MITSUBISHI

MITSUBISHI CARBIDE

TOOL NEWS

2006.7.Update B047A

Steel shank type Expansion

Chatter resistant boring bars

SCREW CLAMP DIMPLE BAR

Highly rigid and light-weight heads prevent vibration and achieve good surface finish.

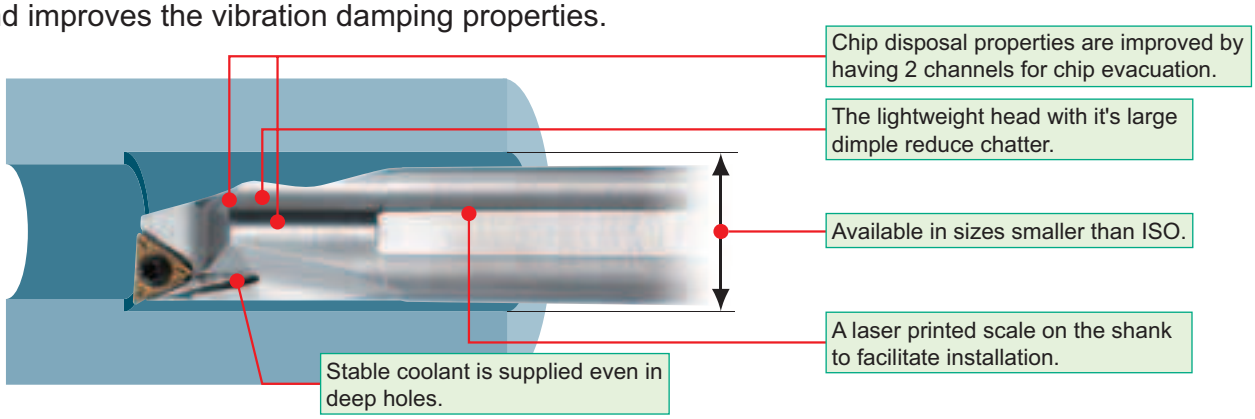
- Heavy metal shank and steel shank having coolant hole.
- Excellent chipbreakers for challenging boring applications
- Expansion of ***MIRACLE*** coated ***VP15TF*** insert series

Chatter resistant boring bars

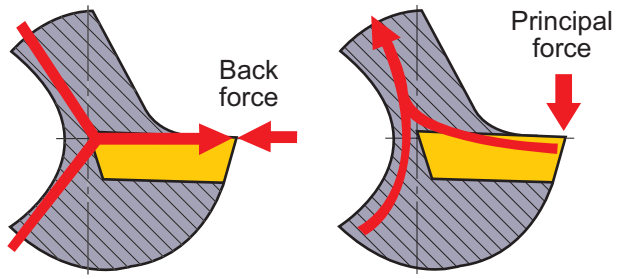
SCREW CLAMP DIMPLE BAR

Features

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



●Deflection resistance

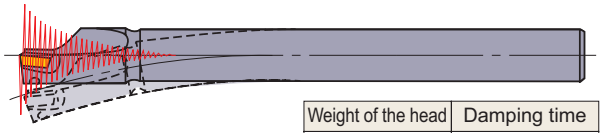


The Dimple bar design effectively balances the principal and back forces, and reduces deflection by up to 17%.

Boring bars	Deflection
Dimple bar	.0011inch
Conventional bar	.0013inch

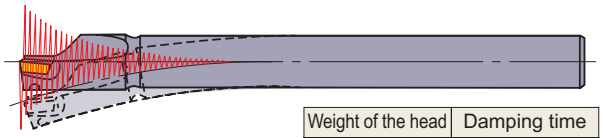
●Vibration resistance

Screw clamp Dimple bar



Weight of the head	Damping time
1.75 oz	15.8ms

Conventional bar

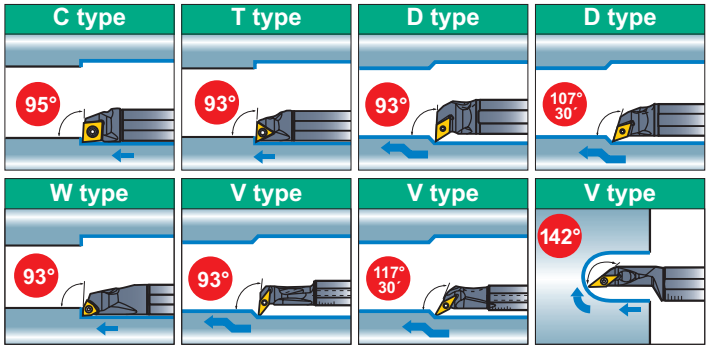


Weight of the head	Damping time
2.50 oz	20ms

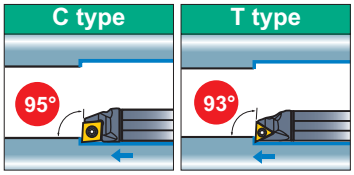
By reducing the weight of the head, the damping properties are increased.

●Standard insert geometries offered in a wide variety of grades.

Heavy metal shank type



Steel shank type

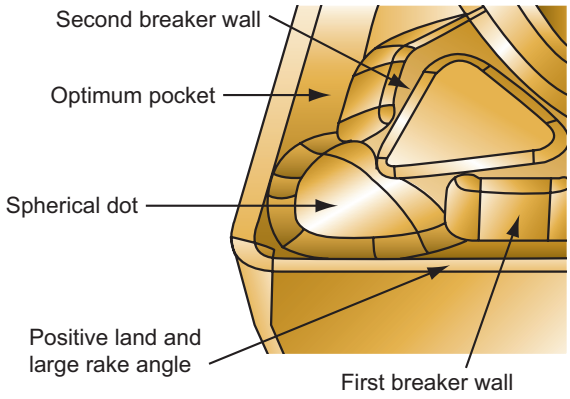


Features of MV·SV breaker

Newly developed, new-concept molded breakers for the Heavy Metal and Steel Shank Screw Dimple Bars. Stable chip control and sharp cutting can be applied to wide cutting areas.

●MV beaker for medium cutting

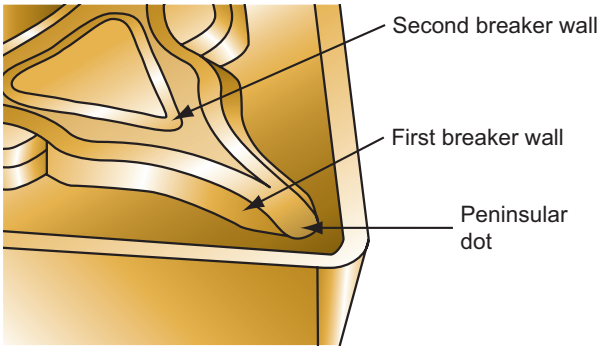
A combination of spherical dots and two-stage breaker walls achieves stable chip control for depths of cut of .031-.079 inch.



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

●SV beaker for light cutting

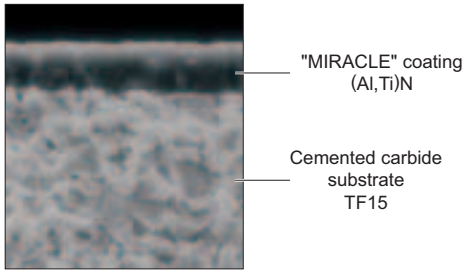
A combination of "peninsular" dots and two-stage breaker walls makes sure of chip control even for depths of cut of .039 inch or below.



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

Features of the Grades

●MIRACLE coating grade VP15TF



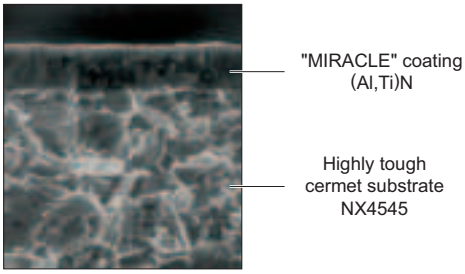
(Al, Ti)N "MIRACLE " coating

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



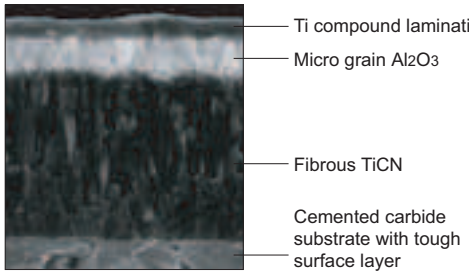
(Al, Ti)N "MIRACLE " coating

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.

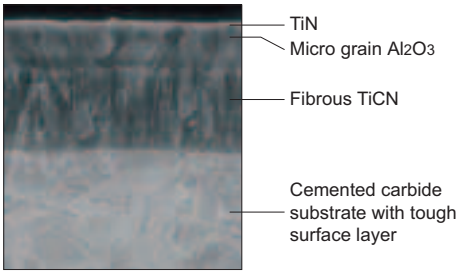
Triple-layer structure

Coating layers, including a surface, are triple-layer structure. An outer layer is a smooth layer of aluminum oxide (Al_2O_3). Al_2O_3 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 Al_2O_3

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

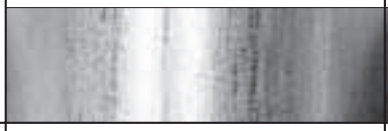
Cemented carbide substrate, which has a hard core and a tougher surface layer than existing grades, has reduced chipping of the cutting edge and plastic deformation in high-speed cutting of stainless steels.

Small honing design

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

SCREW CLAMP DIMPLE BAR

Cutting Performance

l/d	Cutting speed	DIMPLE BAR	Competitor boring bar (using a cermet grade)
Hole depth / Shank dia. =5	262 SFM	Excellent surface finish 	Poor surface finish 
Hole depth / Shank dia. =4	524 SFM	Excellent surface finish 	Surface shows chatter marks 

Heavy metal shank

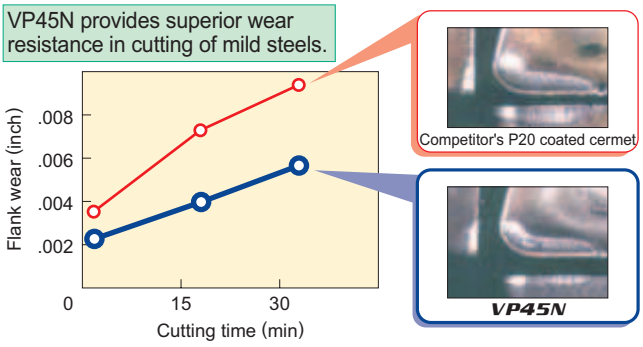
Cutting conditions
- Workpiece : ANSI 4140 (185HB)
- Depth of cut : .020 inch
- Feed : .004 IPR
- Wet cutting

DIMPLE BAR
- Holder : M-FSCLPR-103-C
- Insert : CPMH321MV
- Grade : AP25N

Cutting Performance of VP15TF・VP45N・UE6020・US7020

● VP45N

VP45N provides superior wear resistance in cutting of mild steels.

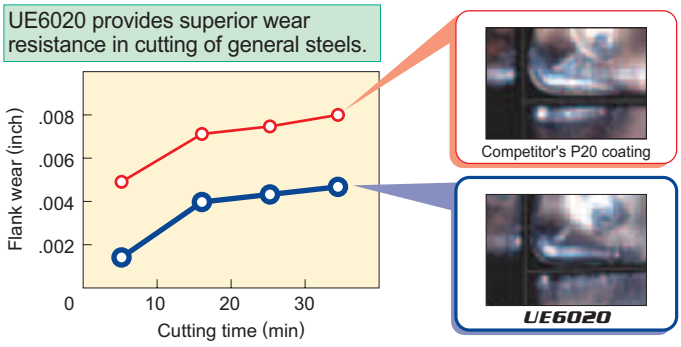


Holder : M-FSCLPR-103-C
Insert : CPMH321MV
Cutting speed : 524 SFM
Feed : .004 IPR
Depth of cut : .039 inch

Workpiece : ANSI 4140
Boring
Overhang : 2.52 inch (l/d=4)
Wet cutting

● UE6020

UE6020 provides superior wear resistance in cutting of general steels.



Holder : M-FSCLPR-123-C
Insert : CPMH321MV
Cutting speed : 590 SFM
Feed : .006 IPR
Depth of cut : .039 inch

Workpiece : ANSI 4140
Boring
Overhang : 1.89 inch (l/d=3)
Wet cutting

● VP15TF

VP15F exhibits excellent fracture resistance.

○Good ×Fracture

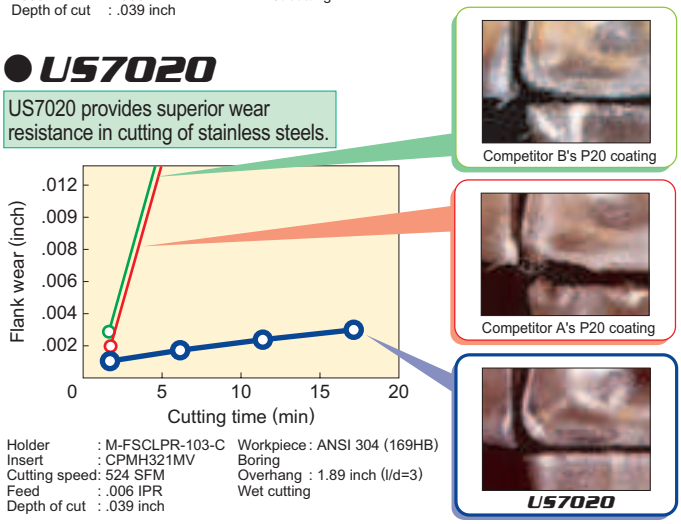
Feed (IPR)	.003	.004	.008	.012
VP15TF	○ ○	○ ○	○ ○	○ ○
Competitor's P20 coating	○ ○	× ×		
Competitor's P20 coated cermet	○ ○	× ×		

Holder : M-FSCLCR-103-C
Insert : CPMH321MV
Cutting speed : 394 SFM
Feed : Var IPR
Depth of cut : .039 inch

Workpiece : ANSI 4140
Interrupted facing
Overhang : 1.89 inch (l/d=3)
Wet cutting

● US7020

US7020 provides superior wear resistance in cutting of stainless steels.



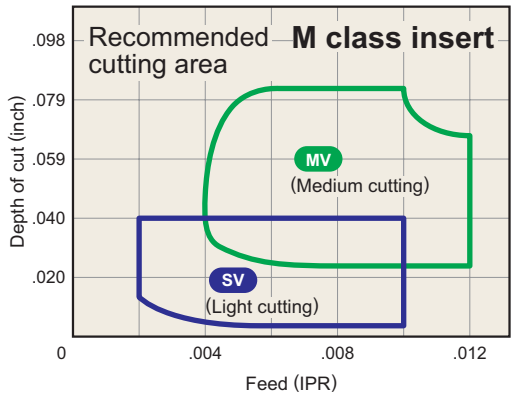
Holder : M-FSCLPR-103-C
Insert : CPMH321MV
Cutting speed: 524 SFM
Feed : .006 IPR
Depth of cut : .039 inch

Workpiece : ANSI 304 (169HB)
Boring
Overhang : 1.89 inch (l/d=3)
Wet cutting

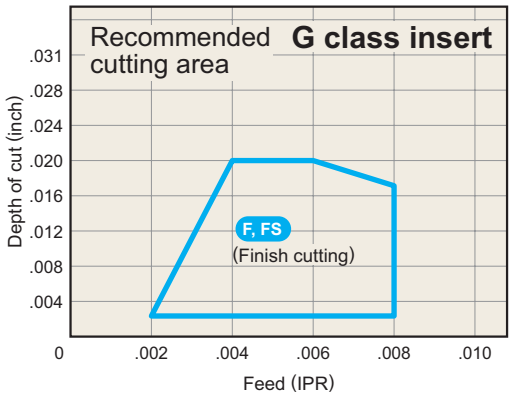
Recommended Use of the Holder

Insert Type	Page	Holder	Lead Angle	Shank Material	Economical	Cutting Edge Strength	Copying	Curved Faces Deep Faces
80°Rhombic	5	**M-FSCLC/P...C**	95°	Heavy metal		◎		
	5	**S-FSCLP...C**	95°	Steel		◎		
Triangular	7	**M-FSTUP...C**	93°	Heavy metal	◎			
	7	**S-FSTUP...C**	93°	Steel	◎			
55°Rhombic	9	**M-FSDUC...C**	93°	Heavy metal			◎	
	11	**M-FSDQC...C**	107°30′	Heavy metal			◎	
Trigon	13	**M-FSWUB/P...C**	93°	Heavy metal	◎	◎		
35°Rhombic	15	**M-FSVUB/C...C**	93°	Heavy metal			◎	
		M-FSVPB/C...C	117°30′	Heavy metal			◎	
	16	**M-FSVJB/C...C**	142°	Heavy metal				◎

Recommended Use of the Breakers



Cutting conditions
Insert : CPMH321MV, SV
Cutting speed : 492 SFM
Workpiece : ANSI 5020
Wet cutting



Cutting conditions
Insert : CCGH21.51LF
Cutting speed : 492 SFM
Workpiece : ANSI 4140
Wet cutting

Recommended Cutting Conditions

Workpiece Material		Cutting Mode	Breaker	Recom-mendation	Grade	Cutting Speed (SFM)	L/D≤3 (Steel shank), L/D≤3 (Heavy metal shank)		L/D=4–5 (Steel shank), L/D=4–6 (Heavy metal shank)	
							Feed (IPR)	D.O.C. (inch)	Feed (IPR)	D.O.C. (inch)
P	Mild steel <180HB	Finishing	F/FS	①	NX2525	555 (390—720)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
		Light	SV	①	VP45N	460 (295—620)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	VP15TF	590 (425—755)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MV	①	VP45N	425 (260—590)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
				②	VP15TF	525 (360—690)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
	Carbon steel Alloy steel 180—280HB	Finishing	F/FS	①	VP15TF	460 (295—620)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
				②	NX2525	425 (260—590)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
		Light	SV	①	VP15TF	425 (260—590)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	UE6020	460 (295—620)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MV	①	VP15TF	390 (230—555)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
				②	UE6020	425 (260—590)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
M	Stainless steel 180—280HB	Finishing	F/FS	①	VP15TF	490 (360—620)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
		Light	SV	①	US7020	490 (360—620)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	VP15TF	425 (295—555)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MV	①	US7020	460 (330—590)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.040
				②	VP15TF	390 (260—525)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.040
K	Cast iron Tensile strength<350MPa	Finishing	F/FS	①	HTi10	425 (295—525)	.006 (.004—.008)	—.020	.006 (.004—.008)	—.020
		Medium	MV	①	US7020	295 (195—390)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.060
H	Heat treated steel 35—65HRC	Finishing	No breaker	①	MB825	330 (260—655)	.004 (.002—.006)	—.006	.004 (.002—.006)	—.004
N	Aluminium Alloy	Finishing	F/FS	①	HTi10	985(655—1310)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
			No breaker	①	MD220	655 (490—820)	.004 (.002—.006)	—.080	.004 (.002—.006)	—.040

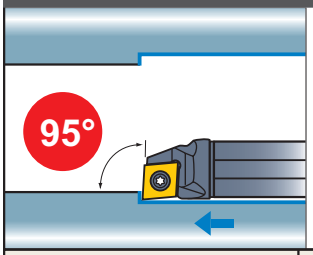
* If the SCREW CLAMP DIMPLE BAR vibrates, reduce cutting speed to 70% of the above.

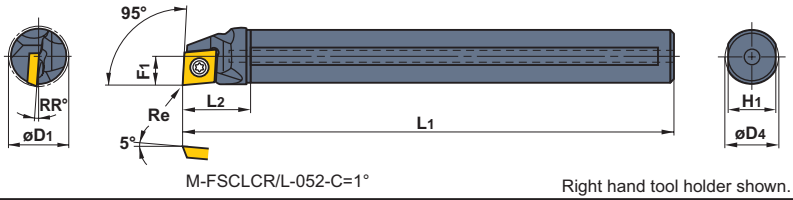
SCREW CLAMP DIMPLE BAR

HOLDERS

M-FSCLC/P

Heavy metal shank with coolant hole — **CC○○inserts, CP○○inserts**





M-FSCLCR/L-052-C=1°

Right hand tool holder shown.

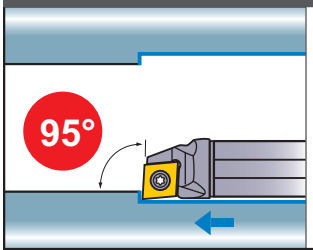
Finish	Light
R/L-F	SV
 (2,2.5,3)	 (2,2.5,3)
Medium	**PCD**
MV	
 (2,2.5,3)	 (2,2.5,3)

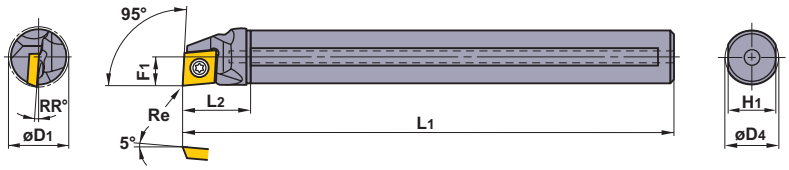
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSCLCR/L-052-C	●	●	CCMH CCGH NP-CCMB NP-CCMH	21.5○○	.313	5.000	.703	.196	.281	12	**.390**	.016	TS253	TKY08F
M-FSCLPR/L-062.5-C	●	●	CPMH NP-CPMB NP-CPMH	2.51.5○	.375	6.000	.844	.227	.336	5	**.450**	.016	TS3D	TKY10F
-082.5-C	●	●		2.51.5○	.500	8.000	1.125	.290	.461	4	**.580**	.016	TS3D	TKY10F
-103-C	●	●		32○	.625	10.000	1.406	.352	.586	3.5	**.700**	.016	TS4D	TKY15F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

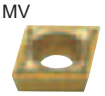
S-FSCLP

Steel shank with coolant hole — **CP○○inserts**





Right hand tool holder shown.

Finish	Light
R/L-F	SV
 (2.5,3)	 (2.5,3)
Medium	**PCD**
MV	
 (2.5,3)	 (2.5,3)

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
S-FSCLPR/L-062.5-C	○	○	CPMH NP-CPMB NP-CPMH	2.51.5○	.375	6.000	.844	.227	.336	5	**.450**	.016	TS3D	TKY10F
-082.5-C	○	○		2.51.5○	.500	8.000	1.125	.290	.461	4	**.580**	.016	TS3D	TKY10F
-103-C	○	○		32○	.625	10.000	1.406	.352	.586	3.5	**.700**	.016	TS4D	TKY15F
-123-C	○	○		32○	.750	10.000	1.688	.414	.711	2	**.825**	.016	TS4D	TKY15F
-163-C	○	○		32○	1.000	12.000	2.250	.598	.937	0	**1.200**	.016	TS4D	TKY15F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

(Note) Insert photo, letters show chip breaker style, figures show inscribed circle.

● : Inventory maintained. ○ : Inventory maintained. (Available Winter 2006) ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

INSERTS

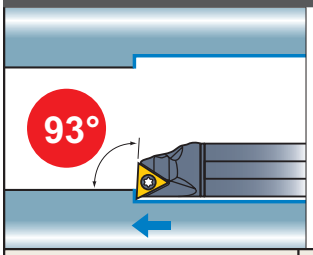
Application	Order Number	Stock Grade										Dimensions (inch)				Geometry
		Coated			MIRACLE Coated		Cermet	Coated Cermet	Carbide	CBN	PCD					
		UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HTi10	MB825	MD220	D1	S1	Re	α°	
Light Cutting	CCMH21.50.5SV	●	★	●	★	★	★					.250	.094	.008	7	CCMH...SV CPMH...SV
	21.51SV	●	★	●	★	★	★					.250	.094	.016	7	
	CPMH2.51.50.5SV	●	★	●	★	●	★					.313	.094	.008	11	
	2.51.51SV	●	★	●	★	●	★					.313	.094	.016	11	
	320.5SV	●	★	●	★	●	★					.375	.125	.008	11	
	321SV	●	★	●	★	●	★					.375	.125	.016	11	
	322SV	●	★	●	★	●	★					.375	.125	.031	11	
Medium Cutting	CCMH21.50.5MV	●	●	●	★	●	★	●				.250	.094	.008	7	CCMH...MV CPMH...MV
	21.51MV	●	●	●	●	●	★	●				.250	.094	.016	7	
	CPMH2.51.51MV	●	●	●	●	●	★	●				.313	.094	.016	11	
	2.51.52MV	●	●	●	●	●	★	●				.313	.094	.031	11	
	321MV	●	●	●	●	●	★	●				.375	.125	.016	11	
	322MV	●	●	●	●	●	★	●				.375	.125	.031	11	
Finish Cutting	CCGH21.50.5RF				●		★	□	●			.250	.094	.008	7	CCGH...R/LF CPMH...R/LF
	21.50.5LF				●		★	★	●			.250	.094	.008	7	
	21.51RF				●		★	□	●			.250	.094	.016	7	
	21.51LF				●		★	★	●			.250	.094	.016	7	
	CPMH2.51.51RF				●		★	□	●			.313	.094	.016	11	
	2.51.51LF				●		★	★	●			.313	.094	.016	11	
	321RF				●		★	□	●			.375	.125	.016	11	
	321LF				●		★	★	●			.375	.125	.016	11	Left hand is shown.
	NP-CCMB21.51G									●		.250	.094	.016	7	NP-CCMB...G NP-CPMB...G
	NP-CPMB2.51.51G									●		.313	.094	.016	11	
	321G									●		.375	.125	.016	11	Last letter of insert number G : For General Purpose
	NP-CCMH21.50.5										●	.250	.094	.008	7	NP-CCMH... NP-CPMH...
	21.51										●	.250	.094	.016	7	
	NP-CPMH2.51.50.5										●	.313	.094	.008	11	
	2.51.51										●	.313	.094	.016	11	
	320.5										●	.375	.125	.008	11	
	321										●	.375	.125	.016	11	

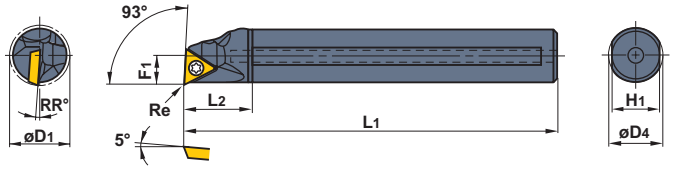
SCREW CLAMP DIMPLE BAR

HOLDERS

M-FSTUP

Heavy metal shank with coolant hole — **TP○○inserts**





Right hand tool holder shown.

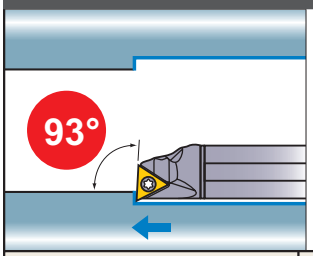
Finish	Light	Medium
R/L-FS	SV	MV
 (1.5,1.8,2)	 (1.5,1.8,2)	 (1.5,1.8,2)
PCD	**CBN**	
R/L-F		
 (1.5,1.8,2)	 (1.5,1.8,2)	

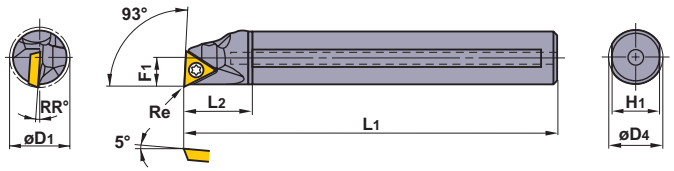
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSTUPR/L-051.5-C	●	●	TPMH TPGH NP-TPMB NP-TPMH	1.51.5○○	.313	5.000	.703	.196	.281	10	**.390**	.016	TS2D	TKY06F
-061.8-C	●	●		1.81.5○○	.375	6.000	.844	.227	.336	8	**.450**	.016	TS25D	TKY08F
-081.8-C	●	●		1.81.5○○	.500	8.000	1.125	.290	.461	7	**.580**	.016	TS25D	TKY08F
-102-C	●	●		22○	.625	10.000	1.406	.352	.586	4	**.700**	.016	TS31D	TKY10F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

S-FSTUP

Steel shank with coolant hole — **TP○○inserts**





Right hand tool holder shown.

Finish	Light	Medium
R/L-FS	SV	MV
 (1.8,2)	 (1.8,2)	 (1.8,2)
PCD	**CBN**	
R/L-F		
 (1.8,2)	 (1.8,2)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
S-FSTUPR/L-061.8-C	○	○	TPMH TPGH NP-TPMB NP-TPMH	1.81.5○○	.375	6.000	.844	.227	.336	8	**.450**	.016	TS25D	TKY08F
-081.8-C	○	○		1.81.5○○	.500	8.000	1.125	.290	.461	7	**.580**	.016	TS25D	TKY08F
-102-C	○	○		22○	.625	10.000	1.406	.352	.586	4	**.700**	.016	TS31D	TKY10F
-122-C	○	○		22○	.750	10.000	1.688	.414	.711	0	**.825**	.016	TS31D	TKY10F
-162-C	○	○		22○	1.000	12.000	2.250	.638	.937	0	**1.280**	.016	TS31D	TKY10F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

(Note) Insert photo, letters show chip breaker style, figures show inscribed circle.

● : Inventory maintained. ○ : Inventory maintained. (Available Winter 2006) ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

INSERTS

Application	Order Number	Stock Grade										Dimensions (inch)			Geometry
		Coated			MIRACLE Coated		Cermet	Coated Cermet	Carbide	CBN	PCD				
		UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HTi10	MB825	MD220	D1	S1	Re	
Light Cutting	TPMH1.51.50.5SV	●	★	●		●	★					.188	.094	.008	TPMH...SV
	1.51.51SV	●	★	●		●	★					.188	.094	.016	
	1.81.50.5SV	●	★	●		●	★					.219	.094	.008	
	1.81.51SV	●	★	●		●	★					.219	.094	.016	
	220.5SV	●	★	●		●	★					.250	.125	.008	
	221SV	●	★	●		●	★					.250	.125	.016	
	222SV	●	★	●		●	★					.250	.125	.031	
	320.5SV	●	★	●		★	★					.375	.125	.008	
	321SV	●	★	●		★	★					.375	.125	.016	
	322SV	●	★	●		●	★					.375	.125	.031	
Medium Cutting	TPMH1.51.50.5MV	●	●	●	●	●	★	●				.188	.094	.008	TPMH...MV
	1.51.51MV	●	●	●	●	●	★	●				.188	.094	.016	
	1.81.50.5MV	●	●	●	●	●	★	●				.219	.094	.008	
	1.81.51MV	●	●	●	●	●	★	★				.219	.094	.016	
	220.5MV	●	★	●	★	★	★	●				.250	.125	.008	
	221MV	●	●	●	●	●	★	●				.250	.125	.016	
	222MV	●	●	●	●	●	★	●				.250	.125	.031	
	321MV	●	●	●	●	●	★	●				.375	.125	.016	
	322MV	●	●	●	●	★	★	●				.375	.125	.031	
Finish Cutting	TPGH1.51.50.5RFS				●		★	□	●			.188	.094	.008	TPGH...R/LFS
	1.51.50.5LFS				●		★	★	●			.188	.094	.008	
	1.51.51RFS				●		★	□	●			.188	.094	.016	
	1.51.51LFS				●		★	★	●			.188	.094	.016	
	1.81.50.5RFS				●		★	□	●			.219	.094	.008	
	1.81.50.5LFS				●		★	★	●			.219	.094	.008	
	1.81.51RFS				●		★	□	●			.219	.094	.016	
	1.81.51LFS				●		★	★	●			.219	.094	.016	
	220.5RFS				●		★	□	●			.250	.125	.008	
	220.5LFS				●		★	★	●			.250	.125	.008	
	221RFS				●		★	□	●			.250	.125	.016	
	221LFS				●		★	★	●			.250	.125	.016	
	321RFS				●		★	□	●			.375	.125	.016	
	321LFS				●		★	★	●			.375	.125	.016	
	322RFS				●		★	□	●			.375	.125	.031	
	322LFS				●		★	★	●			.375	.125	.031	Left hand is shown.
	NP-TPMB1.51.51G									●		.188	.094	.016	NP-TPMB...G
	1.81.51G									●		.219	.094	.016	
	221G									★		.250	.125	.016	
	321G									●		.375	.125	.016	
															Last letter of insert number G : For General Purpose
	NP-TPMH1.51.50.5RF										●	.188	.094	.008	NP-TPMH...R/LF
	1.51.50.5LF										●	.188	.094	.008	
	1.51.51RF										●	.188	.094	.016	
	1.51.51LF										●	.188	.094	.016	
	1.81.50.5RF										●	.219	.094	.008	
	1.81.50.5LF										●	.219	.094	.008	
	1.81.51RF										●	.219	.094	.016	
	1.81.51LF										●	.219	.094	.016	
	220.5RF										●	.250	.125	.008	
	220.5LF										●	.250	.125	.008	
	221RF										●	.250	.125	.016	
	221LF										●	.250	.125	.016	Left hand is shown.

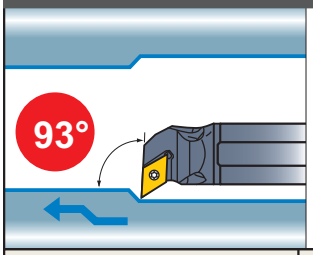
SCREW CLAMP DIMPLE BAR

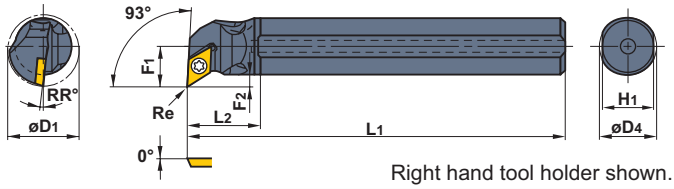
HOLDERS

M-FSDUC

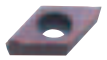
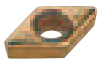
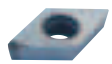
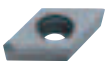
Heavy metal shank
With coolant hole

DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
R/LF	SV	MV
 (2,3)	 (2,3)	 (2,3)
PCD	CBN	
R/LF		
 (2,3)	 (2,3)	

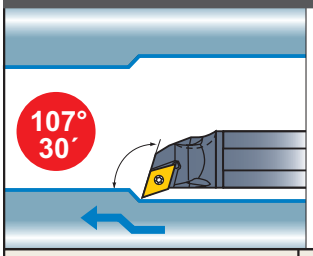
Order Number	Stock		Insert Number		Dimensions (inch)							Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
	R	L			D4	H1	L1	L2	F1	F2	RR°				
M-FSDUCR/L-062-C	●	●	DCMT DCGT NP-DCMT NP-DCGW	21.5○	.375	.336	6.000	.675	.317	.130	7.5	**.525**	.016	TS25	TKY08F
-082-C	●	●		21.5○	.500	.461	8.000	.833	.380	.130	6	**.667**	.016	TS25	TKY08F
-102-C	●	●		21.5○	.625	.586	10.000	.781	.442	.130	5	**.781**	.016	TS25	TKY08F
-123-C	●	●		32.5○	.750	.711	10.000	.844	.615	.240	5	**1.200**	.031	TS43	TKY15F

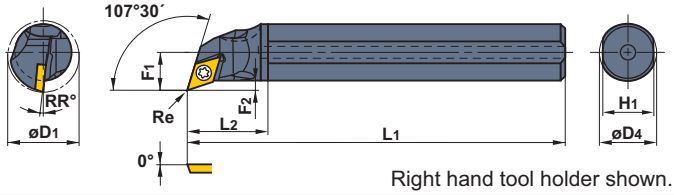
(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

M-FSDQC

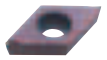
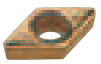
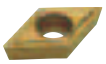
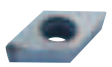
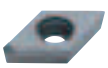
Heavy metal shank
With coolant hole

DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
R/LF	SV	MV
 (2,3)	 (2,3)	 (2,3)
PCD	CBN	
R/LF		
 (2,3)	 (2,3)	

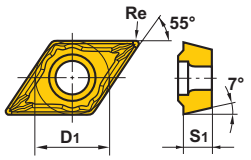
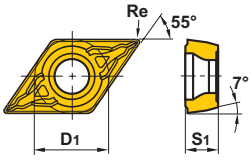
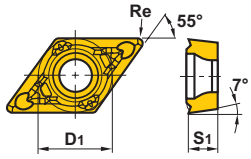
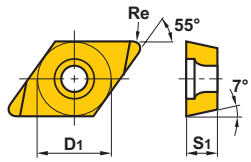
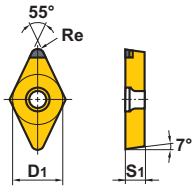
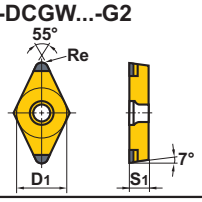
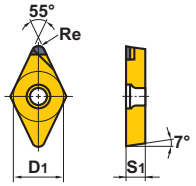
Order Number	Stock		Insert Number		Dimensions (inch)							Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
	R	L			D4	H1	L1	L2	F1	F2	RR°				
M-FSDQCR/L-062-C	●	●	DCMT DCGT NP-DCMT NP-DCGW	21.5○	.375	.336	6.000	.769	.290	.102	8	**.488**	.016	TS25	TKY08F
-082-C	●	●		21.5○	.500	.461	8.000	.938	.352	.102	6	**.667**	.016	TS25	TKY08F
-102-C	●	●		21.5○	.625	.586	10.000	.879	.415	.102	5	**.781**	.016	TS25	TKY08F
-123-C	●	●		32.5○	.750	.711	10.000	.975	.521	.146	7	**.938**	.031	TS43	TKY15F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

(Note) Insert photo, letters show chip breaker style, figures show inscribed circle.

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

INSERTS

Application	Order Number	Stock Grade											Dimensions (inch)			Geometry
		Coated			MIRACLE Coated		Cermet	Coated Cermet	Carbide	CBN		PCD				
		UE6020	US7020	US735	VP15TF	VP45N	NX2525	AP25N	HTi10	MB825	MB8025	MD220	D1	S1	Re	
Finish Cutting	DCMT21.50.5FV	●					★	●					.250	.094	.008	DCMT...FV 
	21.51FV	●					★	●					.250	.094	.016	
	32.51FV	●					★	●					.375	.156	.016	
	32.52FV	●					★	●					.375	.156	.031	
Light Cutting	DCMT21.50.5SV	●	★	●	★	●	★						.250	.094	.008	DCMT...SV 
	21.51SV	●	★	●	●	●	★						.250	.094	.016	
	21.52SV	●	★	●	●	●	★						.250	.094	.031	
	32.50.5SV	●	★	●	●	●	★						.375	.156	.008	
	32.51SV	●	★	●	●	●	★						.375	.156	.016	
	32.52SV	●	★	●	●	★	★						.375	.156	.031	
Medium Cutting	DCMT21.50.5MV	●	★	●	●	●	★	●					.250	.094	.008	DCMT...MV 
	21.51MV	●	●	●	●	★	★	●					.250	.094	.016	
	21.52MV	●	●	●	●	★	★	●					.250	.094	.031	
	32.50.5MV	●	●	●	●	●	★	●					.375	.156	.008	
	32.51MV	●	●	●	●	●	★	●					.375	.156	.016	
	32.52MV	●	●	●	●	★	★	●					.375	.156	.031	
Finish Cutting	DCGT21.50.5RF				●		★	□	●				.250	.094	.008	DCGT...R/LF  Left hand is shown.
	21.50.5LF				●		★	●	●				.250	.094	.008	
	21.51RF				●		★	□	●				.250	.094	.016	
	21.51LF				●		★	●	●				.250	.094	.016	
	32.50.5RF				●		★	□	●				.375	.156	.008	
	32.50.5LF				●		★	●	●				.375	.156	.008	
	32.51RF				●		★	□	●				.375	.156	.016	
	32.51LF				●		★	●	●				.375	.156	.016	
	NP-DCGW21.50.5G										●		.250	.094	.008	NP-DCGW...G/F/T 
	21.51G										●		.250	.094	.016	
	21.52G										●		.250	.094	.031	
	32.50.5G										●		.375	.156	.008	
	32.51G									●	●		.375	.156	.016	
	32.51F										□		.375	.156	.016	
	32.51T										□		.375	.156	.016	
	32.52G									●	●		.375	.156	.031	
	32.52F										□		.375	.156	.031	
	32.52T										□		.375	.156	.031	
	NP-DCGW32.51-G2										●		.375	.156	.016	NP-DCGW...-G2 
	32.52-G2										●		.375	.156	.031	
	NP-DCMT21.50.5RF											●	.250	.094	.008	NP-DCMT...R/LF  Left hand is shown.
	21.50.5LF											●	.250	.094	.008	
	21.51RF											●	.250	.094	.016	
	21.51LF											●	.250	.094	.016	
	32.50.5RF											●	.375	.156	.008	
	32.50.5LF											●	.375	.156	.008	
	32.51RF											●	.375	.156	.016	
	32.51LF											●	.375	.156	.016	

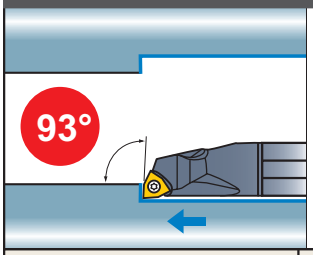
SCREW CLAMP DIMPLE BAR

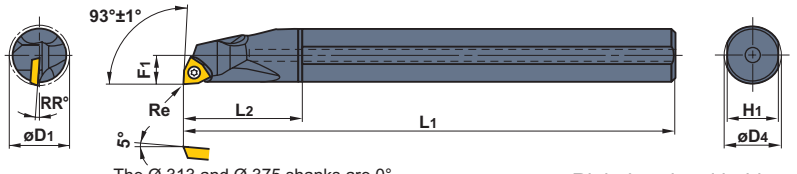
HOLDERS

M-FSWUB/P

Heavy metal shank
With coolant hole

WB○○,WP○○inserts





The Ø.313 and Ø.375 shanks are 0°.

Right hand tool holder shown.

Finish
R/LF

(1.5,2,3)
Medium
MV

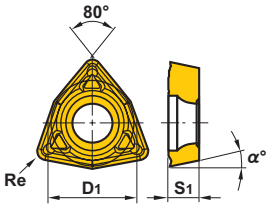
(1.5,2,3)

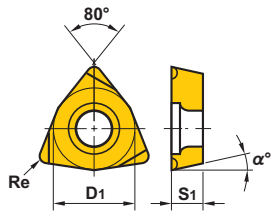
Order Number	Stock R	Stock L	Insert Number		D4	H1	L1	L2	F1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSWUBR/L-051.5-C	●	●	WBMT WBGT	1.51.5○	.313	.281	5.000	.703	.196	14	**.391**	.008	TS2	TKY06F
-061.5-C	●	●		1.51.5○	.375	.336	6.000	.844	.227	11	**.450**	.008	TS2	TKY06F
M-FSWUPR/L-082-C	●	●	WPMT	21.5○	.500	.461	8.000	1.125	.289	4	**.583**	.016	TS253	TKY08F
-102-C	●	●		21.5○	.625	.586	10.000	1.406	.352	1	**.703**	.016	TS253	TKY08F
-123-C	●	●		32○	.750	.711	10.000	1.688	.414	2	**.825**	.031	TS4	TKY15F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

INSERTS

Application	Order Number	Stock Grade: Coated UE6020	Coated US7020	Coated US735	MIRACLE Coated VP15TF	MIRACLE Coated VP45N	Cermet NX2525	Coated Cermet AP25N	Carbide HTi10	D1	S1	Re	α°	Geometry
Medium Cutting	WBMT1.51.50.5RMV	●	●	●	★	★	★	□		.188	.094	.008	5	WBMT...R/LMV WPMT...MV
	1.51.50.5LMV	●	●	●	★	★	★	□		.188	.094	.008	5	
	1.51.51RMV	●	●	●	★	★	★	□		.188	.094	.016	5	
	1.51.51LMV	●	●	●	★	★	★	□		.188	.094	.016	5	
	WPMT21.50.5MV	●	●	●	★	★	★	□		.250	.094	.008	11	
	21.51MV	●	●	●	★	★	★	□		.250	.094	.016	11	
	321MV	●	●	●	●	★	★	□		.375	.125	.016	11	
	322MV	●	●	●	●	★	★	□		.375	.125	.031	11	
Finish Cutting	WBGT1.51.5V3LF				●		★			.188	.094	.001	5	WBGT...R/LF
	1.51.50.2LF				●		★			.188	.094	.004	5	
	1.51.50.5RF				●		★	□	●	.188	.094	.008	5	
	1.51.50.5LF				●		★	□	●	.188	.094	.008	5	
	1.51.51RF				●		★	□	●	.188	.094	.016	5	
	1.51.51LF				●		★	□	●	.188	.094	.016	5	





Left hand is shown.

(Note) Insert photo, letters show chip breaker style, figures show inscribed circle.

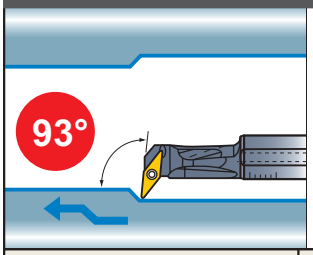
● : Inventory maintained. ★ : Inventory maintained in Japan. □ : Non stock, produced to order only.

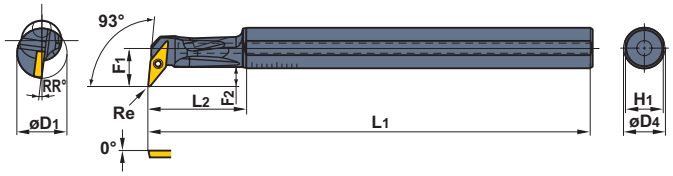
HOLDERS

M-FSVUB/C

Heavy metal shank
With coolant hole

VC○○,VB○○inserts





Right hand tool holder shown.

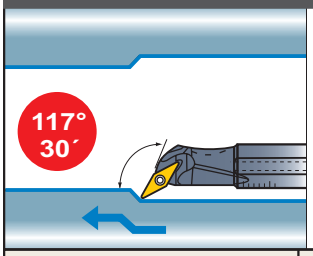
Finish
R/LF
(1.5,2)
Medium
MV
(1.5,2,3)

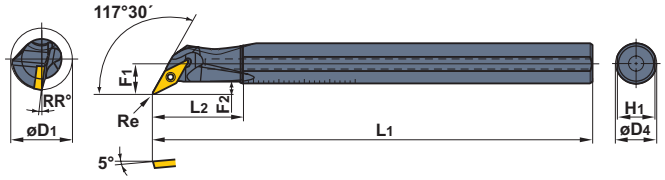
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	H1	L1	L2	F1	F2	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSVUCR/L-081.5-C	●	●	VCGT VCMT	1.51.5○	.500	.461	8.000	1.042	.447	.197	8	**.667**	.016	TS202	TKY06F
M-FSVUBR/L-102-C	●	●	VBGT VBMT NP-VBGW	22○	.625	.586	10.000	1.269	.608	.295	8	**.781**	.016	TS255	TKY08F
-122-C	●	●		22○	.750	.711	10.000	1.519	.670	.295	7	**.938**	.016	TS255	TKY08F

M-FSVPB/C

Heavy metal shank
With coolant hole

VC○○,VB○○inserts





Right hand tool holder shown.

Finish
R/LF
(1.51.5,2)
Medium
MV
(1.51.5,2)

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	H1	L1	L2	F1	F2	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSVPCR/L-061.5-C	●	●	VCGT VCMT	1.51.5○	.375	.336	6.000	.938	.306	.118	8	**.600**	.016	TS202	TKY06F
M-FSVPBR/L-082-C	●	●	VBGT VBMT NP-VBGW	22○	.500	.461	8.000	1.167	.467	.157	8	**.833**	.016	TS255	TKY08F
-102-C	●	●		22○	.625	.586	10.000	1.367	.490	.177	5	**.977**	.016	TS255	TKY08F
-122-C	●	●		22○	.750	.711	10.000	1.500	.572	.177	5	**1.125**	.016	TS255	TKY08F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

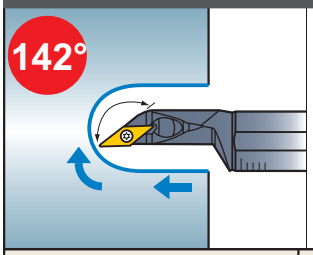
SCREW CLAMP DIMPLE BAR

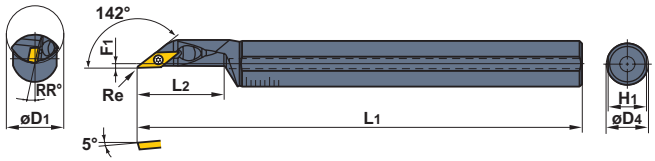
HOLDERS

M-FSVJB/C

Heavy metal shank
With coolant hole

VC○○,VB○○inserts





Right hand tool holder shown.

Finish
R/LF

(1.51.5,2)

Medium
MV

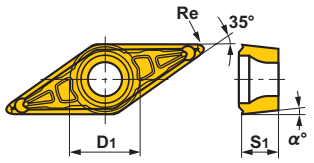
(1.51.5,2)

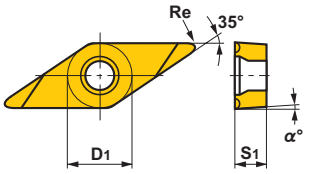
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) D4	H1	L1	L2	F1	RR°	Min. Cutting Diameter (inch) D1	Standard Corner Radius (inch) Re	Insert Screw	Wrench
M-FSVJCR/L-081.5-C	●	●	VCGT VCMT	1.51.5○	.500	.461	8.000	1.083	.093	5	**.667**	.016	TS202	TKY06F
-101.5-C	●	●	VCGT VCMT	1.51.5○	.625	.586	10.000	1.406	.076	5	**.781**	.016	TS202	TKY06F
M-FSVJBR/L-122-C	●	●	VBGT VBMT	22○	.750	.711	10.000	1.406	.060	5	**.938**	.016	TS255	TKY08F

(Note) When using inserts with right and left hand chip breakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

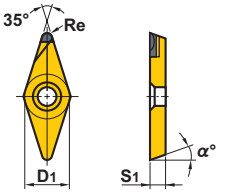
INSERTS

Application	Order Number	Stock Grade: Coated UE6020	Coated US7020	Coated US735	MIRACLE Coated VP15TF	MIRACLE Coated VP45N	Cermet NX2525	Coated Cermet AP25N	Carbide HTi10	CBN MB8025	Dimensions (inch) D1	S1	Re	α°	Geometry
Finish - Medium Cutting	VCMT1.51.50.5MV	●	●	●	●	★	★	●			.188	.094	.008	7	VCMT...MV VBMT...MV
	1.51.51MV	●	●	●	●	★	★	●			.188	.094	.016	7	
	VBMT221MV	★	●	●	●	★	★	●			.250	.125	.016	5	
	222MV	●	●	●	●	★	★	●			.250	.125	.031	5	
	331MV	●	●	●	●	★	★	●			.375	.188	.016	5	
	332MV	●	●	●	●	★	★	●			.375	.188	.031	5	
Finish Cutting	VCGT1.51.50.5RF				●		★	●	●		.188	.094	.008	7	VCGT...R/LF VBGT...R/LF
	1.51.50.5LF				●		★	●	●		.188	.094	.008	7	
	1.51.51RF				●		★	●	●		.188	.094	.016	7	
	1.51.51LF				●		★	●	●		.188	.094	.016	7	
	VBGT220.5RF				●		★	★	●		.250	.125	.008	5	
	220.5LF				●		★	★	●		.250	.125	.008	5	
	221RF				●		★	★	●		.250	.125	.016	5	
	221LF				●		★	★	●		.250	.125	.016	5	
	NP-VBGW331G									●	.375	.188	.016	5	NP-VBGW...G
	332G									●	.375	.188	.031	5	





Left hand is shown.



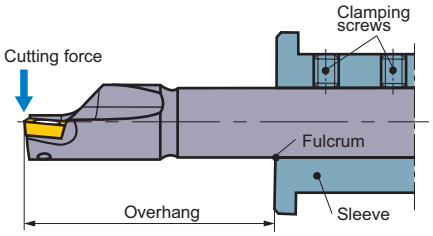
(Note) Insert photo, letters show chip breaker style, figures show inscribed circle.

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

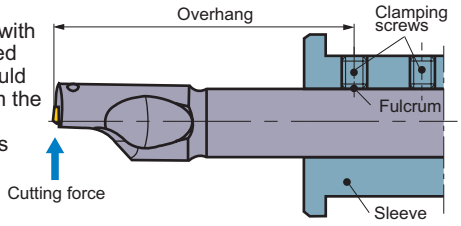
Operational Guidance

●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	Insert Screw	Remark
By changing the Insert screw, it is possible to use the inserts listed on the left hand side.	**CCG/MT21.51○**	Can be used as it is.	If the screw is too long then please grind away the unnecessary material.
	CPG/MT2.51.5○	Change to TS3.	
	CPG/MT32○	Change to TS4.	
	CPMX2.51.5○	Can be used as it is.	
	CPMX32○	Can be used as it is.	
	TPGD/P63○	Change to CS200T.	
	TPGD/P73○	Change to CS250T.	
	TPGA/M22○	Change to CS300890T.	
	TPG/MV1.81.5○	Change to TS25.	
	TPG/MV22○	Change to TS3.	

Machining of the FSVJB/C type

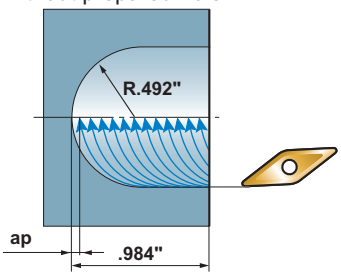
●Use a pre-drilled hole for increased productivity.

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

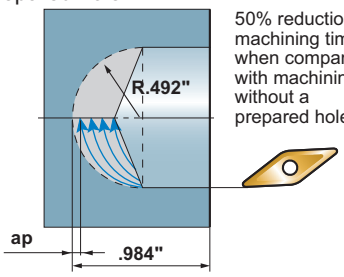
<Cutting conditions>

Workpiece : ANSI 1055
Tool : M-FSVJBR-122-C
Insert : VBMT221MV
Cutting speed : 393 SFM
Feed : .002 IPR
Depth of cut : .011 inch
Coolant : W.S.O

Machining a workpiece without prepared hole.



Machining a workpiece with prepared hole.



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

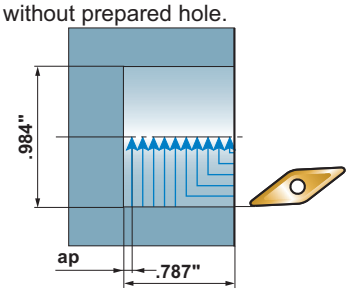
●Deep faces

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

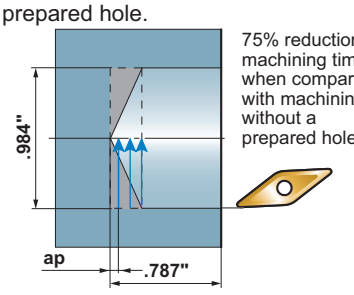
<Cutting conditions>

Workpiece : ANSI 1055
Tool : M-FSVJBR-122-C
Insert : VBMT221MV
Cutting speed : 393 SFM
Feed : .002 IPR
Depth of cut : .011 inch
Coolant : W.S.O

Machining a workpiece without prepared hole.



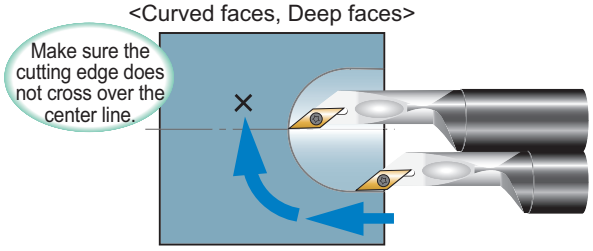
Machining a workpiece with prepared hole.



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

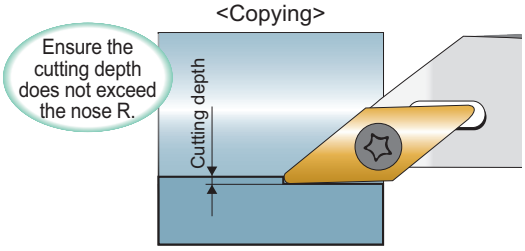
■Caution when using the FSVJB/C type

<Curved faces, Deep faces>



Crossing over the center line leads to chipping.

<Copying>

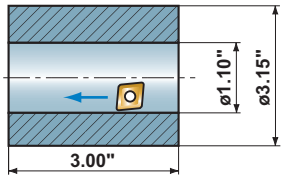
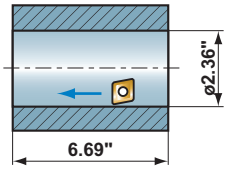
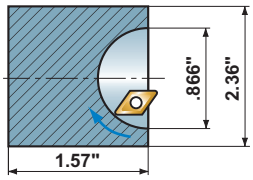


Cutting depths large than nose R lead to burrs developing.

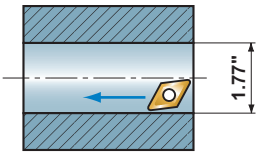
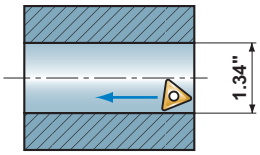
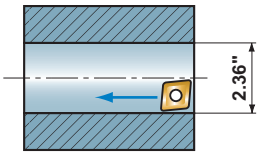
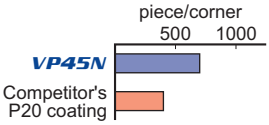
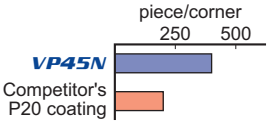
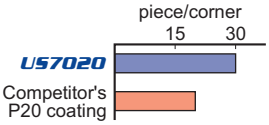
SCREW CLAMP DIMPLE BAR

Application Examples

●Chatter resistance

Tool	M-FSCLPR-103-C	M-FSCLPR-123-C	M-FSVJCR-101.5-C
Insert (Grade)	CPMH322MV (AP25N)	CPMH321LF (VP15TF)	VCMT1.51.51MV (AP25N)
Overhang	3.15 inch (l/d=5)	6.89 inch (l/d=8.75)	2.52 inch (l/d=4)
Machine	NC machine	NC machine	NC machine
Workpiece	ANSI 1045 (200HB) 	Steel (200HB) 	ANSI 4140 (220HB) 
Cutting Conditions: Cutting Speed (SFM)	260	200	260
Cutting Conditions: Feed (IPR)	.008	.007	.002
Cutting Conditions: Depth of Cut (inch)	.020	.020	.011
Cutting Conditions: Coolant	WSO	WSO	WSO
Result	Even with a overhang1.7 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 competitors bar no vibrations occured, surface finish was of a high standard. Additionally excellent chip disposal was also achieved.

●Wear resistance / Chipping resistance

Tool	M-FSDUCR-102-C	M-FSTUPR-122-C	M-FSCLPR-123-C
Insert (Grade)	DCMT21.51SV (VP45N)	TPMH221SV (VP45N)	CPMH321MV (US7020)
Overhang	2.83 inch (l/d=4.5)	5.51 inch (l/d=7)	3.15 inch (l/d=4)
Machine	NC machine	NC machine	NC machine
Workpiece	ANSI 1045 	Steel 	ANSI 304 
Cutting Conditions: Cutting Speed (SFM)	600	750	400
Cutting Conditions: Feed (IPR)	.004	.010	.004
Cutting Conditions: Depth of Cut (inch)	.014	.004	.020
Cutting Conditions: 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.

For your safety
●Do not touch sharp parts 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, and ensure the inserts and spare parts are damped securely.

MITSUBISHI MATERIALS CORPORATION

JSA Tsukuba Plant ISO 9001-2000 Registration No. JSAQ 080 Gifu Plant ISO 9001-2000 Registration No. JSAQ 094
JSA Tsukuba Plant ISO 14001-1996 Registration No. JSAE 036

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