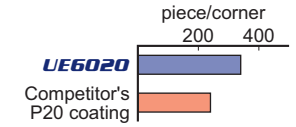
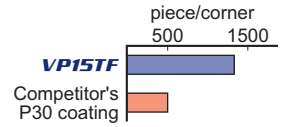
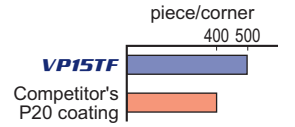
Application examples

●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	Alloy Steel 	Alloy steel 	304 Stainless steel 
Cutting Conditions: Cutting Speed (m/min)	185	230	120
Cutting Conditions: Feed (mm/rev)	0.1	0.25	0.1
Cutting Conditions: Depth of Cut (mm)	0.35	0.1	0.5
Coolant	WSO	WSO	WSO
Result	 1.8 times longer tool life	 Double tool life and improved chip control.	 1.5 times longer tool life.

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	BS 708 M 20 	ISO 42CrMo4 	Alloy steel 
Cutting Conditions: Cutting Speed (m/min)	100	170	180
Cutting Conditions: Feed (mm/rev)	0.25	0.14	0.15
Cutting Conditions: Depth of Cut (mm)	0.6	0.25	1.0
Coolant	WSO	WSO	WSO
Result	 1.4 times longer tool life.	 No chipping with VP15TF and much longer tool life.	 A combination of a sharp chip breaker and a 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 and scattered. Ensure safety guards and goggles are used. ●In case of using non-water soluble oil, ensure for precautions are available. ●Use the provided wrench at spanner, and ensure the inserts and spare parts are clamped securely.

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