DIAEDGE

SMALL TOOLS CATALOG

AHB

TOOLING & MACHINERY

COMPLETE METALWORKING SOLUTIONS

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MITSUBISHI MATERIALS U.S.A.

DIAEDGE

Your manufacturing success is our success.

It's simple. We want to provide high-quality cutting tool products that deliver unparalleled performance and control to help you to manufacture precisely perfect products every day. Our long heritage of building partnerships through providing cutting tool solutions for metal manufacturers has given Mitsubishi Materials U.S.A. a reputation as an industry leader. We understand the importance of getting it right the first time by delivering high-quality cutting tool product brands to help overcome machining challenges and improve machining processes.

Your success is our success, and is the driving force behind our innovative products. Our product brand, DIAEDGE, is trusted globally in the metal manufacturing industries for delivering expertly designed tools of the trade for highly specialized industries like yours. Our traditional Mitsubishi Materials U.S.A. cutting tool product line is now sold under the DIAEDGE product brand name.

MITSUBISHI MATERIALS U.S.A.

INDEX

DIAEDGE

HOW TO READ THE STANDARD OF TURNING INSERTS

●How this section page is organized

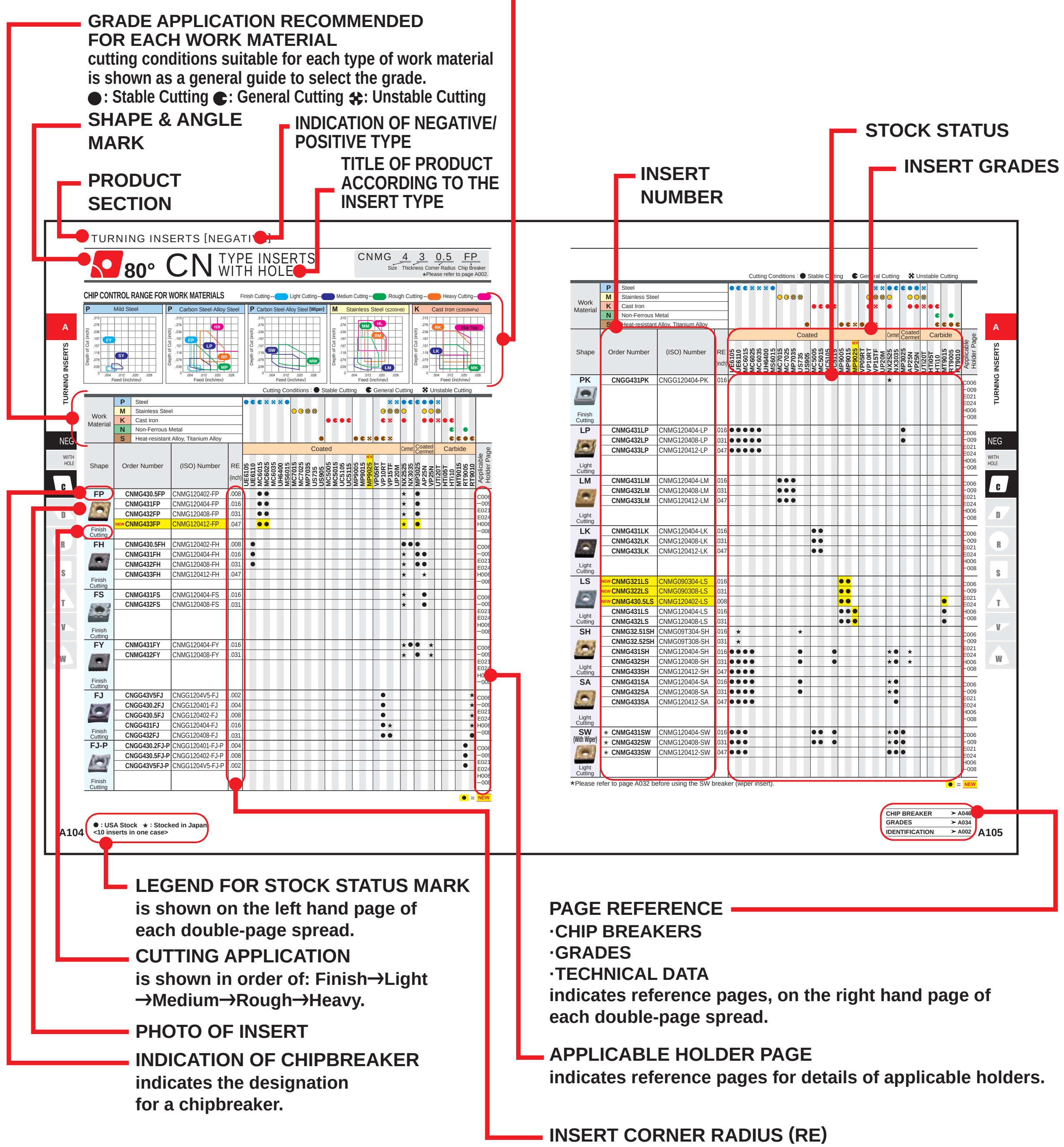
①Organized according to turning insert shape.
(Refer to the index on the next page.)
②Inserts are arranged in order of :
- Negative inserts (with hole→without hole)
- Positive inserts (with hole→without hole)

③Breakers are arranged in order of :
Finish Cutting→Light Cutting→Medium Cutting →Rough Cutting→Heavy Cutting

●Graph of chip control by work material

Shows recommended chip breakers and chip control range according to work material and cutting application. Graphs are colored according to cutting applications (Finish→Light→Medium→Rough→Heavy) and contain recommended breakers for each application.

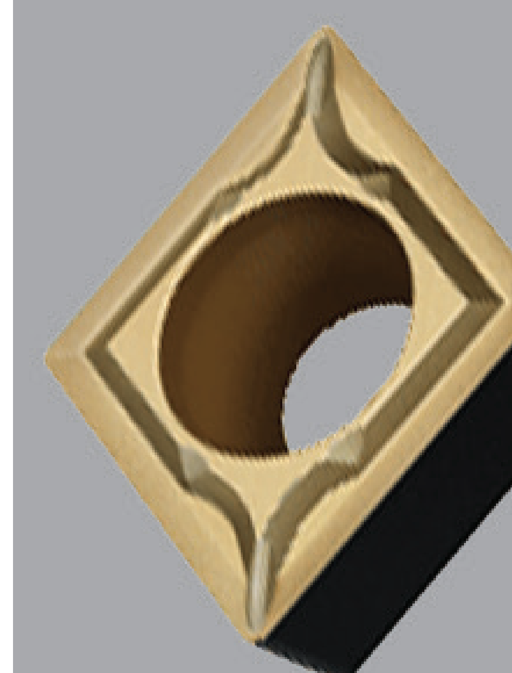
Finish Cutting : Light Cutting : Medium Cutting : Rough Cutting : Heavy Cutting :



●To Order : Please specify insert number and grade.

TURNING TOOLS

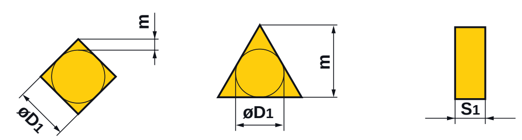
INSERT STANDARDS INSERT GRADES

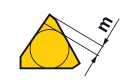


IDENTIFICATION

① Symbol for Insert Shape

Symbol	Insert Shape
H	Hexagonal
O	Octagonal
P	Pentagonal
S	Square
T	Triangular
C	Rhombic 80°
D	Rhombic 55°
E	Rhombic 75°
F	Rhombic 50°
M	Rhombic 86°
V	Rhombic 35°
W	Trigon
L	Rectangular
A	Parallelogram 85°
B	Parallelogram 82°
K	Parallelogram 55°
R	Round
X	Special Design





Triangular insert with a facet (Secondary Cutting Edge)

③ Symbol for Tolerance Class

Symbol	Tolerance of Nose Height m (mm)	Tolerance of Inscribed Circle øD1 (mm)	Tolerance of Thickness S1 (mm)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.013
J	±0.005	±0.05 – ±0.15	±0.025
K*	±0.013	±0.05 – ±0.15	±0.025
L*	±0.025	±0.05 – ±0.15	±0.025
M*	±0.08 – ±0.18	±0.05 – ±0.15	±0.013
N*	±0.08 – ±0.18	±0.05 – ±0.15	±0.025
U*	±0.13 – ±0.38	±0.08 – ±0.25	±0.013

The surface of insert with * mark is sintered.

Detail of M Class Insert Tolerance

●Tolerance of Nose Height m (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	—
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	—
12.70	±0.13	±0.13	±0.13	±0.15	—	—
15.875	±0.15	±0.15	±0.15	±0.18	—	—
19.05	±0.15	±0.15	±0.15	±0.18	—	—
25.40	—	±0.18	—	—	—	—
31.75	—	±0.20	—	—	—	—

●Tolerance of Inscribed Circle (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.005	±0.005	±0.005	±0.005	±0.005	—
9.525	±0.005	±0.005	±0.005	±0.005	±0.005	±0.05
12.70	±0.08	±0.08	±0.08	±0.08	—	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	—	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	—	±0.10
25.40	—	±0.13	—	—	—	±0.13
31.75	—	±0.15	—	—	—	±0.15

③ Symbol for Tolerance Class

① C ② C ③ M ④ T

② Symbol for Normal Clearance

Symbol	Normal Clearance
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other Normal Clearance
	Major Normal Clearance

④ Symbol for Fixing and/or for Chip Breaker

Metric

Symbol	Hole	Hole Configuration	Chip Breaker	Figure	Symbol	Hole	Hole Configuration	Chip Breaker	Figure
W	With Hole	Cylindrical Hole +	No		A	With Hole	Cylindrical Hole	No	
T	With Hole	One Countersink (40–60°)	One Sided		M	With Hole	Cylindrical Hole	One Sided	
Q	With Hole	Cylindrical Hole +	No		G	With Hole	Cylindrical Hole	Double Sided	
U	With Hole	Double Countersink (40–60°)	Double Sided		N	Without Hole	—	No	
B	With Hole	Cylindrical Hole +	No		R	Without Hole	—	One Sided	
H	With Hole	One Countersink (70–90°)	One Sided		F	Without Hole	—	Double Sided	
C	With Hole	Cylindrical Hole +	No		X	—	—	—	Special Design
J	With Hole	Double Countersink (70–90°)	Double Sided						

⑤ Symbol for Insert Size

R	W	V	D	C	S	T	Diameter of Inscribed Circle (mm)
	02		04	03	03	06	3.97
	L3	08	05	04	04	08	4.76
	03	09	06	05	05	09	5.56
06							6.00
	04	11	07	06	06	11	6.35
	05	13	09	08	07	13	7.94
08							8.00
09	06	16	11	09	09	16	9.525
10							10.00
12							12.00
12	08	22	15	12	12	22	12.70
15	10		19	16	15	27	15.875
16							16.00
19	13		23	19	19	33	19.05
20							20.00
			27	22	22	38	22.225
25							25.00
25			31	25	25	44	25.40
31			38	32	31	54	31.75
32							32.00

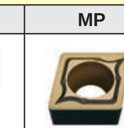
*Thickness is from the bottom of the insert to the top of the cutting edge.

⑥ Symbol for Insert Thickness

Symbol	Thickness (mm)
S1	1.39
01	1.59
T0	1.79
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
06	6.35
07	7.94
09	9.52

⑤ 06 ⑥ 02 ⑦ 02 ⑧ (E) ⑨ (N) - ⑩ FP

⑩ Symbol for Chip Breaker

FP	LP	MP
		
FM	**LM**	**MM**
		
AZ		
		
FJ		
		

(Refer to JIS=B4120-1998)

⑦ Symbol for Insert Corner Configuration

Symbol	Corner Radius (mm)
00	Sharp Nose
V3	0.03
V5	0.05
01	0.1
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
28	2.8
32	3.2
00 : Inch M0 : Metric	Round Insert

⑧ Symbol for Cutting Edge Condition

Figure	Cutting Edge	Symbol
	Sharp Cutting Edges	F
	Round Cutting Edges	E
	Chamfered Cutting Edges	T
	Chamfered and Rounded Cutting Edges	S

Mitsubishi Materials omit the honing symbol.

⑨ Symbol for Cutting Direction

Figure	Hand	Symbol
	Right	R
	Left	L
	Neutral	N

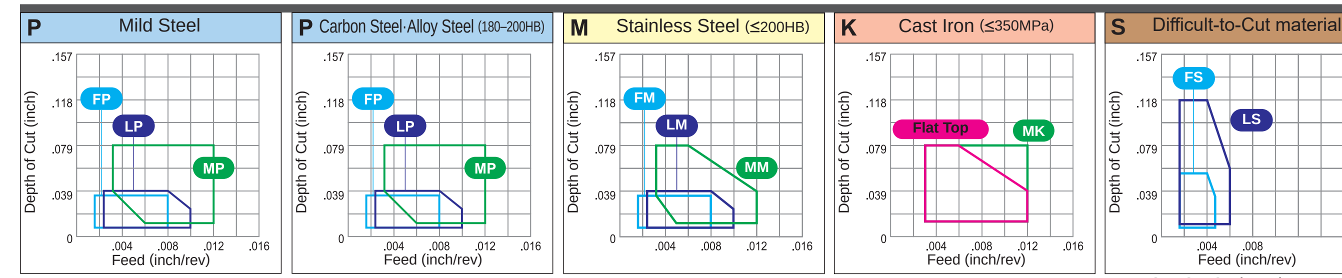
Memo

80° CC TYPE INSERTS WITH HOLE

CCMT 2 1.5 0.5 FP
Size Thickness Corner Radius Chip Breaker
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

FS, LS : G class inserts

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105 (Coated)	UE6110 (Coated)	MC6015 (Coated)	MC6025 (Coated)	UH6400 (Coated)	MS6015 (Coated)	MC7025 (Coated)	MP7035 (Coated)	MS7025 (Coated)	US735 (Coated)	US905 (Coated)	MC5005 (Coated)	MC5015 (Coated)	UC5105 (Coated)	UC5115 (Coated)	MP9005 (Coated)	MP9015 (Coated)	MP9025 (Coated)	MS9025 (Coated)	VP05RT (Coated)	VP10RT (Coated)	VP15TF (Coated)	UP20M (Coated)	NX2525 (Cermet)	NX3035 (Cermet)	MP3025 (Coated Cermet)	AP25N (Coated Cermet)	VP25N (Coated Cermet)	VP45N (Coated Cermet)	UTi20T (Carbide)	HTi05T (Carbide)	HTi10 (Carbide)	TF15 (Carbide)	MT9005 (Carbide)	MT9015 (Carbide)	RT9005 (Carbide)	RT9010 (Carbide)
FP Finish Cutting	**CCMT21.50.5FP**	CCMT060202-FP	.008		●	●	●																				●		●											
	CCMT21.51FP	CCMT060204-FP	.016		●	●	●																				●		●											
	CCMT32.50.5FP	CCMT09T302-FP	.008		●	●	●																				●		●											
	CCMT32.51FP	CCMT09T304-FP	.016		●	●	●																				●		●											
	CCMT32.52FP	CCMT09T308-FP	.031		●	●	●																				●		●											
FM Finish Cutting	**CCMT21.50.5FM**	CCMT060202-FM	.008																						●															
	CCMT21.51FM	CCMT060204-FM	.016																						●															
	CCMT32.50.5FM	CCMT09T302-FM	.008																						●															
	CCMT32.51FM	CCMT09T304-FM	.016																						●															
	CCMT32.52FM	CCMT09T308-FM	.031																						●															
FV Finish Cutting	**CCMT21.50.5FV**	CCMT060202-FV	.008																						●		★	●		●		★								
	CCMT21.51FV	CCMT060204-FV	.016																						●		★	●		●		★								
	CCMT32.50.5FV	CCMT09T302-FV	.008																								●	●				●								
	CCMT32.51FV	CCMT09T304-FV	.016																								★	●		●		★								
	CCMT32.52FV	CCMT09T308-FV	.031																								★	●		●		★								
FS Finish Cutting	**CCGT21.50.2MFS**	CCGT060201M-FS	.003																●	●	●																			
	CCGT21.50.5MFS	CCGT060202M-FS	.007																●	●	●																			
	CCGT32.50.2MFS	CCGT09T301M-FS	.003																●	●	●																			
	CCGT32.50.5MFS	CCGT09T302M-FS	.007																●	●	●																			
	CCGT32.51MFS	CCGT09T304M-FS	.015																●	●	●																			
FS-P Finish Cutting	**CCGT21.50.2MFS-P**	CCGT060201M-FS-P	.003									●										●															●			
	CCGT21.50.5MFS-P	CCGT060202M-FS-P	.007									●										●															●			
	CCGT32.50.2MFS-P	CCGT09T301M-FS-P	.003									●										●															●			
	CCGT32.50.5MFS-P	CCGT09T302M-FS-P	.007									●										●															●			
	CCGT32.51MFS-P	CCGT09T304M-FS-P	.015									●										●															●			
FJ Finish Cutting	**CCGT21.5V5FJ**	CCGT0602V5-FJ	.002																					●																
	CCGT21.50.2FJ	CCGT060201-FJ	.004																					●																
	CCGT21.50.5FJ	CCGT060202-FJ	.008																					●																
	CCGT32.5V5FJ	CCGT09T3V5-FJ	.002																					●																
	CCGT32.50.2FJ	CCGT09T301-FJ	.004																					●																★
	CCGT32.50.5FJ	CCGT09T302-FJ	.008																					●																★
	CCGT32.51FJ	CCGT09T304-FJ	.016																					●																★

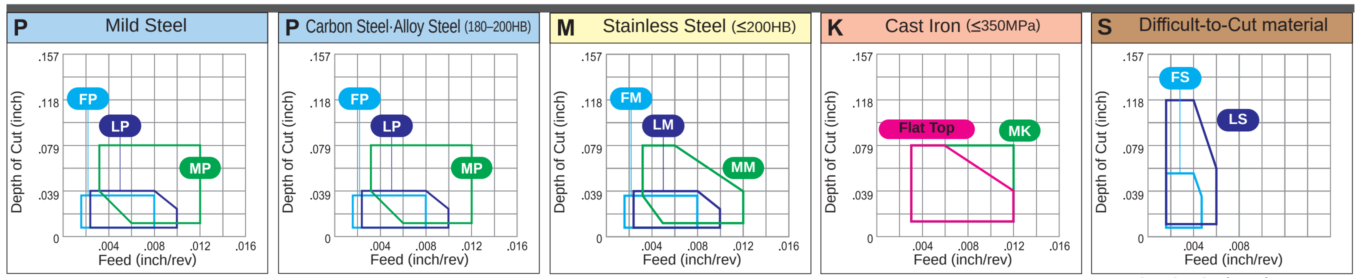
● (highlighted) = NEW

80° CC TYPE INSERTS WITH HOLE

CCGT 2 1.5 V5 FJ-P
Size Thickness Corner Radius Chip Breaker
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

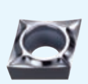
Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

FS, LS : G class inserts

Work Material	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
	Coated																							Cermet		Coated Cermet				Carbide							
P Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N Non-Ferrous Metal																																◐				●	
S Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
FJ-P	CCGT21.5V5FJ-P	CCGT0602V5-FJ-P	.002																																				●	
	CCGT21.50.2FJ-P	CCGT060201-FJ-P	.004																																				●	
	CCGT21.50.5FJ-P	CCGT060202-FJ-P	.008																																				●	
	CCGT32.5V5FJ-P	CCGT09T3V5-FJ-P	.002																																				●	
	CCGT32.50.2FJ-P	CCGT09T301-FJ-P	.004																																				●	
	CCGT32.50.5FJ-P	CCGT09T302-FJ-P	.008																																				●	
Finish Cutting	CCGT32.51FJ-P	CCGT09T304-FJ-P	.016																																				●	
AZ	CCGT21.50.5AZ	CCGT060202-AZ	.008																																●					
	CCGT21.51AZ	CCGT060204-AZ	.016																																●					
	CCGT32.50.5AZ	CCGT09T302-AZ	.008																																●					
	CCGT32.51AZ	CCGT09T304-AZ	.016																																●					
	CCGT32.52AZ	CCGT09T308-AZ	.031																																●					
	CCGT430.5AZ	CCGT120402-AZ	.008																																●					
	CCGT431AZ	CCGT120404-AZ	.016																																●					
Medium-Finish Cutting	CCGT432AZ	CCGT120408-AZ	.031																																●					
R/L F	★1 CCGT03S1V3L-F	CCGT03S1V3L-F	.0012																						●		●													
	★1 CCGT03S101L-F	CCGT03S101L-F	.004																						●		●													
	★1 CCGT03S102L-F	CCGT03S102L-F	.008																						●		★		●											
	★1 CCGT03S104L-F	CCGT03S104L-F	.016																						●		★		●											
	★1 CCGT04T0V3L-F	CCGT04T0V3L-F	.0012																						●		●													
	★1 CCGT04T001L-F	CCGT04T001L-F	.004																						●		●													
	★1 CCGT04T002L-F	CCGT04T002L-F	.008																						●		★		●											
	★1 CCGT04T004L-F	CCGT04T004L-F	.016																						●		★		●											
	CCGT03S101MR-F	CCGT03S101MR-F	.003						●																															
	CCGT03S101ML-F	CCGT03S101ML-F	.003						●																															
	CCGT03S102MR-F	CCGT03S102MR-F	.007						●																															
	CCGT03S102ML-F	CCGT03S102ML-F	.007						●																															
	CCGT03S104MR-F	CCGT03S104MR-F	.015						●																															
	CCGT03S104ML-F	CCGT03S104ML-F	.015						●																															
Finish Cutting	CCGT04T001MR-F	CCGT04T001MR-F	.003						●																															

★1 Diameter of inscribed circle is special (For SCLC type).

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

Work Material	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
	Coated																							Cermet		Coated Cermet				Carbide							
P Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N Non-Ferrous Metal																																◐				●	
S Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L F	CCGT04T001ML-F	CCGT04T001ML-F	.003						●																															
	CCGT04T002MR-F	CCGT04T002MR-F	.007						●																															
	CCGT04T002ML-F	CCGT04T002ML-F	.007						●																															
	CCGT04T004MR-F	CCGT04T004MR-F	.015						●																															
Finish Cutting	CCGT04T004ML-F	CCGT04T004ML-F	.015						●																															
R/L F	CCGH21.50.5RF	CCGH060202R-F	.008																						●		★			★					●					
	CCGH21.50.5LF	CCGH060202L-F	.008																						●		★			★					●					
	CCGH21.51RF	CCGH060204R-F	.016																						●		★			★					●					
	CCGH21.51LF	CCGH060204L-F	.016																						●		★			★					●					
																																								
	CCGH21.50.5MRF	CCGH060202MR-F	.007						●																															
	CCGH21.50.5MLF	CCGH060202ML-F	.007						●																															
	CCGH21.51MRF	CCGH060204MR-F	.015						●																															
Finish Cutting	CCGH21.51MLF	CCGH060204ML-F	.015						●																															
LP	CCMT21.51LP	CCMT060204-LP	.016		●	●	●																				●		●											
	CCMT21.52LP	CCMT060208-LP	.031		●	●	●																				●		●											
	CCMT32.51LP	CCMT09T304-LP	.016		●	●	●																				●		●											
Light Cutting	CCMT32.52LP	CCMT09T308-LP	.031		●	●	●																				●		●											
LM	CCMT21.51LM	CCMT060204-LM	.016							●	●														●															
	CCMT21.52LM	CCMT060208-LM	.031							●	●														●															
	CCMT32.51LM	CCMT09T304-LM	.016							●	●														●															
Light Cutting	CCMT32.52LM	CCMT09T308-LM	.031							●	●														●															
LS	CCMT21.50.5LS	CCMT060202-LS	.008																●	●	●																●			
	CCMT21.51LS	CCMT060204-LS	.016																●	●	●																●			
	CCMT32.50.5LS	CCMT09T302-LS	.008																●	●	●																●			
	CCMT32.51LS	CCMT09T304-LS	.016																●	●	●																●			
Light Cutting	CCMT32.52LS	CCMT09T308-LS	.031																●	●	●																●			
SV	CCMH21.50.5SV	CCMH060202-SV	.008				●						●												★		★	●	●			★								
 Light Cutting	CCMH21.51SV	CCMH060204-SV	.016				●						●												★		★	●	●			★								
SW (With Wiper)	★2 CCMT21.50.5SW	CCMT060202-SW	.008		●	●	●																				●		●		●									
	★2 CCMT21.51SW	CCMT060204-SW	.016		●	●	●												●								●		●		●									
	★2 CCMT32.50.5SW	CCMT09T302-SW	.008		●	●	●												●								●		●		●									
Light Cutting	★2 CCMT32.51SW	CCMT09T304-SW	.016		●	●	●												●								●		●		●									

● = NEW

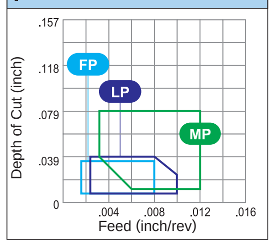
80° CC TYPE INSERTS WITH HOLE

CCGT 2 1.5 V3 R SS
Size Thickness Corner Radius R/L Chip Breaker
*Please refer to page A002.

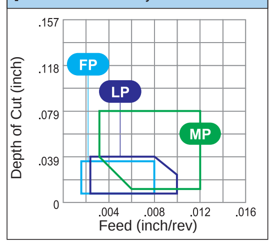
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

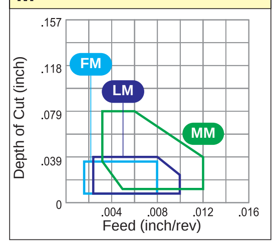
P Mild Steel



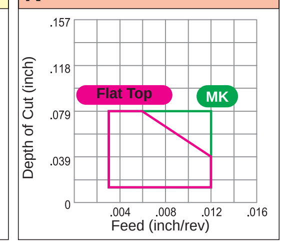
P Carbon Steel·Alloy Steel (180~200HB)



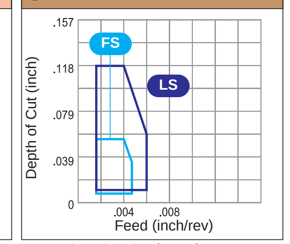
M Stainless Steel (≤200HB)



K Cast Iron (≤350MPa)



S Difficult-to-Cut material



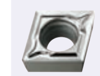
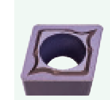
Cutting Conditions : ● Stable Cutting ◐ General Cutting ✲ Unstable Cutting

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲		✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
R/L SS  Light Cutting	CCGT21.5V3RSS	CCGT0602V3R-SS	.0012																						●															
	CCGT21.5V3LSS	CCGT0602V3L-SS	.0012																						●															
	CCGT21.50.2RSS	CCGT060201R-SS	.004																						●															
	CCGT21.50.2LSS	CCGT060201L-SS	.004																						●															
	CCGT21.50.5RSS	CCGT060202R-SS	.008																						●															
	CCGT21.50.5LSS	CCGT060202L-SS	.008																						●															
	CCGT32.5V3RSS	CCGT09T3V3R-SS	.0012																						●															
	CCGT32.5V3LSS	CCGT09T3V3L-SS	.0012																						●															
	CCGT32.50.2RSS	CCGT09T301R-SS	.004																						●															
	CCGT32.50.2LSS	CCGT09T301L-SS	.004																						●															
	CCGT32.50.5RSS	CCGT09T302R-SS	.008																						●															
	CCGT32.50.5LSS	CCGT09T302L-SS	.008																						●															
	CCGT21.50.2MRSS	CCGT060201MR-SS	.003						●																															
	CCGT21.50.2MLSS	CCGT060201ML-SS	.003						●																															
	CCGT21.50.5MRSS	CCGT060202MR-SS	.007						●																															
	CCGT21.50.5MLSS	CCGT060202ML-SS	.007						●																															
	CCGT32.50.2MRSS	CCGT09T301MR-SS	.003						●																															
	CCGT32.50.2MLSS	CCGT09T301ML-SS	.003						●																															
	CCGT32.50.5MRSS	CCGT09T302MR-SS	.007						●																															
	CCGT32.50.5MLSS	CCGT09T302ML-SS	.007						●																															
	CCGT32.51MRSS	CCGT09T304MR-SS	.015						●																															
	CCGT32.51MLSS	CCGT09T304ML-SS	.015						●																															
LS  Light Cutting	CCGT21.50.2MLS	CCGT060201M-LS	.003																●	●	● NEW																			
	CCGT21.50.5MLS	CCGT060202M-LS	.007																●	●	● NEW																			
	CCGT32.50.2MLS	CCGT09T301M-LS	.003																●	●	● NEW																			
	CCGT32.50.5MLS	CCGT09T302M-LS	.007																●	●	● NEW																			
	CCGT32.51MLS	CCGT09T304M-LS	.015																●	●	● NEW																			

● = NEW

● : USA Stock
<10 inserts in one case>

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲		✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
LS-P  Light Cutting	CCGT21.50.2MLS-P	CCGT060201M-LS-P	.003						●			● NEW										● NEW															●			
	CCGT21.50.5MLS-P	CCGT060202M-LS-P	.007						●			● NEW										● NEW															●			
	CCGT32.50.2MLS-P	CCGT09T301M-LS-P	.003						●			● NEW										● NEW															●			
	CCGT32.50.5MLS-P	CCGT09T302M-LS-P	.007						●			● NEW										● NEW															●			
	CCGT32.51MLS-P	CCGT09T304M-LS-P	.015						●			● NEW										● NEW															●			
MJ  Light Cutting	CCGT21.51MJ	CCGT060204-MJ	.016																					●																
	CCGT32.52MJ	CCGT09T308-MJ	.031																					●																
MJ-P  Light Cutting	CCGT21.51MJ-P	CCGT060204-MJ-P	.016																																				●	
	CCGT32.52MJ-P	CCGT09T308-MJ-P	.031																																				●	
MP  Medium Cutting	CCMT21.51MP	CCMT060204-MP	.016		●	●	●																				●		●											
	CCMT21.52MP	CCMT060208-MP	.031		●	●	●																				●		●											
	CCMT32.51MP	CCMT09T304-MP	.016		●	●	●																				●		●											
	CCMT32.52MP	CCMT09T308-MP	.031		●	●	●																				●		●											
	CCMT431MP	CCMT120404-MP	.016		●	●	●																				●		●											
	CCMT432MP	CCMT120408-MP	.031		●	●	●																				●		●											
	CCMT433MP	CCMT120412-MP	.047		●	●	●																				●		●											
MM  Medium Cutting	CCMT21.51MM	CCMT060204-MM	.016							●	●														●															
	CCMT21.52MM	CCMT060208-MM	.031							●	●														●															
	CCMT32.51MM	CCMT09T304-MM	.016							●	●														●															
	CCMT32.52MM	CCMT09T308-MM	.031							●	●														●															
	CCMT431MM	CCMT120404-MM	.016							●	●														●															
	CCMT432MM	CCMT120408-MM	.031							●	●														●															
	CCMT433MM	CCMT120412-MM	.047							●	●														●															
MS  Medium Cutting	CCMT21.50.5MS	CCMT060202-MS	.008																●	●	● NEW																●			
	CCMT21.51MS	CCMT060204-MS	.016																●	●	● NEW																●			
	CCMT21.52MS	CCMT060208-MS	.031																●	●	● NEW																●			
	CCMT32.50.5MS	CCMT09T302-MS	.008																●	●	● NEW																●			
	CCMT32.51MS	CCMT09T304-MS	.016																●	●	● NEW																●			
	CCMT32.52MS	CCMT09T308-MS	.031																●	●	● NEW																●			
	CCMT431MS	CCMT120404-MS	.016																●	●	● NEW																●			
	CCMT432MS	CCMT120408-MS	.031																●	●	● NEW																●			
	CCMT433MS	CCMT120412-MS	.047																●	●	● NEW																●			

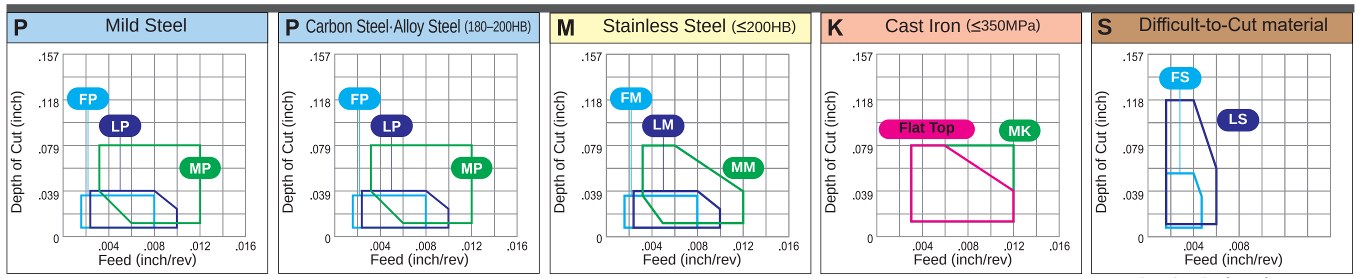
● = NEW

80° CC TYPE INSERTS WITH HOLE

CCMT 2 1.5 1 MK
Size / Thickness / Corner Radius / Chip Breaker
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting / Light Cutting / Medium Cutting



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✱ Unstable Cutting

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
	M	Stainless Steel								◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✱										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
MK	CCMT21.51MK	CCMT060204-MK	.016												●	●																								
	CCMT21.52MK	CCMT060208-MK	.031												●	●																								
	CCMT32.51MK	CCMT09T304-MK	.016												●	●																								
	CCMT32.52MK	CCMT09T308-MK	.031												●	●																								
	CCMT431MK	CCMT120404-MK	.016												●	●																								
	CCMT432MK	CCMT120408-MK	.031												●	●																								
Medium Cutting	CCMT433MK	CCMT120412-MK	.047												★	●																								
Standard	CCMT21.50.5	CCMT060202	.008		●								●														★	●	●	●			●		●					
	CCMT21.51	CCMT060204	.016	●	●								●					●							●		★	●	●	●			●		●					
	CCMT21.52	CCMT060208	.031		●								●					●							●		★						●		●					
	CCMT2.520.5	CCMT080302	.008		★																																			
	CCMT2.521	CCMT080304	.016		★								●														★	●	●	●			●							
	CCMT2.522	CCMT080308	.031		★								●																				●							
	CCMT32.50.5	CCMT09T302	.008		●								●														★	●	●	●					●					
	CCMT32.51	CCMT09T304	.016	●	●								●					●							●		★	●	●	●			●		●					
	CCMT32.52	CCMT09T308	.031	●	●								●					●							●		★	●	●	●			●		●					
	CCMT431	CCMT120404	.016	●	●								●					●							●		★	●	●	●			★		●					
	CCMT432	CCMT120408	.031	●	●								●					●							●		★	●	●				●		●					
Medium Cutting	CCMT433	CCMT120412	.047		●								●					★										●												
MV	CCMH21.50.5MV	CCMH060202-MV	.008				●						●												★		★	●	●	●		●								
 Medium Cutting	CCMH21.51MV	CCMH060204-MV	.016				●						●			●									●		★	●	●	●		●								
MW (With Wiper)	⋆CCMT21.51MW	CCMT060204-MW	.016			●	●																				●		●		●									
	⋆CCMT21.52MW	CCMT060208-MW	.031		●	●	●																				●		●		●									
	⋆CCMT32.51MW	CCMT09T304-MW	.016		●	●	●																				★		●		●									
	⋆CCMT32.52MW	CCMT09T308-MW	.031		●	●	●																				●		●		●									
	⋆CCMT431MW	CCMT120404-MW	.016		●	●	●											●									●				●									
Medium Cutting	⋆CCMT432MW	CCMT120408-MW	.031		●	●	●											●									●				●									

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
	M	Stainless Steel								◐	✱		✱											◐	✱	✱	●			●	●		✱							
	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✱										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
R/L SR	CCET21.5V3RSR	CCET0602V3R-SR	.0012																						●		★								●					
	CCET21.5V3LSR	CCET0602V3L-SR	.0012																						●		★								●					
	CCET21.50.2RSR	CCET060201R-SR	.004																						●		★								●					
	CCET21.50.2LSR	CCET060201L-SR	.004																						●		★								●					
	CCET21.50.5RSR	CCET060202R-SR	.008																						●		★								●					
	CCET21.50.5LSR	CCET060202L-SR	.008																						●		★								●					
	CCET21.51RSR	CCET060204R-SR	.016																						●		★								●					
	CCET21.51LSR	CCET060204L-SR	.016																						●		★								●					
	CCET32.5V3RSR	CCET09T3V3R-SR	.0012																						●		★								●					
	CCET32.5V3LSR	CCET09T3V3L-SR	.0012																						●		★								●					
	CCET32.50.2RSR	CCET09T301R-SR	.004																						●		★								●					
	CCET32.50.2LSR	CCET09T301L-SR	.004																						●		★								●					
	CCET32.50.5RSR	CCET09T302R-SR	.008																						●		★								●					
	CCET32.50.5LSR	CCET09T302L-SR	.008																						●		★								●					
	CCET32.51RSR	CCET09T304R-SR	.016																						●		★								●					
Medium Cutting	CCET32.51LSR	CCET09T304L-SR	.016																						●		★								●					
R/L SN	CCET21.5V0RSN	CCET060200R-SN	0																						●		★								●					
	CCET21.5V0LSN	CCET060200L-SN	0																						●		★								●					
	CCET21.5V3RSN	CCET0602V3R-SN	.0012																						●		★								●					
	CCET21.5V3LSN	CCET0602V3L-SN	.0012																						●		★								●					
	CCET21.50.2RSN	CCET060201R-SN	.004																						●		★								●					
	CCET21.50.2LSN	CCET060201L-SN	.004																						●		★								●					
	CCET21.50.5RSN	CCET060202R-SN	.008																						●		★								●					
	CCET21.50.5LSN	CCET060202L-SN	.008																						●		★								●					
	CCET21.51RSN	CCET060204R-SN	.016																						●		★								●					
	CCET21.51LSN	CCET060204L-SN	.016																						●		★								●					
	CCET32.5V0RSN	CCET09T300R-SN	0																						●		★								●					
	CCET32.5V0LSN	CCET09T300L-SN	0																						●		★								●					
	CCET32.5V3RSN	CCET09T3V3R-SN	.0012																						●		★								●					
	CCET32.5V3LSN	CCET09T3V3L-SN	.0012																						●		★								●					
	CCET32.50.2RSN	CCET09T301R-SN	.004																						●		★								●					
	CCET32.50.2LSN	CCET09T301L-SN	.004																						●		★								●					
	CCET32.50.5RSN	CCET09T302R-SN	.008																						●		★								●					
	CCET32.50.5LSN	CCET09T302L-SN	.008																						●		★								●					
	CCET32.51RSN	CCET09T304R-SN	.016																						●		★								●					
Medium Cutting	CCET32.51LSN	CCET09T304L-SN	.016																						●		★								●					

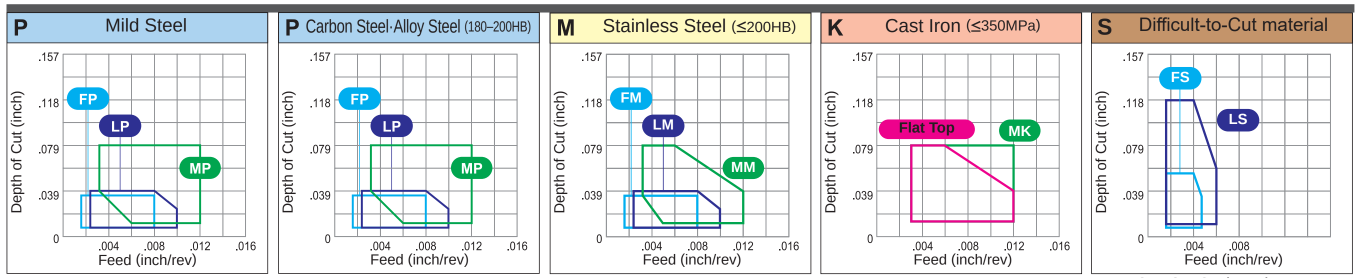
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

80° CC TYPE INSERTS WITH HOLE

CCGT 2 1.5 V3 R SN
Size Thickness Corner Radius R/L Chip Breaker
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

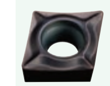
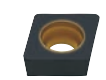


Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤		✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
R/L SN  Medium Cutting	CCGT21.5V3RSN	CCGT0602V3R-SN	.0012																						●															
	CCGT21.50.2RSN	CCGT060201R-SN	.004																						●															
	CCGT21.50.2LSN	CCGT060201L-SN	.004																						●															
	CCGT21.50.5RSN	CCGT060202R-SN	.008																						●															
	CCGT21.50.5LSN	CCGT060202L-SN	.008																						●															
	CCGT32.5V3RSN	CCGT09T3V3R-SN	.0012																						●															
	CCGT32.5V3LSN	CCGT09T3V3L-SN	.0012																						●															
	CCGT32.50.2RSN	CCGT09T301R-SN	.004																						●															
	CCGT32.50.2LSN	CCGT09T301L-SN	.004																						●															
	CCGT32.50.5RSN	CCGT09T302R-SN	.008																						●															
	CCGT32.50.5LSN	CCGT09T302L-SN	.008																						●															
	CCGT32.51RSN	CCGT09T304R-SN	.016																						●															
	CCGT32.51LSN	CCGT09T304L-SN	.016																						●															
	CCGT21.50.2MRSN	CCGT060201MR-SN	.003						●			● NEW										● NEW																		
	CCGT21.50.2MLSN	CCGT060201ML-SN	.003						●																															
	CCGT21.50.5MRSN	CCGT060202MR-SN	.007						●			● NEW										● NEW																		
	CCGT21.50.5MLSN	CCGT060202ML-SN	.007						●																															
	CCGT32.50.2MRSN	CCGT09T301MR-SN	.003						●			● NEW										● NEW																		
	CCGT32.50.2MLSN	CCGT09T301ML-SN	.003						●																															
	CCGT32.50.5MRSN	CCGT09T302MR-SN	.007						●			● NEW										● NEW																		
	CCGT32.50.5MLSN	CCGT09T302ML-SN	.007						●																															
	CCGT32.51MRSN	CCGT09T304MR-SN	.015						●			● NEW										● NEW																		
	CCGT32.51MLSN	CCGT09T304ML-SN	.015						●																															
R/LW SN (With Wiper)  Medium Cutting	★ CCET21.5V3RWSN	CCET0602V3RW-SN	.0012																						●															
	★ CCET21.5V3LWSN	CCET0602V3LW-SN	.0012																						●															
	★ CCET32.5V3RWSN	CCET09T3V3RW-SN	.0012																						●															
	★ CCET32.5V3LWSN	CCET09T3V3LW-SN	.0012																						●															

● = NEW

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
SMG  Medium Cutting	CCGT21.50.2MSMG	CCGT060201M-SMG	.003						●																															
	CCGT21.50.5MSMG	CCGT060202M-SMG	.007						●																●															
	CCGT21.51MSMG	CCGT060204M-SMG	.015						●																●															
	CCGT32.50.2MSMG	CCGT09T301M-SMG	.003						●																															
	CCGT32.50.5MSMG	CCGT09T302M-SMG	.007						●																															
	CCGT32.51MSMG	CCGT09T304M-SMG	.015						●																															
Flat Top 	CCMW21.50.5	CCMW060202	.008																																★					
	CCMW21.51	CCMW060204	.016												●	●	●	●															★		★					
	CCMW21.52	CCMW060208	.031												●	●																								
	CCMW32.51	CCMW09T304	.016												●	●	●	●																	★					
	CCMW32.52	CCMW09T308	.031												●	●	●	●															★		★					
	CCMW32.53	CCMW09T312	.008												●	●																								
	CCMW431	CCMW120404	.016												●	●	●	●																	★					
	CCMW432	CCMW120408	.031												●	●	●	●																	★					
	CCMW433	CCMW120412	.047												●	●		★																						
Flat Top 	CCGW21.5V0	CCGW060200	0																								●													
	CCGW21.5V5	CCGW0602V5	.002																								●													
	CCGW21.50.5E	CCGW060202E	.008																								★													
	CCGW21.51E	CCGW060204E	.016																								★													
	CCGW21.52E	CCGW060208E	.031																								★													
	CCGW21.50.5	CCGW060202	.008																																	★				
	CCGW21.51	CCGW060204	.016																																	★				
	CCGW21.52	CCGW060208	.031																																	★				
	CCGW32.5V0	CCGW09T300	0																								●													
	CCGW32.5V5	CCGW09T3V5	.002																								●													

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

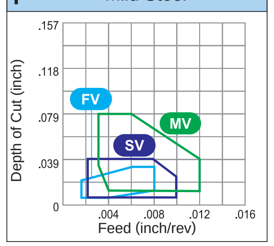
80° CP TYPE INSERTS WITH HOLE

CPMH 2.5 1.5 0.5 FV
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

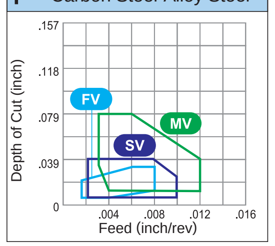
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

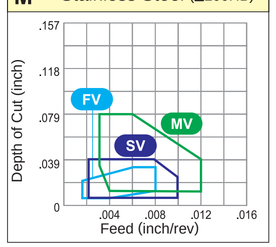
P Mild Steel



P Carbon Steel·Alloy Steel



M Stainless Steel (≤200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✲ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
FV  Finish Cutting	**CPMH2.51.50.5FV**	CPMH080202-FV	.008																						●		●	★	●											
	CPMH2.51.51FV	CPMH080204-FV	.016																						●		●	★	●											
	CPMH320.5FV	CPMH090302-FV	.008																						●		●	★	●											
	CPMH321FV	CPMH090304-FV	.016																						●		●	★	●											
	CPMH322FV	CPMH090308-FV	.031																						●		●	★	●											
R/L F  Finish Cutting	**CPMH2.51.51RF**	CPMH080204R-F	.016																						●		★								●					
	CPMH2.51.51LF	CPMH080204L-F	.016																						●		★								●					
	CPMH321RF	CPMH090304R-F	.016																						●		★								●					
	CPMH321LF	CPMH090304L-F	.016																						●		★			★					●					
R/L F  Finish Cutting	**CPGT2.51.51RF**	CPGT080204R-F	.016																								★													
	CPGT2.51.51LF	CPGT080204L-F	.016																								★													
	CPGT320.5RF	CPGT090302R-F	.008																								★													
	CPGT320.5LF	CPGT090302L-F	.008																								★													
	CPGT321RF	CPGT090304R-F	.016																								★													
	CPGT321LF	CPGT090304L-F	.016																								★													
SQ  Finish Cutting	**CPMT21.50.5SQ**	CPMT060202-SQ	.008										●																											
	CPMT21.51SQ	CPMT060204-SQ	.016		●								●																											
	CPMT21.52SQ	CPMT060208-SQ	.031										●																											
	CPMT32.50.5SQ	CPMT09T302-SQ	.008										●																											
	CPMT32.51SQ	CPMT09T304-SQ	.016		●								●																											
	CPMT32.52SQ	CPMT09T308-SQ	.031		●								●																											
Standard  Finish Cutting	**CPGT2.51.50.5**	CPGT080202	.008																																●					
	CPGT2.51.51	CPGT080204	.016																																●					
	CPGT320.5	CPGT090302	.008																																●					
	CPGT321	CPGT090304	.016																																●					
SV  Light Cutting	**CPMH2.51.50.5SV**	CPMH080202-SV	.008				●						●												★		★	●	●			●								
	CPMH2.51.51SV	CPMH080204-SV	.016				●						●												★		★	●	●			●								
	CPMH320.5SV	CPMH090302-SV	.008				●						●												★		★	●	●			●								
	CPMH321SV	CPMH090304-SV	.016				●						●												★		★	●	●			●								
	CPMH322SV	CPMH090308-SV	.031				●						●												★		★	●	●			●								

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
Standard  Medium Cutting	**CPMX2.51.51**	CPMX080204	.016		●																					★														
	CPMX2.51.52	CPMX080208	.031		●																					★														
	CPMX321	CPMX090304	.016		●																					★	★						★							
	CPMX322	CPMX090308	.031		●																					★							★							
MV  Medium Cutting	**CPMH2.51.51MV**	CPMH080204-MV	.016				●						●			●									●		★	●	●	●		●								
	CPMH2.51.52MV	CPMH080208-MV	.031				●						●			●									●		★	●	●	●		●								
	CPMH321MV	CPMH090304-MV	.016				●						●			●									●		★	●	●	●		●								
	CPMH322MV	CPMH090308-MV	.031				●						●			●									●		★	●	●	●		●								
MQ  Medium Cutting	**CPMT21.51MQ**	CPMT060204-MQ	.016		●								●																	●										
	CPMT21.52MQ	CPMT060208-MQ	.031		●								●																	●										
	CPMT32.51MQ	CPMT09T304-MQ	.016		●								●																	●										
	CPMT32.52MQ	CPMT09T308-MQ	.031		●								●																	●										

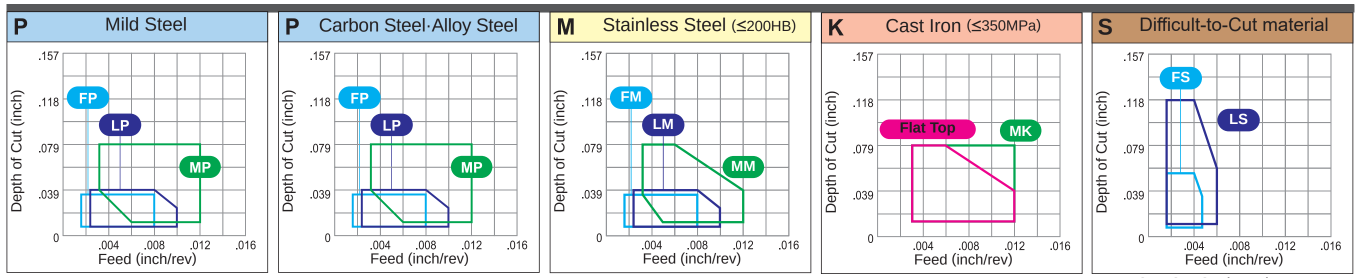
A
TURNING INSERTS
POSI 11°
WITH HOLE
C
D
R
S
T
V
W
X

55° DC TYPE INSERTS WITH HOLE

DCMT 2 1.5 0.5 FP
Size / Thickness / Corner Radius / Chip Breaker
★Please refer to page A002.

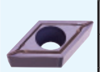
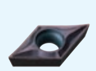
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

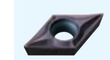
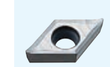
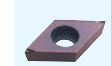
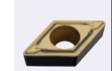
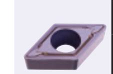


Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
FP	DCMT21.50.5FP	DCMT070202-FP	.008		●	●	●																				●		●											
	DCMT21.51FP	DCMT070204-FP	.016		●	●	●																				●		●											
	DCMT32.50.5FP	DCMT11T302-FP	.008		●	●	●																				●		●											
	DCMT32.51FP	DCMT11T304-FP	.016		●	●	●																				●		●											
Finish Cutting	DCMT32.52FP	DCMT11T308-FP	.031		●	●	●																				●		●											
FM	DCMT21.50.5FM	DCMT070202-FM	.008																						●															
	DCMT21.51FM	DCMT070204-FM	.016																						●															
	DCMT32.50.5FM	DCMT11T302-FM	.008																						●															
	DCMT32.51FM	DCMT11T304-FM	.016																						●															
Finish Cutting	DCMT32.52FM	DCMT11T308-FM	.031																						●															
FV	DCMT21.50.5FV	DCMT070202-FV	.008		★																				●		★	●		●										
	DCMT21.51FV	DCMT070204-FV	.016		★																				●		★	●		●										
	DCMT21.52FV	DCMT070208-FV	.031																						●		●	★												
	DCMT32.50.5FV	DCMT11T302-FV	.008																						●		●	★												
	DCMT32.51FV	DCMT11T304-FV	.016		★																				●		★	●		●										
Finish Cutting	DCMT32.52FV	DCMT11T308-FV	.031		★																				●		★	●		●										
FJ	DCGT21.5V5FJ	DCGT0702V5-FJ	.002																					●																
	DCGT21.50.2FJ	DCGT070201-FJ	.004																					●																
	DCGT21.50.5FJ	DCGT070202-FJ	.008																					●																
	DCGT32.5V5FJ	DCGT11T3V5-FJ	.002																					●																
	DCGT32.50.2FJ	DCGT11T301-FJ	.004																					●																
Finish Cutting	DCGT32.50.5FJ	DCGT11T302-FJ	.008																					●																
FJ-P	DCGT21.5V5FJ-P	DCGT0702V5-FJ-P	.002																																				●	
	DCGT21.50.2FJ-P	DCGT070201-FJ-P	.004																																				●	
	DCGT21.50.5FJ-P	DCGT070202-FJ-P	.008																																				●	
	DCGT32.5V5FJ-P	DCGT11T3V5-FJ-P	.002																																				●	
	DCGT32.50.2FJ-P	DCGT11T301-FJ-P	.004																																				●	
Finish Cutting	DCGT32.50.5FJ-P	DCGT11T302-FJ-P	.008																																				●	

● = NEW

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
FS	DCGT21.50.2MFS	DCGT070201M-FS	.003																●	●																				
	DCGT21.50.5MFS	DCGT070202M-FS	.007																●	●																				
	DCGT32.50.2MFS	DCGT11T301M-FS	.003																●	●																				
Finish Cutting	DCGT32.50.5MFS	DCGT11T302M-FS	.007																●	●																				
FS-P	DCGT21.50.2MFS-P	DCGT070201M-FS-P	.003									●										●															●			
	DCGT21.50.5MFS-P	DCGT070202M-FS-P	.007									●										●															●			
	DCGT32.50.2MFS-P	DCGT11T301M-FS-P	.003									●										●															●			
Finish Cutting	DCGT32.50.5MFS-P	DCGT11T302M-FS-P	.007									●										●															●			
AZ	DCGT21.50.5AZ	DCGT070202-AZ	.008																																●					
	DCGT21.51AZ	DCGT070204-AZ	.016																																●					
	DCGT32.50.5AZ	DCGT11T302-AZ	.008																																●					
	DCGT32.51AZ	DCGT11T304-AZ	.016																																●					
Medium-Finish Cutting	DCGT32.52AZ	DCGT11T308-AZ	.031																																●					
R/L F	DCGT21.50.5RF	DCGT070202R-F	.008																						●		★								●					
	DCGT21.50.5LF	DCGT070202L-F	.008																						●		★			●					●					
	DCGT21.51RF	DCGT070204R-F	.016																						●		★								●					
	DCGT21.51LF	DCGT070204L-F	.016																						●		★			●					●					
	DCGT32.50.5RF	DCGT11T302R-F	.008																						●		★								●					
	DCGT32.50.5LF	DCGT11T302L-F	.008																						●		★			●					●					
	DCGT32.51RF	DCGT11T304R-F	.016																						●		★								●					
Finish Cutting	DCGT32.51LF	DCGT11T304L-F	.016																						●		★			●					●					
LP	DCMT21.51LP	DCMT070204-LP	.016		●	●	●																				●		●											
	DCMT21.52LP	DCMT070208-LP	.031		●	●	●																				●		●											
	DCMT32.51LP	DCMT11T304-LP	.016		●	●	●																				●		●											
Light Cutting	DCMT32.52LP	DCMT11T308-LP	.031		●	●	●																				●		●											
LM	DCMT21.51LM	DCMT070204-LM	.016							●	●														●															
	DCMT21.52LM	DCMT070208-LM	.031							●	●														●															
	DCMT32.51LM	DCMT11T304-LM	.016							●	●														●															
Light Cutting	DCMT32.52LM	DCMT11T308-LM	.031							●	●														●															

● = NEW

●: USA Stock ★: Stocked in Japan
<10 inserts in one case>

55° DC TYPE INSERTS WITH HOLE

DCMT 2 1.5 0.5 LS

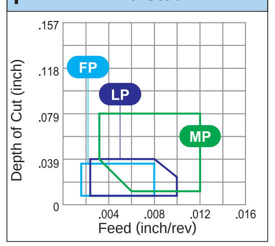
2 = Size, 1.5 = Thickness, 0.5 = Corner Radius, LS = Chip Breaker

★Please refer to page A002.

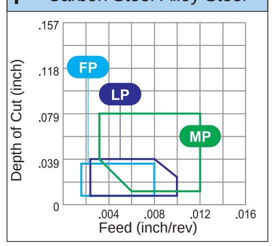
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

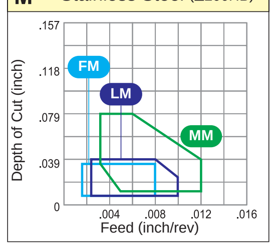
P Mild Steel



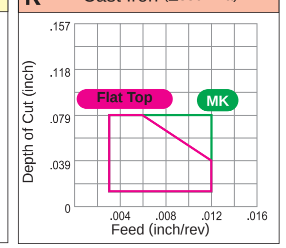
P Carbon Steel·Alloy Steel



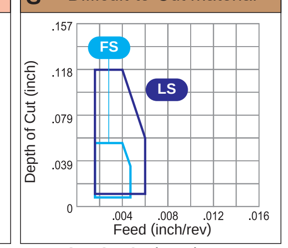
M Stainless Steel (≤200HB)



K Cast Iron (≤350MPa)

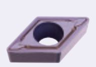


S Difficult-to-Cut material

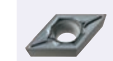
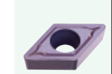


Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
LS  Light Cutting	DCMT21.50.5LS	DCMT070202-LS	.008																●	●	●(NEW)																●			
	DCMT21.51LS	DCMT070204-LS	.016																●	●	●(NEW)																●			
	DCMT32.50.5LS	DCMT11T302-LS	.008																●	●	●(NEW)																●			
	DCMT32.51LS	DCMT11T304-LS	.016																●	●	●(NEW)																●			
	DCMT32.52LS	DCMT11T308-LS	.031																●	●	●(NEW)																●			
SV  Light Cutting	DCMT21.50.5SV	DCMT070202-SV	.008										●												●		★	●				●								
	DCMT21.51SV	DCMT070204-SV	.016		★								●												●		★	●				●								
	DCMT21.52SV	DCMT070208-SV	.031		★								●												●		★	●				●								
	DCMT32.50.5SV	DCMT11T302-SV	.008		★								●												●		★	●				●								
	DCMT32.51SV	DCMT11T304-SV	.016		★								●												●		★	●				●								
	DCMT32.52SV	DCMT11T308-SV	.031		★								●												●		★	●				★								
R/L SS  Light Cutting	DCGT21.5V3RSS	DCGT0702V3R-SS	.0012																						●															
	DCGT21.5V3LSS	DCGT0702V3L-SS	.0012																						●															
	DCGT21.50.2RSS	DCGT070201R-SS	.004																						●															
	DCGT21.50.2LSS	DCGT070201L-SS	.004																						●															
	DCGT21.50.5RSS	DCGT070202R-SS	.008																						●															
	DCGT21.50.5LSS	DCGT070202L-SS	.008																						●															
	DCGT32.5V3RSS	DCGT11T3V3R-SS	.0012																						●															
	DCGT32.50.2RSS	DCGT11T301R-SS	.004																						●															
	DCGT32.50.5RSS	DCGT11T302R-SS	.008																						●															
	DCGT21.50.2MRSS	DCGT070201MR-SS	.003						●																															
	DCGT21.50.2MLSS	DCGT070201ML-SS	.003						●																															
	DCGT21.50.5MRSS	DCGT070202MR-SS	.007						●																															
	DCGT21.50.5MLSS	DCGT070202ML-SS	.007						●																															
	DCGT32.50.2MRSS	DCGT11T301MR-SS	.003						●																															
	DCGT32.50.2MLSS	DCGT11T301ML-SS	.003						●																															
	DCGT32.50.5MRSS	DCGT11T302MR-SS	.007						●																															
	DCGT32.50.5MLSS	DCGT11T302ML-SS	.007						●																															
	DCGT32.51MRSS	DCGT11T304MR-SS	.015						●																															
	DCGT32.51MLSS	DCGT11T304ML-SS	.015						●																															

● = NEW (yellow)

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
LS  Light Cutting	DCGT21.50.2MLS	DCGT070201M-LS	.003																●	●																				
	DCGT21.50.5MLS	DCGT070202M-LS	.007																●	●																				
	DCGT21.51MLS	DCGT070204M-LS	.015																●	●																				
	DCGT32.50.2MLS	DCGT11T301M-LS	.003																●	●																				
	DCGT32.50.5MLS	DCGT11T302M-LS	.007																●	●																				
	DCGT32.51MLS	DCGT11T304M-LS	.015																●	●																				
LS-P  Light Cutting	DCGT21.50.2MLS-P	DCGT070201M-LS-P	.003						●			●(NEW)									●(NEW)																●			
	DCGT21.50.5MLS-P	DCGT070202M-LS-P	.007						●			●(NEW)									●(NEW)																●			
	DCGT21.51MLS-P	DCGT070204M-LS-P	.015						●			●(NEW)									●(NEW)																●			
	DCGT32.50.2MLS-P	DCGT11T301M-LS-P	.003						●			●(NEW)									●(NEW)																●			
	DCGT32.50.5MLS-P	DCGT11T302M-LS-P	.007						●			●(NEW)									●(NEW)																●			
	DCGT32.51MLS-P	DCGT11T304M-LS-P	.015						●			●(NEW)									●(NEW)																●			
MJ  Light Cutting	DCGT21.51MJ	DCGT070204-MJ	.016																					●																
	DCGT32.51MJ	DCGT11T304-MJ	.016																					●																
	DCGT32.52MJ	DCGT11T308-MJ	.031																					●																
MJ-P  Light Cutting	DCGT21.51MJ-P	DCGT070204-MJ-P	.016																																				●	
	DCGT32.51MJ-P	DCGT11T304-MJ-P	.016																																				●	
	DCGT32.52MJ-P	DCGT11T308-MJ-P	.031																																				●	
MP  Medium Cutting	DCMT21.51MP	DCMT070204-MP	.016		●	●	●																				●		●											
	DCMT21.52MP	DCMT070208-MP	.031		●	●	●																				●		●											
	DCMT32.51MP	DCMT11T304-MP	.016		●	●	●																				●		●											
	DCMT32.52MP	DCMT11T308-MP	.031		●	●	●																				●		●											
	DCMT431MP	DCMT150404-MP	.016		●	●	●																				●		●											
	DCMT432MP	DCMT150408-MP	.031		●	●	●																				●		●											
MM  Medium Cutting	DCMT21.51MM	DCMT070204-MM	.016							●	●														●															
	DCMT21.52MM	DCMT070208-MM	.031							●	●														●															
	DCMT32.51MM	DCMT11T304-MM	.016							●	●														●															
	DCMT32.52MM	DCMT11T308-MM	.031							●	●														●															
	DCMT431MM	DCMT150404-MM	.016							●	●														●															
	DCMT432MM	DCMT150408-MM	.031							●	●														●															
MR  Medium Cutting	DCGT32.50.2MR-SFR	DCGT11T301MR-SRF	.003							●												●(NEW)																		
	DCGT32.50.5MR-SRF	DCGT11T302MR-SRF	.007							●												●(NEW)																		
	DCGT32.51MR-SRF	DCGT11T304MR-SRF	.015							●												●(NEW)																		

● = NEW (yellow)

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

A
TURNING INSERTS
POSI 7°
WITH HOLE
C D R S T V W X

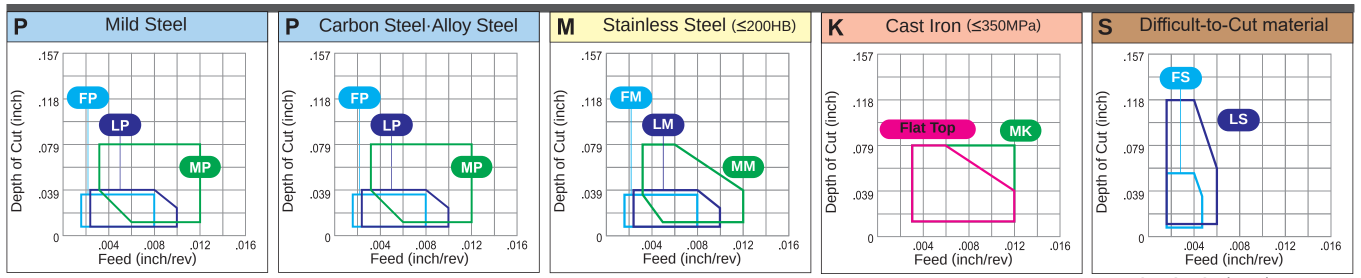
A
TURNING INSERTS
POSI 7°
WITH HOLE
C D R S T V W X

55° DC TYPE INSERTS WITH HOLE

DCMT 2 1.5 1 MS
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✲ Unstable Cutting

FS, LS : G class inserts

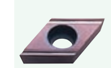
Work Material			UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel	●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel							◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron												◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																◐				●	
	S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
MS  Medium Cutting	DCMT21.51MS	DCMT070204-MS	.016																●	●	●																●			
	DCMT21.52MS	DCMT070208-MS	.031																●	●	●																●			
	DCMT32.51MS	DCMT11T304-MS	.016																●	●	●																●			
	DCMT32.52MS	DCMT11T308-MS	.031																●	●	●																●			
	DCMT32.53MS	DCMT11T312-MS	.047																●	●	●																●			
MK  Medium Cutting	DCMT21.51MK	DCMT070204-MK	.016												●	●																								
	DCMT21.52MK	DCMT070208-MK	.031												●	●																								
	DCMT32.51MK	DCMT11T304-MK	.016												●	●																								
	DCMT32.52MK	DCMT11T308-MK	.031												●	●																								
	DCMT431MK	DCMT150404-MK	.016												●	●																								
	DCMT432MK	DCMT150408-MK	.031												●	●																								
Standard  Medium Cutting	DCMT21.50.5	DCMT070202	.008		●								●														★	●	●	●			★							
	DCMT21.51	DCMT070204	.016	●	●								●					★							●		★	●	●	●			★							
	DCMT21.52	DCMT070208	.031		★								★					●									★	●	●	●										
	DCMT32.50.5	DCMT11T302	.008		●								●														★	●	●	●			★							
	DCMT32.51	DCMT11T304	.016	●	●								●					●							●		★	●	●	●			★		●					
	DCMT32.52	DCMT11T308	.031	●	●								●					●							●		★	●	●	●			★							
	DCMT32.53	DCMT11T312	.047		★																																			
	DCMT431	DCMT150404	.016		●								●					★									★	●	●	★			★							
	DCMT432	DCMT150408	.031		●								●					★									★	●	●				★							
	DCMT433	DCMT150412	.047		★																																			
MV  Medium Cutting	DCMT21.50.5MV	DCMT070202-MV	.008		★		●						●												●		★	●	●	●		●								
	DCMT21.51MV	DCMT070204-MV	.016		★		●						●			●									●		★	●	●	●		★								
	DCMT21.52MV	DCMT070208-MV	.031		★		●						●			●									●		★	●	●	●		★								
	DCMT32.50.5MV	DCMT11T302-MV	.008		★		●						●												●		★	●	●	●		●								
	DCMT32.51MV	DCMT11T304-MV	.016		★		●						●			●									●		★	●	●	●		●								
	DCMT32.52MV	DCMT11T308-MV	.031		★		●						●			●									●		★	●	●	●		★								

● = NEW

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

Work Material			UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel	●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel							◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron												◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																◐				●	
	S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L SR  Medium Cutting	DCET21.5V3RSR	DCET0702V3R-SR	.0012																						●		★								●					
	DCET21.5V3LSR	DCET0702V3L-SR	.0012																						●		★								●					
	DCET21.50.2RSR	DCET070201R-SR	.004																						●		★								●					
	DCET21.50.2LSR	DCET070201L-SR	.004																						●		★								●					
	DCET21.50.5RSR	DCET070202R-SR	.008																						●		★								●					
	DCET21.50.5LSR	DCET070202L-SR	.008																						●		★								●					
	DCET21.51RSR	DCET070204R-SR	.016																						●		★								●					
	DCET21.51LSR	DCET070204L-SR	.016																						●		★								●					
	DCET32.5V3RSR	DCET11T3V3R-SR	.0012																						●		★								●					
	DCET32.5V3LSR	DCET11T3V3L-SR	.0012																						●		★								●					
	DCET32.50.2RSR	DCET11T301R-SR	.004																						●		★								●					
	DCET32.50.2LSR	DCET11T301L-SR	.004																						●		★								●					
	DCET32.50.5RSR	DCET11T302R-SR	.008																						●		★								●					
	DCET32.50.5LSR	DCET11T302L-SR	.008																						●		★								●					
	DCET32.51RSR	DCET11T304R-SR	.016																						●		★								●					
	DCET32.51LSR	DCET11T304L-SR	.016																						●		★								●					
R/L SN  Medium Cutting	DCET21.5V0RSN	DCET070200R-SN	0																						●		★								●					
	DCET21.5V0LSN	DCET070200L-SN	0																						●		★								●					
	DCET21.5V3RSN	DCET0702V3R-SN	.0012																						●		★								●					
	DCET21.5V3LSN	DCET0702V3L-SN	.0012																						●		★								●					
	DCET21.50.2RSN	DCET070201R-SN	.004																						●		★								●					
	DCET21.50.2LSN	DCET070201L-SN	.004																						●		★								●					
	DCET21.50.5RSN	DCET070202R-SN	.008																						●		★								●					
	DCET21.50.5LSN	DCET070202L-SN	.008																						●		★								●					
	DCET21.51RSN	DCET070204R-SN	.016																						●		★								●					
	DCET21.51LSN	DCET070204L-SN	.016																						●		★								●					
	DCET32.5V0RSN	DCET11T300R-SN	0																						●		★								●					
	DCET32.5V0LSN	DCET11T300L-SN	0																						●		★								●					
	DCET32.5V3RSN	DCET11T3V3R-SN	.0012																						●		★								●					
	DCET32.5V3LSN	DCET11T3V3L-SN	.0012																						●		★								●					
	DCET32.50.2RSN	DCET11T301R-SN	.004																						●		★								●					
	DCET32.50.2LSN	DCET11T301L-SN	.004																						●		★								●					
	DCET32.50.5RSN	DCET11T302R-SN	.008																						●		★								●					
	DCET32.50.5LSN	DCET11T302L-SN	.008																						●		★								●					
	DCET32.51RSN	DCET11T304R-SN	.016																						●		★								●					
	DCET32.51LSN	DCET11T304L-SN	.016																						●		★								●					

● = NEW

55° DC TYPE INSERTS WITH HOLE

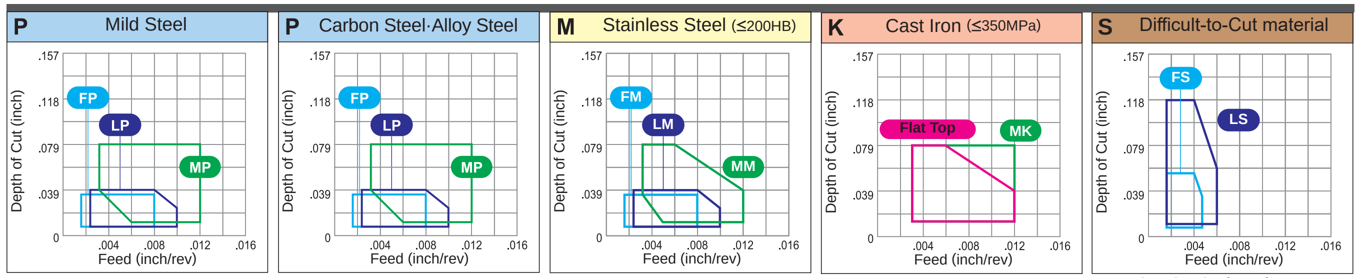
DCGT 2 1.5 V3 R SN

Size Thickness Corner Radius R/L Chip Breaker

*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

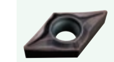
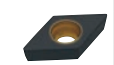
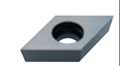
FS, LS : G class inserts

Work Material			UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
	P	Steel	●	◐	◐	✤	✤	●																	✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel							◐	✤	◐	✤												◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤													●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L SN	DCGT21.5V3RSN	DCGT0702V3R-SN	.0012																						●															
	DCGT21.50.2RSN	DCGT070201R-SN	.004																						●															
	DCGT21.50.5RSN	DCGT070202R-SN	.008																						●															
	DCGT21.50.5LSN	DCGT070202L-SN	.008																						●															
	DCGT32.5V3RSN	DCGT11T3V3R-SN	.0012																						●															
	DCGT32.5V3LSN	DCGT11T3V3L-SN	.0012																						●															
	DCGT32.50.2RSN	DCGT11T301R-SN	.004																						●															
	DCGT32.50.2LSN	DCGT11T301L-SN	.004																						●															
	DCGT32.50.5RSN	DCGT11T302R-SN	.008																						●															
	DCGT32.50.5LSN	DCGT11T302L-SN	.008																						●															
	DCGT32.51RSN	DCGT11T304R-SN	.016																						●															
	DCGT32.51LSN	DCGT11T304L-SN	.016																						●															
	DCGT21.50.2MRSN	DCGT070201MR-SN	.003						●			● (NEW)										● (NEW)																		
	DCGT21.50.2MLSN	DCGT070201ML-SN	.003						●																															
	DCGT21.50.5MRSN	DCGT070202MR-SN	.007						●			● (NEW)										● (NEW)																		
	DCGT21.50.5MLSN	DCGT070202ML-SN	.007						●																															
	DCGT32.50.2MRSN	DCGT11T301MR-SN	.003						●			● (NEW)										● (NEW)																		
	DCGT32.50.2MLSN	DCGT11T301ML-SN	.003						●																															
	DCGT32.50.5MRSN	DCGT11T302MR-SN	.007						●			● (NEW)										● (NEW)																		
	DCGT32.50.5MLSN	DCGT11T302ML-SN	.007						●																															
Medium Cutting	DCGT32.51MRSN	DCGT11T304MR-SN	.015						●			● (NEW)										● (NEW)																		
	DCGT32.51MLSN	DCGT11T304ML-SN	.015						●																															
R/LW SN (With Wiper)	★ DCET21.5V3RWSN	DCET0702V3RW-SN	.0012																						●															
	★ DCET21.5V3LWSN	DCET0702V3LW-SN	.0012																						●															
	★ DCET32.5V3RWSN	DCET11T3V3RW-SN	.0012																						●															
Medium Cutting	★ DCET32.5V3LWSN	DCET11T3V3LW-SN	.0012																						●															

● (highlighted) = NEW

Work Material			UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
	P	Steel	●	◐	◐	✤	✤	●																	✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel							◐	✤	◐	✤												◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤													●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
SMG	DCGT21.50.2MSMG	DCGT070201M-SMG	.003						●																															
	DCGT21.50.5MSMG	DCGT070202M-SMG	.007						●																●															
	DCGT21.51MSMG	DCGT070204M-SMG	.015						●																●															
	DCGT32.50.2MSMG	DCGT11T301M-SMG	.003						●																															
Medium Cutting	DCGT32.50.5MSMG	DCGT11T302M-SMG	.007						●																●															
	DCGT32.51MSMG	DCGT11T304M-SMG	.015						●																●															
Flat Top	DCMW21.51	DCMW070204	.016												●	●	★	★																	★					
	DCMW32.51	DCMW11T304	.016												●	●	★	★															●		★					
	DCMW32.52	DCMW11T308	.031												●	●	★	★																	★					
	DCMW431	DCMW150404	.016																																★					
	DCMW432	DCMW150408	.031																																★					
Flat Top	DCGW21.5V0	DCGW070200	0																								★													
	DCGW21.5V5	DCGW0702V5	.002																								★													
	DCGW32.5V0	DCGW11T300	0																								★													
	DCGW32.5V5	DCGW11T3V5	.002																								★													

● (highlighted) = NEW

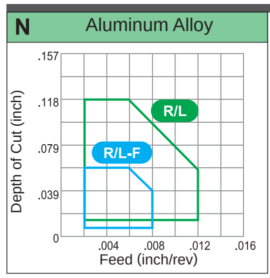
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

55° DE TYPE INSERTS WITH HOLE

DEGX 4 3 0.5 R F
Size Thickness Corner Radius R/L Chip Breaker
*Please refer to page A002.

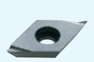
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
		Coated																							Cermet		Coated Cermet				Carbide							
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L F	DEGX430.5RF	DEGX150402R-F	.008																																★					
	DEGX430.5LF	DEGX150402L-F	.008																																★					
	DEGX431RF	DEGX150404R-F	.016																																★					
	DEGX431LF	DEGX150404L-F	.016																																★					
Finish Cutting																																								
R/L	DEGX430.5R	DEGX150402R	.008																																●					
	DEGX430.5L	DEGX150402L	.008																																●					
	DEGX431R	DEGX150404R	.016																																●					
	DEGX431L	DEGX150404L	.016																																●					
Medium Cutting	DEGX432R	DEGX150408R	.031																																●					

● = NEW

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

CHIP BREAKER ➤ A076

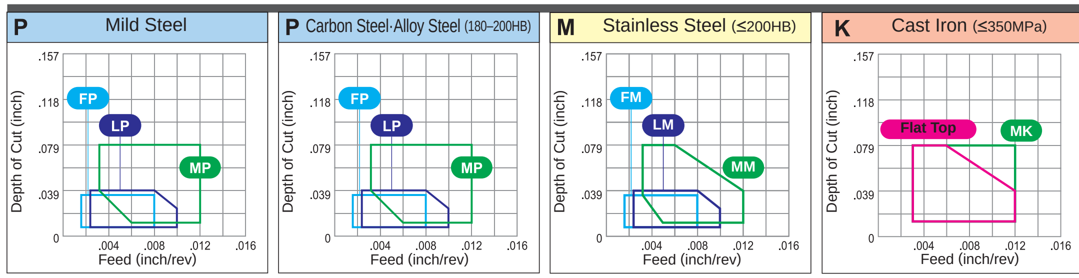
Memo

90° SC TYPE INSERTS WITH HOLE

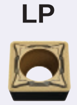
SCMT 3 2.5 1 FP
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

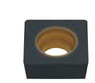
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✱ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
Work Material	M	Stainless Steel								◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
Work Material	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
Work Material	N	Non-Ferrous Metal																																	◐				●	
Work Material	S	Heat-resistant Alloy, Titanium Alloy													●					●	◐	◐	◐	●	◐	✱									◐		●	◐	●	◐
FP  Finish Cutting	SCMT32.51FP	SCMT09T304-FP	.016		●	●	●																				●		●											
	SCMT32.52FP	SCMT09T308-FP	.031		●	●	●																				●		●											
FM  Finish Cutting	SCMT32.51FM	SCMT09T304-FM	.016																						●															
	SCMT32.52FM	SCMT09T308-FM	.031																						●															
FV  Finish Cutting	SCMT32.51FV	SCMT09T304-FV	.016																								★	●		●		★								
LP  Light Cutting	SCMT32.51LP	SCMT09T304-LP	.016		●	●	●																				●		●											
	SCMT32.52LP	SCMT09T308-LP	.031		●	●	●																				●		●											
LM  Light Cutting	SCMT32.51LM	SCMT09T304-LM	.016							●	●														●															
	SCMT32.52LM	SCMT09T308-LM	.031							●	●														●															
MP  Medium Cutting	SCMT32.51MP	SCMT09T304-MP	.016		●	●	●																				●		●											
	SCMT32.52MP	SCMT09T308-MP	.031		●	●	●																				●		●											
	SCMT431MP	SCMT120404-MP	.016		●	●	●																				●		●											
	SCMT432MP	SCMT120408-MP	.031		●	●	●																				●		●											

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
Work Material	M	Stainless Steel								◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
Work Material	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
Work Material	N	Non-Ferrous Metal																																	◐				●	
Work Material	S	Heat-resistant Alloy, Titanium Alloy													●					●	◐	◐	◐	●	◐	✱									◐		●	◐	●	◐
MM  Medium Cutting	SCMT32.51MM	SCMT09T304-MM	.016							●	●														●															
	SCMT32.52MM	SCMT09T308-MM	.031							●	●														●															
	SCMT431MM	SCMT120404-MM	.016							●	●														●															
	SCMT432MM	SCMT120408-MM	.031							●	●														●															
MK  Medium Cutting	SCMT32.51MK	SCMT09T304-MK	.016												●	●																								
	SCMT32.52MK	SCMT09T308-MK	.031												●	●																								
	SCMT431MK	SCMT120404-MK	.016												●	●																								
	SCMT432MK	SCMT120408-MK	.031												●	●																								
MS  Medium Cutting	SCMT32.51MS	SCMT09T304-MS	.016																●	●	●																●			
	SCMT32.52MS	SCMT09T308-MS	.031																●	●	●																●			
	SCMT431MS	SCMT120404-MS	.016																●	●	●																●			
	SCMT432MS	SCMT120408-MS	.031																●	●	●																●			
	SCMT433MS	SCMT120412-MS	.047																●	●	●																●			
Standard  Medium Cutting	SCMT32.51	SCMT09T304	.016	★	●								●					●									★	●	●	●			●							
	SCMT32.52	SCMT09T308	.031	●	●								●					●									★	●	●	●			★							
	SCMT431	SCMT120404	.016	★	●								●					★									★	●	●											
	SCMT432	SCMT120408	.031	●	●								●					★									★	●	●	●			★							
	SCMT433	SCMT120412	.047		★																																			
Flat Top 	SCMW32.51	SCMW09T304	.016												●	●		★															★		★					
	SCMW32.52	SCMW09T308	.031												●	●	★	★																						
	SCMW432	SCMW120408	.031												●	●	★	★																						

● = NEW

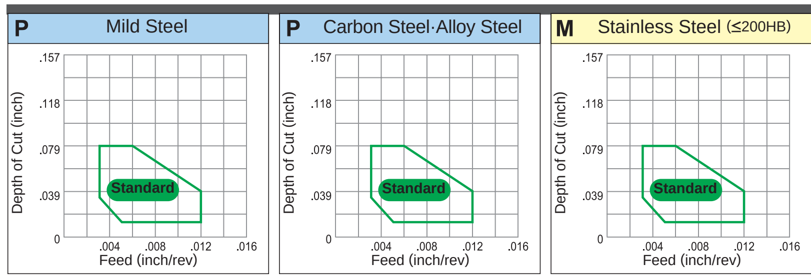
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

90° SP TYPE INSERTS WITH HOLE

SPMT 3 2 1
Size Thickness Corner Radius
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✱ Unstable Cutting

Work Material / Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel			●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
M	Stainless Steel									◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
K	Cast Iron														◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
N	Non-Ferrous Metal																																		◐				●	
S	Heat-resistant Alloy, Titanium Alloy														●					●	◐	◐	◐	●	◐	✱											◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
Standard  Medium Cutting	SPMT321	SPMT090304	.016																								★													
	SPMT322	SPMT090308	.031																								★													
	SPMT422	SPMT120308	.031																								★						★							
Flat Top 	SPMW321	SPMW090304	.016																						●	★	★						★		★					
	SPMW322	SPMW090308	.031																						★	★	★						★		★					
	SPMW421	SPMW120304	.016																						●	●	★						●		●					
	SPMW422	SPMW120308	.031																						●	●	★						●		●					
Flat Top 	SPGX321	SPGX090304	.016																								★								★					
	SPGX322	SPGX090308	.031																																★					
	SPGX421	SPGX120304	.016																																★					
	SPGX422	SPGX120308	.031																																★					

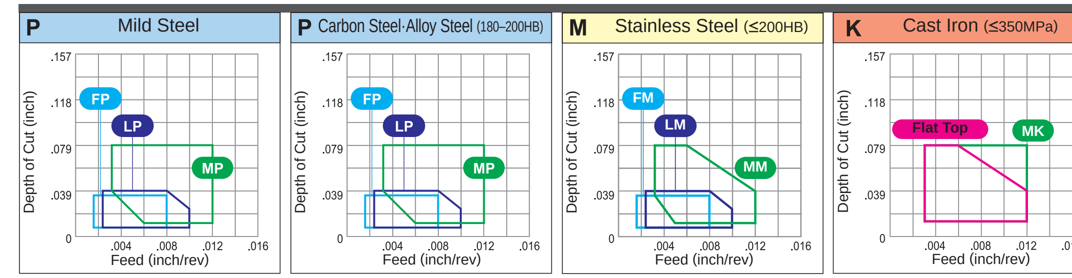
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

60° TC TYPE INSERTS WITH HOLE

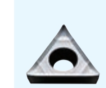
TCMT 1.8 1.5 0.5 FP
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting Light Cutting Medium Cutting



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✱ Unstable Cutting

Work Material / Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel			●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
M	Stainless Steel									◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
K	Cast Iron														◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
N	Non-Ferrous Metal																																		◐				●	
S	Heat-resistant Alloy, Titanium Alloy														●					●	◐	◐	◐	●	◐	✱											◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
FP  Finish Cutting	TCMT1.81.50.5FP	TCMT090202-FP	.008		●	●	●																				●		●											
	TCMT1.81.51FP	TCMT090204-FP	.016		●	●	●																				●		●											
	TCMT21.50.5FP	TCMT110202-FP	.008		●	●	●																				●		●											
	TCMT21.51FP	TCMT110204-FP	.016		●	●	●																				●		●											
	TCMT32.51FP	TCMT16T304-FP	.016		●	●	●																				●		●											
FM  Finish Cutting	TCMT1.81.50.5FM	TCMT090202-FM	.008																						●															
	TCMT1.81.51FM	TCMT090204-FM	.016																						●															
	TCMT21.50.5FM	TCMT110202-FM	.008																						●															
	TCMT21.51FM	TCMT110204-FM	.016																						●															
	TCMT32.51FM	TCMT16T304-FM	.016																						●															
FV  Finish Cutting	TCMT21.51FV	TCMT110204-FV	.016																								★	●		●		★								
	TCMT32.51FV	TCMT16T304-FV	.016																								★	●		●										
FJ-P  Finish Cutting	TCGT21.5V5FJ-P	TCGT1102V5-FJ-P	.002																																				●	
	TCGT21.50.2FJ-P	TCGT110201-FJ-P	.004																																				●	
	TCGT21.50.5FJ-P	TCGT110202-FJ-P	.008																																				●	
	TCGT32.5V5FJ-P	TCGT16T3V5-FJ-P	.002																																				●	
	TCGT32.50.2FJ-P	TCGT16T301-FJ-P	.004																																				●	
	TCGT32.50.5FJ-P	TCGT16T302-FJ-P	.008																																				●	
AZ  Medium-Finish Cutting	TCGT21.50.5AZ	TCGT110202-AZ	.008																																●					
	TCGT21.51AZ	TCGT110204-AZ	.016																																●					
	TCGT21.52AZ	TCGT110208-AZ	.031																																●					
	TCGT32.50.5AZ	TCGT16T302-AZ	.008																																●					
	TCGT32.51AZ	TCGT16T304-AZ	.016																																●					
	TCGT32.52AZ	TCGT16T308-AZ	.031																																●					

60° TC TYPE INSERTS WITH HOLE

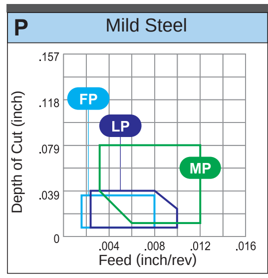
TCGT 1.2 1 V3 L F

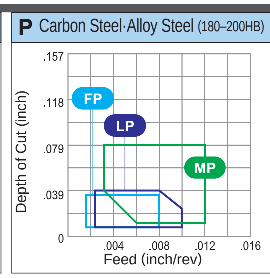
Size / Thickness / Corner Radius / R/L / Chip Breaker

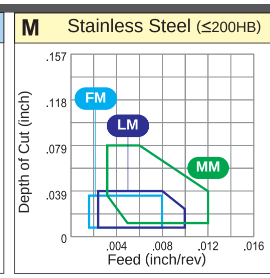
★Please refer to page A002.

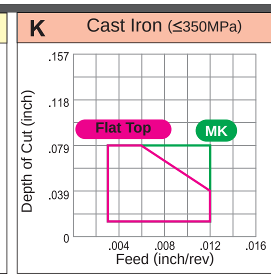
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting / Light Cutting / Medium Cutting

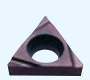
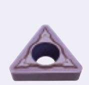








Cutting Conditions : ● Stable Cutting ◐ General Cutting ✱ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
	M	Stainless Steel								◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					◐	◐	◐	◐	◐	◐	✱										◐		●	◐	●	◐
R/L F	TCGT1.21V3LF	TCGT0601V3L-F	.0012																								★													
	TCGT1.210.2LF	TCGT060101L-F	.004																						●		★													
	TCGT1.210.5RF	TCGT060102R-F	.008																						★		★								★					
	TCGT1.210.5LF	TCGT060102L-F	.008																						●		★								●					
	TCGT1.211RF	TCGT060104R-F	.016																								★								★					
	TCGT1.211LF	TCGT060104L-F	.016																						●		★								●					
Finish Cutting	TCGT1.210.2MRF	TCGT060101MR-F	.003						●																															
	TCGT1.210.2MLF	TCGT060101ML-F	.003						●																															
	TCGT1.210.5MRF	TCGT060102MR-F	.007						●																															
	TCGT1.210.5MLF	TCGT060102ML-F	.007						●																															
	TCGT1.211MRF	TCGT060104MR-F	.015						●																															
	TCGT1.211MLF	TCGT060104ML-F	.015						●																															
LP	TCMT1.81.51LP	TCMT090204-LP	.016		●	●	●																				●		●											
	TCMT1.81.52LP	TCMT090208-LP	.031		●	●	●																				●		●											
	TCMT21.51LP	TCMT110204-LP	.016		●	●	●																				●		●											
	TCMT21.52LP	TCMT110208-LP	.031		●	●	●																				●		●											
Light Cutting	TCMT32.51LP	TCMT16T304-LP	.016		●	●	●																				●		●											
	TCMT32.52LP	TCMT16T308-LP	.031		●	●	●																				●		●											
LM	TCMT1.81.51LM	TCMT090204-LM	.016							●	●														●															
	TCMT1.81.52LM	TCMT090208-LM	.031							●	●														●															
	TCMT21.51LM	TCMT110204-LM	.016							●	●														●															
	TCMT21.52LM	TCMT110208-LM	.031							●	●														●															
Light Cutting	TCMT32.51LM	TCMT16T304-LM	.016							●	●														●															
	TCMT32.52LM	TCMT16T308-LM	.031							●	●														●															
LS	TCMT1.81.50.5LS	TCMT090202-LS	.008																●	●	● NEW																●			
 Light Cutting	TCMT21.50.5LS	TCMT110202-LS	.008																●	●	● NEW																●			

● NEW = NEW

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✱	✱	●																✱	✱	●	◐	◐	●	●	◐	✱							
	M	Stainless Steel								◐	✱	◐	✱											◐	✱	✱	●			●	●		✱							
	K	Cast Iron													◐	✱	●	◐						◐	✱		●			●	●		✱	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					◐	◐	◐	◐	◐	◐	✱										◐		●	◐	●	◐
MJ	TCGT21.51MJ	TCGT110204-MJ	.016																					●																
	TCGT32.51MJ	TCGT16T304-MJ	.016																					●																
Light Cutting	TCGT32.52MJ	TCGT16T308-MJ	.031																					●																
MJ-P	TCGT21.51MJ-P	TCGT110204-MJ-P	.016																																				●	
	TCGT32.51MJ-P	TCGT16T304-MJ-P	.016																																				●	
Light Cutting	TCGT32.52MJ-P	TCGT16T308-MJ-P	.031																																				●	
MP	TCMT1.81.51MP	TCMT090204-MP	.016		●	●	●																				●		●											
	TCMT1.81.52MP	TCMT090208-MP	.031		●	●	●																				●		●											
	TCMT21.51MP	TCMT110204-MP	.016		●	●	●																				●		●											
	TCMT21.52MP	TCMT110208-MP	.031		●	●	●																				●		●											
	TCMT2.521MP	TCMT130304-MP	.016		●	●	●																				●		●											
	TCMT32.51MP	TCMT16T304-MP	.016		●	●	●																				●		●											
Medium Cutting	TCMT32.52MP	TCMT16T308-MP	.031		●	●	●																				●		●											
	TCMT32.53MP	TCMT16T312-MP	.047		●	●	●																				●		●											
MM	TCMT1.81.51MM	TCMT090204-MM	.016							●	●														●															
	TCMT1.81.52MM	TCMT090208-MM	.031							●	●														●															
	TCMT21.51MM	TCMT110204-MM	.016							●	●														●															
	TCMT21.52MM	TCMT110208-MM	.031							●	●														●															
	TCMT2.521MM	TCMT130304-MM	.016							●	●														●															
	TCMT32.51MM	TCMT16T304-MM	.016							●	●														●															
Medium Cutting	TCMT32.52MM	TCMT16T308-MM	.031							●	●														●															
	TCMT32.53MM	TCMT16T312-MM	.047							●	●														●															
MK	TCMT21.51MK	TCMT110204-MK	.016												●	●																								
	TCMT21.52MK	TCMT110208-MK	.031												●	●																								
	TCMT32.51MK	TCMT16T304-MK	.016												●	●																								
Medium Cutting	TCMT32.52MK	TCMT16T308-MK	.031												●	●																								
	TCMT32.53MK	TCMT16T312-MK	.047												●	●																								
MS	TCMT1.81.51MS	TCMT090204-MS	.016																●	●	● NEW																●			
	TCMT1.81.52MS	TCMT090208-MS	.031																●	●	● NEW																●			
	TCMT21.51MS	TCMT110204-MS	.016																●	●	● NEW																			
	TCMT21.52MS	TCMT110208-MS	.031																●	●	● NEW																			
	TCMT32.51MS	TCMT16T304-MS	.016																●	●	● NEW																●			
Medium Cutting	TCMT32.52MS	TCMT16T308-MS	.031																●	●	● NEW																●			
	TCMT32.53MS	TCMT16T312-MS	.047																●	●	● NEW																●			

● NEW = NEW

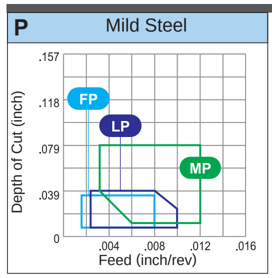
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

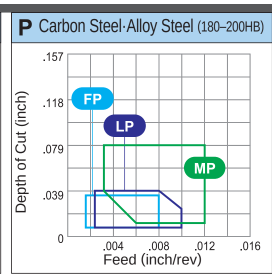
60° TC TYPE INSERTS WITH HOLE

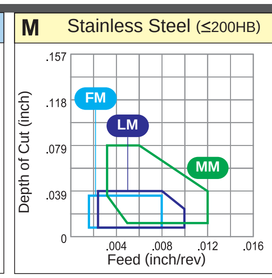
TCMT 1.5 1.5 1
Size Thickness Corner Radius
★Please refer to page A002.

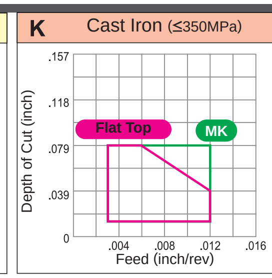
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting / Light Cutting / Medium Cutting





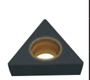
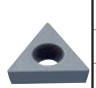




Cutting Conditions : ● Stable Cutting ◐ General Cutting ✣ Unstable Cutting

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
M	Stainless Steel							◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
K	Cast Iron												◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐

Coated: UE6105–UP20M; Cermet: NX2525, NX3035; Coated Cermet: MP3025–VP45N; Carbide: UTi20T–RT9010

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Standard	**TCMT1.51.51**	TCMT080204	.016																									●	●				★							
	TCMT1.81.51	TCMT090204	.016		●								★														★	●	●	●			★		●					
	TCMT21.50.5	TCMT110202	.008		●								●												●		★	●	●	●										
	TCMT21.51	TCMT110204	.016	●	●								●					★							●		★	●	●	●			●		●					
	**TCMT21.52**	TCMT110208	.031	●	●																				●				●											
	TCMT2.520.5	TCMT130302	.008																										●	●										
	TCMT2.521	TCMT130304	.016		●								●															●	●											
	TCMT32.51	TCMT16T304	.016	●	●								●					●							●		★	●	●	●			●		●					
	TCMT32.52	TCMT16T308	.031	●	●								●					●							●		★	●	●	●			●		●					
Medium Cutting	**TCMT32.53**	TCMT16T312	.047		★																																			
Flat Top	**TCMW21.51**	TCMW110204	.016												●	●	★	★																	★					
	TCMW2.521	TCMW130304	.016																																★					
	**TCMW32.51**	TCMW16T304	.016												●	●	●	●																	★					
	TCMW32.52	TCMW16T308	.031												●	●	●	●																	★					
	TCMW32.53	TCMW16T312	.047												●	●																								
Flat Top	**TCGW21.51**	TCGW110204	.016																																	★				
	TCGW21.51E	TCGW110204E	.016																								★													
	**TCGW21.52**	TCGW110208	.031																																	★				
	TCGW21.52E	TCGW110208E	.031																								★													

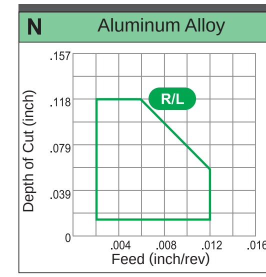
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

60° TE TYPE INSERTS WITH HOLE

TEGX 3 2 0.5 R
Size Thickness Corner Radius R/L
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting



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

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
M	Stainless Steel							◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
K	Cast Iron												◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐

Coated: UE6105–UP20M; Cermet: NX2525, NX3035; Coated Cermet: MP3025–VP45N; Carbide: UTi20T–RT9010

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L	**TEGX320.5R**	TEGX160302R	.008																																●					
	**TEGX320.5L**	TEGX160302L	.008																																●					
	TEGX321R	TEGX160304R	.016																																●					
Medium Cutting	**TEGX321L**	TEGX160304L	.016																																●					

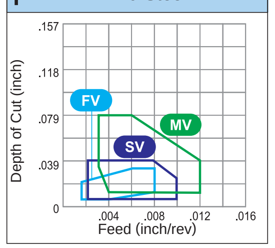
60° TP TYPE INSERTS WITH HOLE

TPMH 1.5 1.5 0.5 FV
Size / Thickness / Corner Radius / Chip Breaker
*Please refer to page A002.

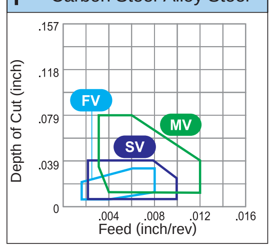
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting / Light Cutting / Medium Cutting

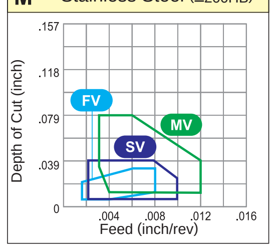
P Mild Steel



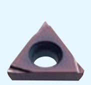
P Carbon Steel·Alloy Steel



M Stainless Steel (≤200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✲ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
FV 	TPMH1.51.50.5FV	TPMH080202-FV	.008																						●		●	★	●											
	TPMH1.51.51FV	TPMH080204-FV	.016																						●		●	★	●											
	TPMH1.81.50.5FV	TPMH090202-FV	.008																						●		●	★	●											
	TPMH1.81.51FV	TPMH090204-FV	.016																						●		●	★	●											
	TPMH220.5FV	TPMH110302-FV	.008																						●		●	★	●											
	TPMH221FV	TPMH110304-FV	.016																						●		●	★	●											
	TPMH222FV	TPMH110308-FV	.031																						●		●	★	●											
	TPMH320.5FV	TPMH160302-FV	.008																						●		●	★	●											
	TPMH321FV	TPMH160304-FV	.016																						●		●	★	●											
Finish Cutting	TPMH322FV	TPMH160308-FV	.031																						●		●	★	●											
R/L FS 	TPGH1.51.50.5RFS	TPGH080202R-FS	.008																						●		★								●					
	TPGH1.51.50.5LFS	TPGH080202L-FS	.008																						●		★		●	★					●					
	TPGH1.51.51RFS	TPGH080204R-FS	.016																						●		★								●					
	TPGH1.51.51LFS	TPGH080204L-FS	.016																						●		★		●	★					●					
	TPGH1.81.50.5RFS	TPGH090202R-FS	.008																						●		★								●					
	TPGH1.81.50.5LFS	TPGH090202L-FS	.008																						●		★		●	★					●					
	TPGH1.81.51RFS	TPGH090204R-FS	.016																						●		★								●					
	TPGH1.81.51LFS	TPGH090204L-FS	.016																						●		★		●	★					●					
	TPGH220.5RFS	TPGH110302R-FS	.008																						●		★								●					
	TPGH220.5LFS	TPGH110302L-FS	.008																						●		★		●	★					●					
	TPGH221RFS	TPGH110304R-FS	.016																						●		★								●					
	TPGH221LFS	TPGH110304L-FS	.016																						●		★		●	★					●					
	TPGH321RFS	TPGH160304R-FS	.016																						●		★								●					
	TPGH321LFS	TPGH160304L-FS	.016																						●		★		●						●					
	TPGH322RFS	TPGH160308R-FS	.031																						●		★								●					
Finish Cutting	TPGH322LFS	TPGH160308L-FS	.031																						●		★		●						●					
SQ 	TPMT1.81.51SQ	TPMT090204-SQ	.016										●																											
	TPMT21.50.5SQ	TPMT110202-SQ	.008		●								●																											
	TPMT21.51SQ	TPMT110204-SQ	.016		●								●																											
	TPMT21.52SQ	TPMT110208-SQ	.031		●								●																											
	TPMT32.51SQ	TPMT16T304-SQ	.016										●																											
Finish Cutting	TPMT32.52SQ	TPMT16T308-SQ	.031										●																											

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

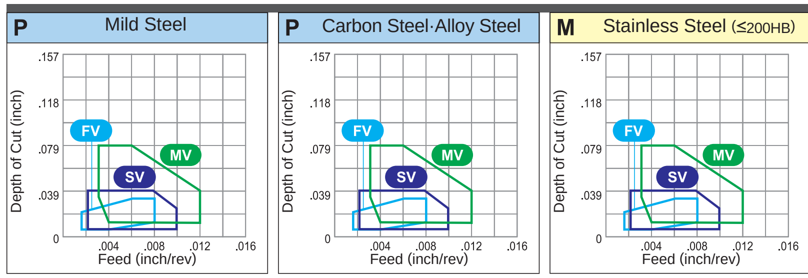
Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	RT9005	MT9015	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐			●		
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	●	◐	◐
R/L 	TPGX1.51.50.5R	TPGX080202R	.008																								★													
	TPGX1.51.50.5L	TPGX080202L	.008																								★						★		●					
	TPGX1.51.51R	TPGX080204R	.016																								★								★					
	TPGX1.51.51L	TPGX080204L	.016																							★	★						★		●					
	TPGX1.81.50.5R	TPGX090202R	.008																								★													
	TPGX1.81.50.5L	TPGX090202L	.008																								★						★		●					
	TPGX1.81.51R	TPGX090204R	.016																								★								●					
	TPGX1.81.51L	TPGX090204L	.016																							★	★						★		●					
	TPGX1.81.52R	TPGX090208R	.031																																★					
	TPGX1.81.52L	TPGX090208L	.031																								★								★					
	TPGX220.5L	TPGX110302L	.008																								★						★		★					
	TPGX221R	TPGX110304R	.016																							★	★								★					
	TPGX221L	TPGX110304L	.016																							★	★						★		★					
	TPGX222R	TPGX110308R	.031																								★								★					
Finish Cutting	TPGX222L	TPGX110308L	.031																							★	★						★	★	●					
L 	TPMX1.81.51L	TPMX090204L	.016																								★													
Finish Cutting	TPMX221L	TPMX110304L	.016																								★													
SV 	TPMH1.51.50.5SV	TPMH080202-SV	.008				●						●												★		★	●	●											
	TPMH1.51.51SV	TPMH080204-SV	.016				●						●												★		★	●	●			●								
	TPMH1.81.50.5SV	TPMH090202-SV	.008				●						●												★		★	●	●											
	TPMH1.81.51SV	TPMH090204-SV	.016				●						●												★		★	●	●			●								
	TPMH220.5SV	TPMH110302-SV	.008				●						●												★		★	●	●			●								
	TPMH221SV	TPMH110304-SV	.016				●						●												★		★	●	●			●								
	TPMH222SV	TPMH110308-SV	.031				●						●												★		★	●	●			●								
	TPMH320.5SV	TPMH160302-SV	.008				●						●												★		★	★	●			★								
	TPMH321SV	TPMH160304-SV	.016				●						●												★		★	★	●			★								
Light Cutting	TPMH322SV	TPMH160308-SV	.031				●						●												★		★	★	●			●								

60° TP TYPE INSERTS WITH HOLE

TPMH 1.5 1.5 0.5 MV
Size Thickness Corner Radius Chip Breaker
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
MV	TPMH1.51.50.5MV	TPMH080202-MV	.008				●						●												●		★	●	●											
	TPMH1.51.51MV	TPMH080204-MV	.016				●						●			●									●		★	●	●	●		●								
	TPMH1.81.50.5MV	TPMH090202-MV	.008				●						●												●		★	●	●											
	TPMH1.81.51MV	TPMH090204-MV	.016				●						●			●									●		★	●	●	●		●								
	TPMH1.81.52MV	TPMH090208-MV	.031				●									●									●			●	●											
	TPMH220.5MV	TPMH110302-MV	.008				●						●												★		★	●	●	●		★								
	TPMH221MV	TPMH110304-MV	.016				●						●			●									●		★	●	●	●		●								
	TPMH222MV	TPMH110308-MV	.031				●						●			●									●		★	●	●	●		●								
	TPMH321MV	TPMH160304-MV	.016				●						●			●									●		★	★	●	●		★								
Medium Cutting	TPMH322MV	TPMH160308-MV	.031				●						●			●									●		★	★	●	●		●								
MQ	TPMT21.51MQ	TPMT110204-MQ	.016		●								●																											
	TPMT21.52MQ	TPMT110208-MQ	.031		●								●																	●										
	TPMT32.51MQ	TPMT16T304-MQ	.016		●								●																											
Medium Cutting	TPMT32.52MQ	TPMT16T308-MQ	.031		●								●																											
Standard	TPMX221	TPMX110304	.016																								★	●	●											
 Medium Cutting	TPMX222	TPMX110308	.031																								★	●	●											
Flat Top	TPGX1.51.50.5	TPGX080202	.008																														●		●					
	TPGX1.51.51	TPGX080204	.016																						★	★	★						●		●					
	TPGX1.51.52	TPGX080208	.031																								★						●		★					
	TPGX1.81.50.5	TPGX090202	.008																																●					
	TPGX1.81.51	TPGX090204	.016																							★	★						●		●					
	TPGX1.81.52	TPGX090208	.031																							★	★						●		●					
	TPGX220.5	TPGX110302	.008																																●					
	TPGX221	TPGX110304	.016																						★	★	★						●	★	●					
	TPGX222	TPGX110308	.031																							★	★						●	★	●					
	TPGX321	TPGX160304	.016																								★						★		●					
	TPGX322	TPGX160308	.031																														★		●					

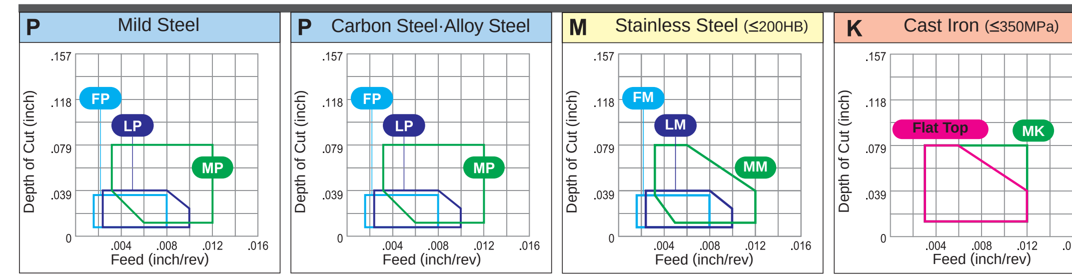
● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

35° VB TYPE INSERTS WITH HOLE

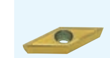
VBMT 2 2 0.5 FP
Size Thickness Corner Radius Chip Breaker
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
FP	VBMT220.5FP	VBMT110302-FP	.008		●	●	●																				●		●											
	VBMT221FP	VBMT110304-FP	.016		●	●	●																				●		●											
	VBMT222FP	VBMT110308-FP	.031		●	●	●																				●		●											
	VBMT331FP	VBMT160404-FP	.016		●	●	●																				●		●											
Finish Cutting	VBMT332FP	VBMT160408-FP	.031		●	●	●																				●		●											
FM	VBMT220.5FM	VBMT110302-FM	.008																						●															
	VBMT221FM	VBMT110304-FM	.016																						●															
	VBMT222FM	VBMT110308-FM	.031																						●															
	VBMT331FM	VBMT160404-FM	.016																						●															
Finish Cutting	VBMT332FM	VBMT160408-FM	.031																						●															
FV	VBMT221FV	VBMT110304-FV	.016																						●		●	★												
	VBMT222FV	VBMT110308-FV	.031																						●		●	★												
	VBMT331FV	VBMT160404-FV	.016																						●		●	★												
Finish Cutting	VBMT332FV	VBMT160408-FV	.031																						●		●	★												
FJ	VBGT33V5FJ	VBGT1604V5-FJ	.002																					●																
	VBGT330.2FJ	VBGT160401-FJ	.004																					●																
Finish Cutting	VBGT330.5FJ	VBGT160402-FJ	.008																					●																
FJ-P	VBGT33V5FJ-P	VBGT1604V5-FJ-P	.002																																				●	
	VBGT330.2FJ-P	VBGT160401-FJ-P	.004																																				●	
Finish Cutting	VBGT330.5FJ-P	VBGT160402-FJ-P	.008																																				●	

35° VB TYPE INSERTS WITH HOLE

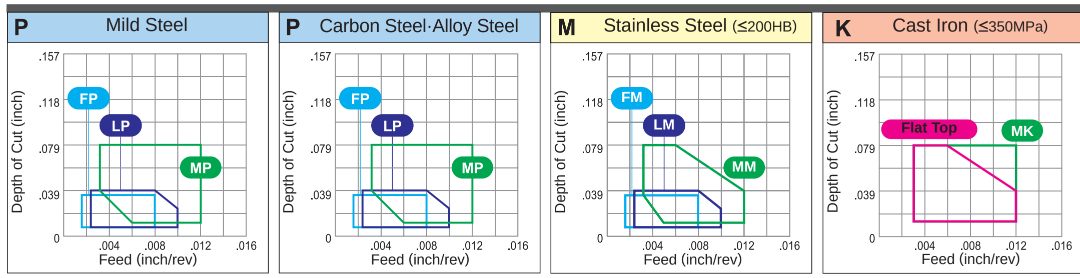
VBGT 2 2 0.5 R F

Size Thickness Corner Radius R/L Chip Breaker

★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

	Work Material	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
R/L F  Finish Cutting	VBGT220.5RF	VBGT110302R-F	.008																						●		★		●	★					●					
	VBGT220.5LF	VBGT110302L-F	.008																						●		★		●	★					●					
	VBGT221RF	VBGT110304R-F	.016																						●		★			★					●					
	VBGT221LF	VBGT110304L-F	.016																						●		★			★					●					
	VBGT330.5RF	VBGT160402R-F	.008																						★		★			★					★					
	VBGT330.5LF	VBGT160402L-F	.008																						★		★			★					★					
	VBGT331RF	VBGT160404R-F	.016																						★		★			★					★					
	VBGT331LF	VBGT160404L-F	.016																						★		★			★					★					
LP  Light Cutting	VBMT221LP	VBMT110304-LP	.016		●	●	●																				●		●											
	VBMT222LP	VBMT110308-LP	.031		●	●	●																				●		●											
	VBMT331LP	VBMT160404-LP	.016		●	●	●																				●		●											
	VBMT332LP	VBMT160408-LP	.031		●	●	●																				●		●											
LM  Light Cutting	VBMT221LM	VBMT110304-LM	.016							●	●														●															
	VBMT222LM	VBMT110308-LM	.031							●	●														●															
	VBMT331LM	VBMT160404-LM	.016							●	●														●															
	VBMT332LM	VBMT160408-LM	.031							●	●														●															
LS  Light Cutting	VBMT220.5LS	VBMT110302-LS	.008																●	●	●																●			
	VBMT221LS	VBMT110304-LS	.016																●	●	●																●			
	VBMT222LS	VBMT110308-LS	.031																●	●	●																●			
	VBMT331LS	VBMT160404-LS	.016																●	●	●																●			
	VBMT332LS	VBMT160408-LS	.031																●	●	●																●			
SV  Light Cutting	VBMT221SV	VBMT110304-SV	.016																						●			●												
	VBMT222SV	VBMT110308-SV	.031																						●			●												
	VBMT331SV	VBMT160404-SV	.016																						●			●												
	VBMT332SV	VBMT160408-SV	.031																						●			●												

● = NEW

● : USA Stock ★ : Stocked in Japan

<10 inserts in one case>

	Work Material	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	Coated																							Cermet		Coated Cermet				Carbide							
				UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
MJ  Light Cutting	VBGT331MJ	VBGT160404-MJ	.016																					●																
	VBGT332MJ	VBGT160408-MJ	.031																					●																
MJ-P  Light Cutting	VBGT331MJ-P	VBGT160404-MJ-P	.016																																				●	
	VBGT332MJ-P	VBGT160408-MJ-P	.031																																				●	
MP  Medium Cutting	VBMT331MP	VBMT160404-MP	.016		●	●	●																				●		●											
	VBMT332MP	VBMT160408-MP	.031		●	●	●																				●		●											

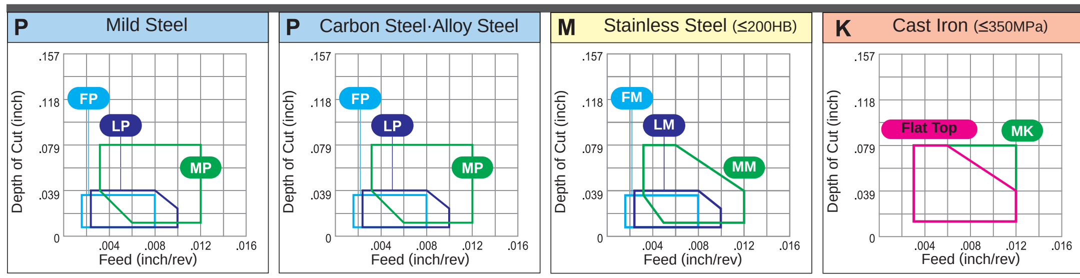
A
TURNING INSERTS
POSI 5°
WITH HOLE
C
D
R
S
T
V
W
X

35° VB TYPE INSERTS WITH HOLE

VBMT 3 3 1 MM
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting Light Cutting Medium Cutting



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✲ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●	◐	✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
MM  Medium Cutting	VBMT331MM	VBMT160404-MM	.016							●	●														●															
	VBMT332MM	VBMT160408-MM	.031							●	●														●															
MS  Medium Cutting	VBMT330.5MS	VBMT160402-MS	.008																●	●	●																●			
	VBMT331MS	VBMT160404-MS	.016																●	●	●																●			
	VBMT332MS	VBMT160408-MS	.031																●	●	●																●			
	VBMT333MS	VBMT160412-MS	.047																●	●	●																●			
MK  Medium Cutting	VBMT331MK	VBMT160404-MK	.016												●	●																								
	VBMT332MK	VBMT160408-MK	.031												●	●																								
Standard  Medium Cutting	VBMT331	VBMT160404	.016		●																																			
	VBMT332	VBMT160408	.031		●								●																											
MV  Medium Cutting	VBMT221MV	VBMT110304-MV	.016				●						●			●									●		★	●	●	●		★								
	VBMT222MV	VBMT110308-MV	.031				●						●			●									●		★	●	●	●		★								
	VBMT331MV	VBMT160404-MV	.016				●						●			●									●		★	●	●	●		★								
	VBMT332MV	VBMT160408-MV	.031				●						●			●									●		★	●	●	●		★								

● = NEW

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✲	✲	●																✲	✲	●	◐	◐	●	●		✲							
	M	Stainless Steel								◐	✲	◐	✲											◐	✲	✲	●			●	●		✲							
	K	Cast Iron													◐	✲	●	◐						◐	✲		●			●	●		✲	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✲										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
R/L SR  Medium Cutting	VBET22V3RSR	VBET1103V3R-SR	.0012																						●		★								●					
	VBET22V3LSR	VBET1103V3L-SR	.0012																						●		★								●					
	VBET220.2RSR	VBET110301R-SR	.004																						●		★								●					
	VBET220.2LSR	VBET110301L-SR	.004																						●		★								●					
	VBET220.5RSR	VBET110302R-SR	.008																						●		★								●					
	VBET220.5LSR	VBET110302L-SR	.008																						●		★								●					
	VBET221RSR	VBET110304R-SR	.016																						●		★								●					
	VBET221LSR	VBET110304L-SR	.016																						●		★								●					
R/L SN  Medium Cutting	VBET22V0RSN	VBET110300R-SN	0																						●		★								●					
	VBET22V0LSN	VBET110300L-SN	0																						●		★								●					
	VBET22V3RSN	VBET1103V3R-SN	.0012																						●		★								●					
	VBET22V3LSN	VBET1103V3L-SN	.0012																						●		★								●					
	VBET220.2RSN	VBET110301R-SN	.004																						●		★								●					
	VBET220.2LSN	VBET110301L-SN	.004																						●		★								●					
	VBET220.5RSN	VBET110302R-SN	.008																						●		★								●					
	VBET220.5LSN	VBET110302L-SN	.008																						●		★								●					
	VBET221RSN	VBET110304R-SN	.016																						●		★								●					
	VBET221LSN	VBET110304L-SN	.016																						●		★								●					
R/LW SN (With Wiper)  Medium Cutting	★VBET22V3RWSN	VBET1103V3RW-SN	.0012																						●															
	★VBET22V3LWSN	VBET1103V3LW-SN	.0012																						●															
Flat Top 	VBMW332	VBMW160408	.031												●	●																								

35° VC TYPE INSERTS WITH HOLE

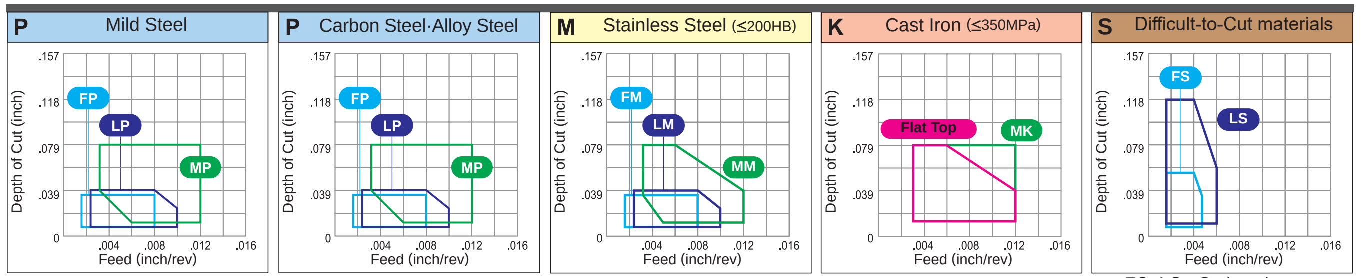
VCMT 2 2 0.5 FP

Size Thickness Corner Radius Chip Breaker

★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting / Light Cutting / Medium Cutting



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

FS, LS : G class inserts

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
	M	Stainless Steel								◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
	K	Cast Iron													◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
FP	VCMT220.5FP	VCMT110302-FP	.008		●	●	●																				●		●											
	VCMT221FP	VCMT110304-FP	.016		●	●	●																				●		●											
	VCMT331FP	VCMT160404-FP	.016		●	●	●																				●		●											
Finish Cutting	VCMT332FP	VCMT160408-FP	.031		●	●	●																				●		●											
FM	VCMT220.5FM	VCMT110302-FM	.008																						●															
	VCMT221FM	VCMT110304-FM	.016																						●															
	VCMT331FM	VCMT160404-FM	.016																						●															
Finish Cutting	VCMT332FM	VCMT160408-FM	.031																						●															
FV	VCMT1.51.50.5FV	VCMT080202-FV	.008				●																		●		●	★	●											
	VCMT1.51.51FV	VCMT080204-FV	.016				●																		●		●	★	●											
	VCMT331FV	VCMT160404-FV	.016		★																						★	●		●										
Finish Cutting	VCMT332FV	VCMT160408-FV	.031		★																						★	●		●										
AZ	VCGT331AZ	VCGT160404-AZ	.016																																●					
	VCGT332AZ	VCGT160408-AZ	.031																																●					
Finish Cutting	VCGT333AZ	VCGT160412-AZ	.047																																●					
R/L F	VCGT1.51.50.5RF	VCGT080202R-F	.008																						●		★			●					●					
	VCGT1.51.50.5LF	VCGT080202L-F	.008																						●		★			●					●					
	VCGT1.51.51RF	VCGT080204R-F	.016																						●		★			●					●					
Finish Cutting	VCGT1.51.51LF	VCGT080204L-F	.016																						●		★			●					●					

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
	M	Stainless Steel								◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
	K	Cast Iron													◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
LP	VCMT221LP	VCMT110304-LP	.016		●	●	●																				●		●											
	VCMT222LP	VCMT110308-LP	.031		●	●	●																				●		●											
	VCMT331LP	VCMT160404-LP	.016		●	●	●																				●		●											
Light Cutting	VCMT332LP	VCMT160408-LP	.031		●	●	●																				●		●											
LM	VCMT221LM	VCMT110304-LM	.016							●	●														●															
	VCMT222LM	VCMT110308-LM	.031							●	●														●															
	VCMT331LM	VCMT160404-LM	.016							●	●														●															
Light Cutting	VCMT332LM	VCMT160408-LM	.031							●	●														●															
LS	VCMT220.5LS	VCMT110302-LS	.008																●	●	● (NEW)																●			
	VCMT221LS	VCMT110304-LS	.016																●	●	● (NEW)																●			
	VCMT331LS	VCMT160404-LS	.016																●	●	● (NEW)																●			
Light Cutting	VCMT332LS	VCMT160408-LS	.031																●	●	● (NEW)																●			
LS	VCGT220.2MLS	VCGT110301M-LS	.003																●	●	● (NEW)																			
	VCGT220.5MLS	VCGT110302M-LS	.007																●	●	● (NEW)																			
	VCGT221MLS	VCGT110304M-LS	.015																●	●	● (NEW)																			
	VCGT2.520.2MLS	VCGT130301M-LS	.003																●	●	● (NEW)																			
	VCGT2.520.5MLS	VCGT130302M-LS	.007																●	●	● (NEW)																			
Light Cutting	VCGT2.521MLS	VCGT130304M-LS	.015																●	●	● (NEW)																			
LS-P	VCGT220.2MLS-P	VCGT110301M-LS-P	.003									● (NEW)																									●			
	VCGT220.5MLS-P	VCGT110302M-LS-P	.007									● (NEW)																									●			
	VCGT221MLS-P	VCGT110304M-LS-P	.015									● (NEW)																									●			
	VCGT2.520.2MLS-P	VCGT130301M-LS-P	.003									● (NEW)																									●			
	VCGT2.520.5MLS-P	VCGT130302M-LS-P	.007									● (NEW)																									●			
Light Cutting	VCGT2.521MLS-P	VCGT130304M-LS-P	.015									● (NEW)																									●			
SV	VCMT1.51.50.5SV	VCMT080202-SV	.008				●																		●			●	●											
 Light Cutting	VCMT1.51.51SV	VCMT080204-SV	.016				●																		●			●	●											
MP	VCMT331MP	VCMT160404-MP	.016		●	●	●																				●		●											
	VCMT332MP	VCMT160408-MP	.031		●	●	●																				●		●											
Medium Cutting	VCMT333MP	VCMT160412-MP	.047		●	●	●																				●		●											
MM	VCMT331MM	VCMT160404-MM	.016							●	●														●															
	VCMT332MM	VCMT160408-MM	.031							●	●														●															
Medium Cutting	VCMT333MM	VCMT160412-MM	.047							●	●														●															

● = NEW

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

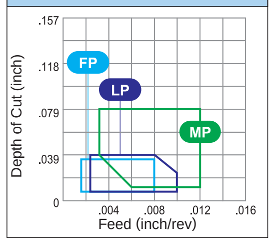
35° VC TYPE INSERTS WITH HOLE

VCMT 2 2 0.5 MS
Size Thickness Corner Radius Chip Breaker
*Please refer to page A002.

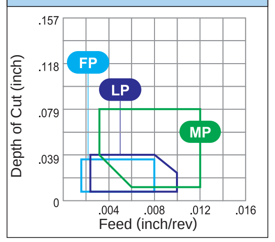
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Light Cutting··· Medium Cutting···

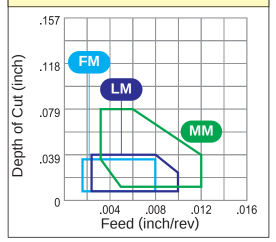
P Mild Steel



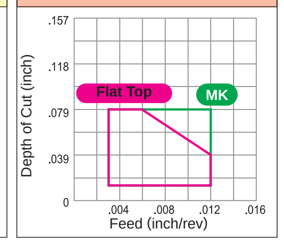
P Carbon Steel·Alloy Steel



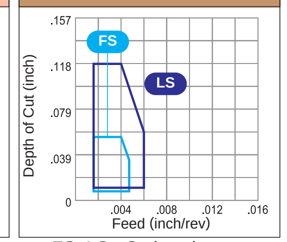
M Stainless Steel (≤200HB)



K Cast Iron (≤350MPa)



S Difficult-to-Cut material



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

FS, LS : G class inserts

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
M	Stainless Steel							◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
K	Cast Iron												◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
MS	VCMT220.5MS	VCMT110302-MS	.008																●	●	●																			
	VCMT221MS	VCMT110304-MS	.016																●	●	●																●			
Medium Cutting	VCMT222MS	VCMT110308-MS	.031																●	●	●																●			
	VCMT331MS	VCMT160404-MS	.016																●	●	●																●			
	VCMT332MS	VCMT160408-MS	.031																●	●	●																●			
MK	VCMT331MK	VCMT160404-MK	.016												●	●																								
 Medium Cutting	VCMT332MK	VCMT160408-MK	.031												●	●																								
Standard	VCMT221	VCMT110304	.016		●								●												●		★	●	●	●			★		★					
	VCMT331	VCMT160404	.016	●	●								●					★							●		★	●	●	●			●		●					
Medium Cutting	VCMT332	VCMT160408	.031	●	●								●					●							●		★	●	●	●			●							
	VCMT333	VCMT160412	.047		●								●														★	●												
MV	VCMT1.51.50.5MV	VCMT080202-MV	.008				●						●												●		★	●	●	●		★								
 Medium Cutting	VCMT1.51.51MV	VCMT080204-MV	.016				●						●			●									●		★	●	●	●		★								
Flat Top	VCMW221	VCMW110304	.016																																★					
	VCMW331	VCMW160404	.016												●	●	★	★																	★					
	VCMW332	VCMW160408	.031												●	●	★	★																	★					

● = NEW

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

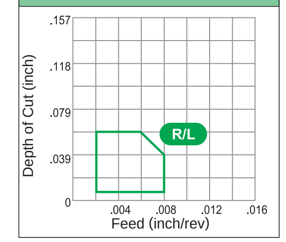
35° VD TYPE INSERTS WITH HOLE

VDGX 3 2 0.5 R
Size Thickness Corner Radius R/L
*Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting···

N Aluminum Alloy



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

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
M	Stainless Steel							◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
K	Cast Iron												◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
N	Non-Ferrous Metal																																◐				●	
S	Heat-resistant Alloy, Titanium Alloy											●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
R/L	VDGX320.5R	VDGX160302R	.008																																●					
	VDGX320.5L	VDGX160302L	.008																																●					
Medium Cutting	VDGX321R	VDGX160304R	.016																																●					
	VDGX321L	VDGX160304L	.016																																●					

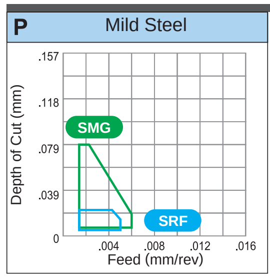
35° VP TYPE INSERTS WITH HOLE

VPET 1.5 1.5 0.2 R SRF
Size Thickness Corner Radius R/L Chip Breaker
*Please refer to page A002.

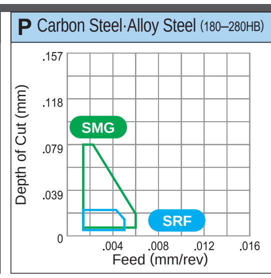
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Medium Cutting···

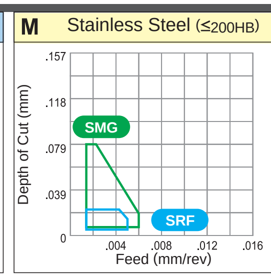
P Mild Steel



P Carbon Steel·Alloy Steel (180~280HB)



M Stainless Steel (≤200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
R/L SRF  Finish Cutting	VPET1.51.50.2RSRF	VPET080201R-SRF	.004																						●															
	VPET1.51.50.2LSRF	VPET080201L-SRF	.004																						●															
	VPET1.51.50.5RSRF	VPET080202R-SRF	.008																						●															
	VPET1.51.50.5LSRF	VPET080202L-SRF	.008																						●															
	VPET22V3RSRF	VPET1103V3R-SRF	.0012																						●															
	VPET22V3LSRF	VPET1103V3L-SRF	.0012																						●															
	VPET220.2RSRF	VPET110301R-SRF	.004																						●															
	VPET220.2LSRF	VPET110301L-SRF	.004																						●															
	VPET220.5RSRF	VPET110302R-SRF	.008																						●															
	VPET220.5LSRF	VPET110302L-SRF	.008																						●															
SMG  Medium Cutting	VPGT1.51.50.2MSMG	VPGT080201M-SMG	.004																						●															
	VPGT1.51.50.5MSMG	VPGT080202M-SMG	.008																						●															
	VPGT220.2MSMG	VPGT110301M-SMG	.004																						●															
	VPGT220.5MSMG	VPGT110302M-SMG	.008																						●															

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

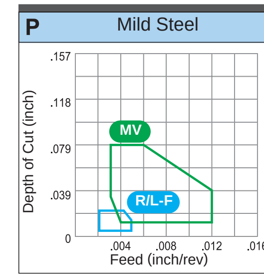
80° WB TYPE INSERTS WITH HOLE

WBGT 1.2 1 V3 L F
Size Thickness Corner Radius R/L Chip Breaker
*Please refer to page A002.

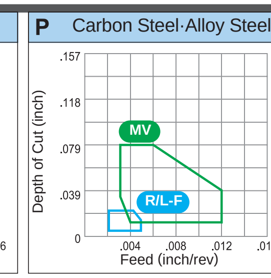
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Medium Cutting···

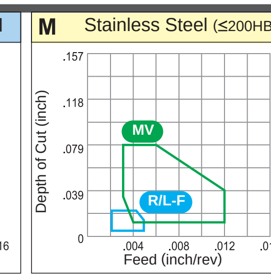
P Mild Steel



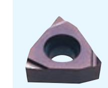
P Carbon Steel·Alloy Steel



M Stainless Steel (≤200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
Work Material	P	Steel		●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
	M	Stainless Steel								◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
	K	Cast Iron													◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
R/L F  Finish Cutting	WBGT1.21V3LF	WBGT0201V3L-F	.0012																						●		★													
	WBGT1.210.2LF	WBGT020101L-F	.004																						●		★													
	WBGT1.210.5LF	WBGT020102L-F	.008																						●		★		●											
	WBGT1.211LF	WBGT020104L-F	.016																						●		★		●											
	WBGT1.51.5V3LF	WBGTL302V3L-F	.0012																						●		★													
	WBGT1.51.50.2LF	WBGTL30201L-F	.004																						●		★													
	WBGT1.51.50.5RF	WBGTL30202R-F	.008																						●		★													
	WBGT1.51.50.5LF	WBGTL30202L-F	.008																						●		★		●											
	WBGT1.51.51RF	WBGTL30204R-F	.016																						●		★													
	WBGT1.51.51LF	WBGTL30204L-F	.016																						●		★		●											
R/L MV  Medium Cutting	WBMT1.51.50.5RMV	WBMTL30202R-MV	.008				●																		★		★	●	●			★								
	WBMT1.51.50.5LMV	WBMTL30202L-MV	.008				●																		★		★	●	●			★								
	WBMT1.51.51RMV	WBMTL30204R-MV	.016				●																		★		★	●	●			★								
	WBMT1.51.51LMV	WBMTL30204L-MV	.016				●																		★		★	●	●			★								

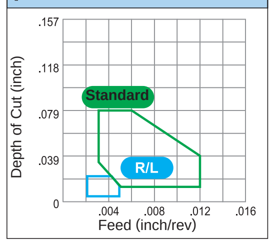
80° WC TYPE INSERTS WITH HOLE

WCGT 2 1.5 V5 FJ-P
Size / Thickness / Corner Radius / Chip Breaker
★Please refer to page A002.

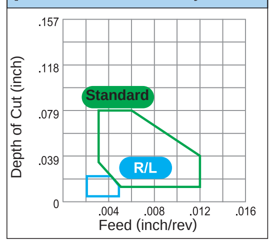
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Medium Cutting···

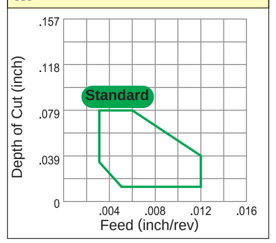
P Mild Steel



P Carbon Steel·Alloy Steel

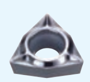
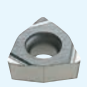


M Stainless Steel (≦200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																		◐				●	
S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤											◐		●	◐	●	◐

Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
FJ-P  Finish Cutting	**WCGT21.5V5FJ-P**	WCGT0402V5-FJ-P	.002																																				●	
	WCGT21.50.2FJ-P	WCGT040201-FJ-P	.004																																				●	
	WCGT21.50.5FJ-P	WCGT040202-FJ-P	.008																																				●	
	WCGT32.5V5FJ-P	WCGT06T3V5-FJ-P	.002																																				●	
	WCGT32.50.2FJ-P	WCGT06T301-FJ-P	.004																																				●	
	WCGT32.50.5FJ-P	WCGT06T302-FJ-P	.008																																				●	
R/L  Finish Cutting	**WCGT1.210.5R**	WCGT020102R	.008																								★													
	WCGT1.210.5L	WCGT020102L	.008																								★								●					
	WCGT1.211R	WCGT020104R	.016																								★													
	WCGT1.211L	WCGT020104L	.016																								★								●					
	WCGT1.51.50.5L	WCGTL30202L	.008																								★													
	WCGT1.51.51L	WCGTL30204L	.016																								★													
MJ  Light Cutting	**WCGT21.51MJ**	WCGT040204-MJ	.016																					●																					
	WCGT32.51MJ	WCGT06T304-MJ	.016																					●																					
	WCGT32.52MJ	WCGT06T308-MJ	.031																					●																					
MJ-P  Light Cutting	**WCGT21.51MJ-P**	WCGT040204-MJ-P	.016																																				●	
	WCGT32.51MJ-P	WCGT06T304-MJ-P	.016																																				●	
	WCGT32.52MJ-P	WCGT06T308-MJ-P	.031																																				●	
Standard  Medium Cutting	**WCMT1.210.5**	WCMT020102	.008		●								●														★	●	●	●			●							●
	WCMT1.211	WCMT020104	.016		●								●														★	●	●	●			●							●
	WCMT1.51.50.5	WCMTL30202	.008		●								●														★	●	●	●			●							●
	WCMT1.51.51	WCMTL30204	.016		●								●														★	●	●	●			●							●
	WCMT21.50.5	WCMT040202	.008		●								●														★	●	●	●			●							
	WCMT21.51	WCMT040204	.016		●								●														★	●	●	●			●							●
	WCMT32.51	WCMT06T304	.016		●								●														★	●	●	●			●							
	WCMT32.52	WCMT06T308	.031		●								●														★	●	●	●			●							

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case>

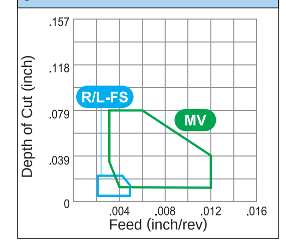
80° WP TYPE INSERTS WITH HOLE

WPGT 2 1.5 1 R FS
Size / Thickness / Corner Radius / R/L / Chip Breaker
★Please refer to page A002.

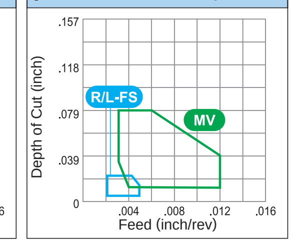
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting··· Medium Cutting···

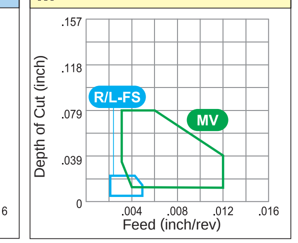
P Mild Steel



P Carbon Steel·Alloy Steel



M Stainless Steel (≦200HB)



Cutting Conditions : ● Stable Cutting ◐ General Cutting ✤ Unstable Cutting

Work Material		UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
P	Steel	●	◐	◐	✤	✤	●																✤	✤	●	◐	◐	●	●	◐	✤							
M	Stainless Steel							◐	✤	◐	✤											◐	✤	✤	●			●	●		✤							
K	Cast Iron												◐	✤	●	◐						◐	✤		●			●	●		✤	●	◐					
N	Non-Ferrous Metal																																		◐				●	
S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✤											◐		●	◐	●	◐

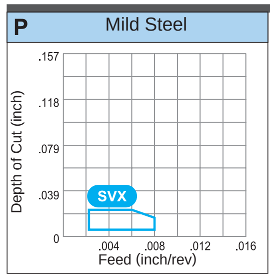
Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
				Coated																							Cermet		Coated Cermet				Carbide							
R/L  Finish Cutting	**WPGT21.51RFS**	WPGT040204R-FS	.016																						★		★													
	WPGT21.51LFS	WPGT040204L-FS	.016																						★		★													
	WPGT321RFS	WPGT060304R-FS	.016																						★		★													
	WPGT321LFS	WPGT060304L-FS	.016																						★		★													
MV  Medium Cutting	**WPMT21.50.5MV**	WPMT040202-MV	.008				●						●												★		★	●	●											
	WPMT21.51MV	WPMT040204-MV	.016				●						●			●									★		★	●	●			★								
	WPMT321MV	WPMT060304-MV	.016				●						●			●									●		★	●	●											
	WPMT322MV	WPMT060308-MV	.031				●						●			●									●		★	●	●			★								

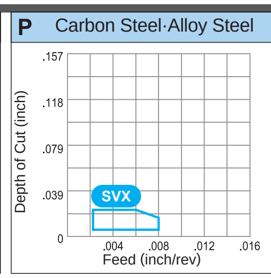
25° XC TYPE INSERTS WITH HOLE

XCMT 2 2 0.5 SVX
Size Thickness Corner Radius Chip Breaker
★Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting...





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

Work Material	P	Steel		●	◐	◐	✣	✣	●																✣	✣	●	◐	◐	●	●	◐	✣							
	M	Stainless Steel								◐	✣	◐	✣											◐	✣	✣	●			●	●		✣							
	K	Cast Iron													◐	✣	●	◐						◐	✣		●			●	●		✣	●	◐					
	N	Non-Ferrous Metal																																	◐				●	
	S	Heat-resistant Alloy, Titanium Alloy												●					●	◐	◐	◐	●	◐	✣										◐		●	◐	●	◐
				Coated																							Cermet		Coated Cermet				Carbide							
Shape	Order Number	(ISO) Number	RE (inch)	UE6105	UE6110	MC6015	MC6025	UH6400	MS6015	MC7025	MP7035	MS7025	US735	US905	MC5005	MC5015	UC5105	UC5115	MP9005	MP9015	MP9025	MS9025	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	MP3025	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	TF15	MT9005	MT9015	RT9005	RT9010
SVX	XCMT220.5SVX	XCMT150302-SVX	.008																						●															
	XCMT221SVX	XCMT150304-SVX	.016																						●															
Finish Cutting	XCMT222SVX	XCMT150308-SVX	.031																						●															

● : USA Stock
<10 inserts in one case>

Memo

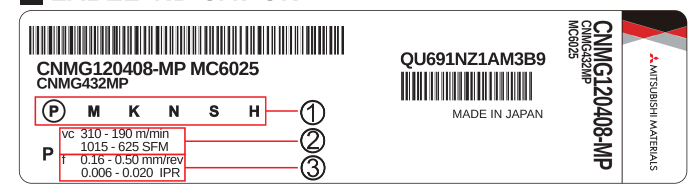
Memo

TOOL NAVI

OUTLINE

TOOL NAVI supports our customers with information and supplies suitable cutting conditions for each work material by selecting optimal indexable insert together with the optional tool.

LABEL INDICATION



*1. The above is an example. There may be inserts recommended for multiple work materials.
*2. Please contact us for recommended cutting conditions using coefficient values other than the above.

①Work materials

- **P** : Steel (Material reference : Carbon steel, alloy steel 180HB)
- **M** : Stainless steel (Material reference : Austenitic stainless steel 180HB)
- **K** : Cast iron (Material reference : Gray cast iron, ductile cast iron 180HB)
- **N** : Aluminum alloy, Non-ferrous metal
- **S** : Material reference : Titanium alloy 320HB, Ni, Co-based alloy 400HB
- **H** : Hardened steel 60HRC

②Cutting speed standards

Work Material	Tool Life		Work Material	Hardness
	Life	Performance		
P	90min.	15min.	Carbon steel, alloy steel	180HB
M	90min.	15min.	Stainless steel	180HB
K	90min.	15min.	Cast iron	180HB
S	25min.	5min.	Titanium alloy	320HB
			Ni, Co-based alloy	400HB
H	80min.	10min.	Hardened steel	60HRC

*3. N : Life based on each grade. For stable conditions choose the performance cutting speed and for unstable choose the tool life feed rate.
*4. The tool life is based on the following (VB wear). Some materials include elements other than this.
PMKS • • • VB=0.3 mm
H • • • VB=0.1 mm

③Feed rate

Minimum and maximum feed rate settings are based on the chip control range of the chip breaker.

TOOL LIFE

Cutting speed has a large affect on tool life. TOOL NAVI is based on Taylor's equation (relationship vc x Tn=C between tool grade, cutting conditions, and tool life). Therefore, performance speed and tool life is found for each work material. When the customer requires different tool life, obtain coefficient values of the grade you use from the charts below. Multiply the coefficient values by the cutting speed to calculate the new cutting speed.

● P Grade (Steel) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
UE6105	1.00	0.79	0.69	0.63	0.55
MC6015	1.00	0.82	0.72	0.67	0.59
MC6025	1.00	0.83	0.75	0.69	0.62
MC6035	1.00	0.88	0.82	0.78	0.73
MP3025	1.00	0.85	0.77	0.72	0.65
NX2525	1.00	0.87	0.80	0.76	0.70

● M Grade (Stainless Steel) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
MC7015	1.00	0.83	0.75	0.70	0.63
MC7025	1.00	0.90	0.84	0.80	0.75
MP7035	1.00	0.84	0.76	0.71	0.62
US735	1.00	0.78	0.68	0.61	0.53

● K Grade (Cast Iron) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
MC5005	1.00	0.83	0.75	0.70	0.63
MC5015	1.00	0.83	0.75	0.69	0.62

(ex.) Medium cutting of steel
The 1st recommendation : MC6025
Indexable inserts : CNMG432MA
Recommended cutting speed : vc = 1015 SFM
(Tool life : 15min.)

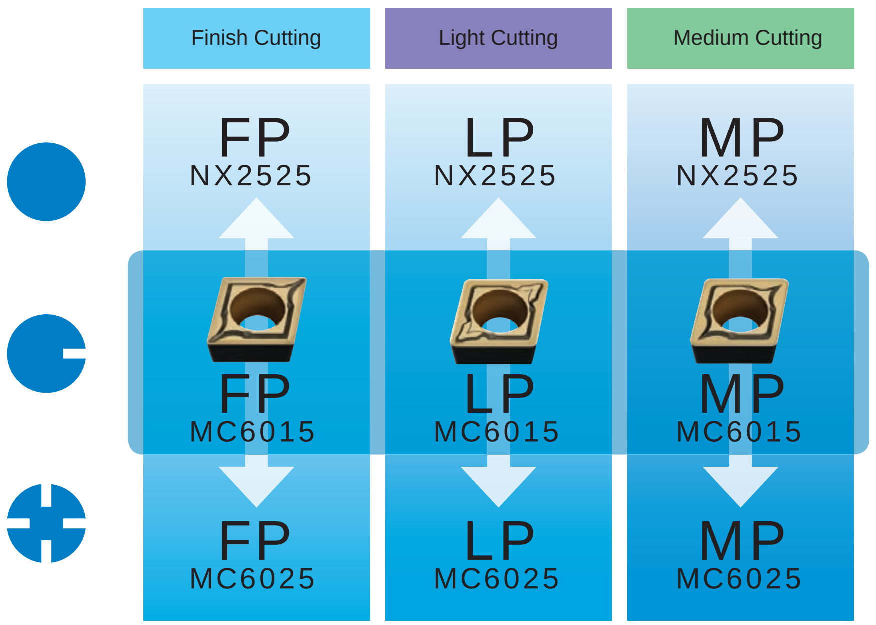
Tool life required by the customer : 30min.
1015×0.83≒840 SFM

HARDNESS OF WORKPIECE

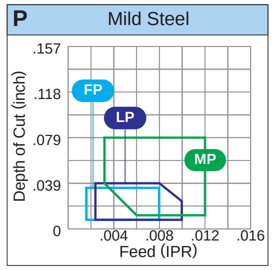
Hardness of the work material also affects tool life. Mitsubishi's TOOL NAVI suggests cutting speed variations when hardness of the work material differs. Obtain the suitable coefficient value for each work material from the chart below. Multiply the coefficient value by the recommended cutting speed of the grade you use to calculate the new cutting speed.

Work Material	Soft ← (Hardness of work material) → Hard											
	120HB	140HB	160HB	180HB	200HB	220HB	240HB	260HB	280HB	300HB	320HB	340HB
P	1.34	1.19	1.08	1.00	0.92	0.85	0.80	0.75	0.71	0.68	0.64	0.61
M	1.41	1.23	1.10	1.00	0.91	0.85	0.78	0.72	0.68	0.64	0.61	0.58
K	1.27	1.19	1.09	1.00	0.97	0.91	0.88	0.85	0.81	0.78	0.75	0.72

OPTIMUM GRADES AND CHIP BREAKERS FOR EXTERNAL TURNING



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting

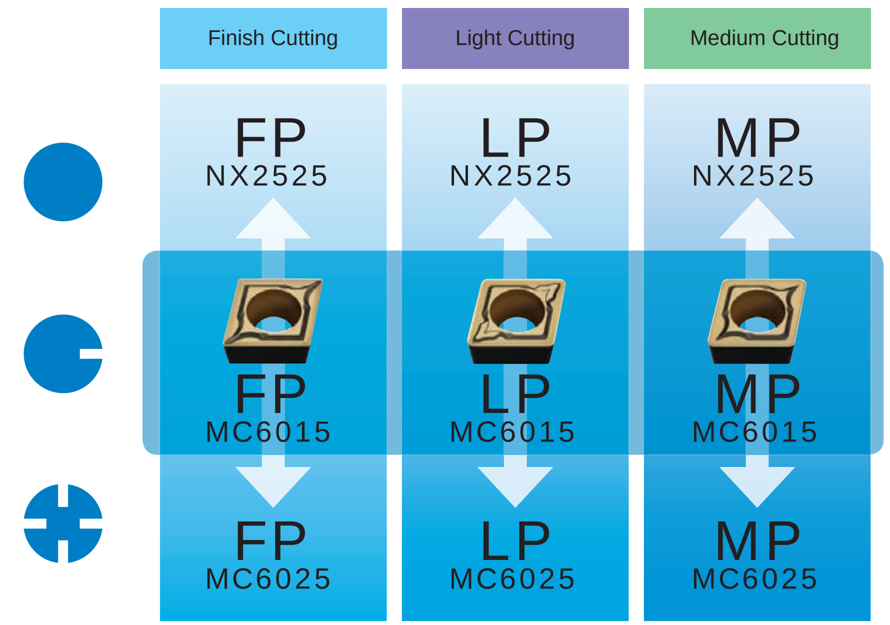


P Mild Steel (EX. : ASTM A283, AISI 1010)

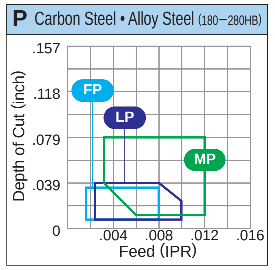
7° POSITIVE INSERTS WITH HOLE

vc : Cutting speed
f : Feed
ap : Depth of cut.

Cutting Area		Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	FP	NX2525	740—1050	.002—.008	.008—.036
	L	LP	NX2525	740—1050	.003—.010	.008—.040
	M	MP	NX2525	605—885	.004—.012	.012—.079
General Cutting	F	FP	MC6015	920—1395	.002—.008	.008—.036
	L	LP	MC6015	920—1395	.003—.010	.008—.040
	M	MP	MC6015	690—1165	.004—.012	.012—.079
Unstable Cutting	F	FP	MC6025	920—1330	.002—.008	.008—.036
	L	LP	MC6025	920—1330	.003—.010	.008—.040
	M	MP	MC6025	690—1115	.004—.012	.012—.079



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting



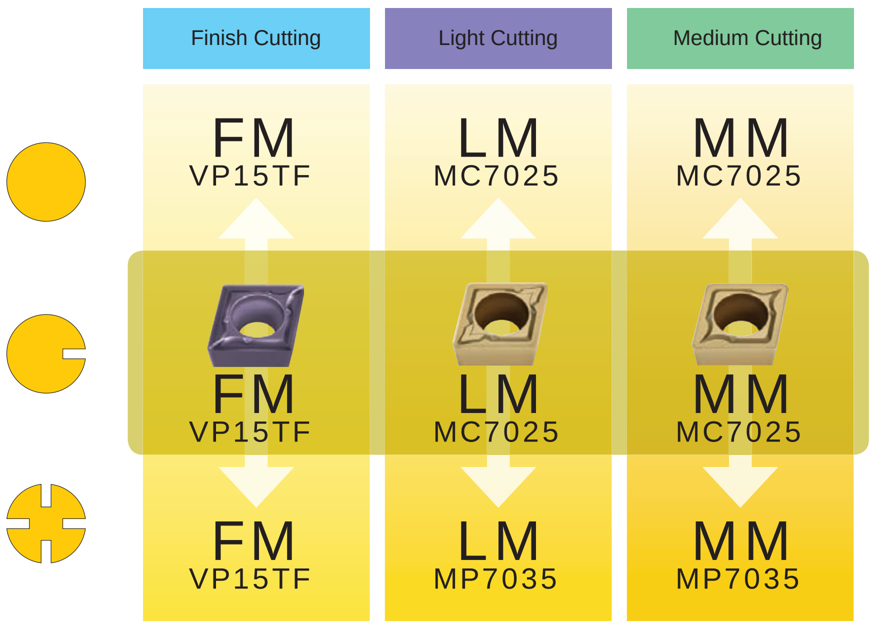
P Carbon Steel • Alloy Steel (EX. : AISI 1045, AISI 4140)

7° POSITIVE INSERTS WITH HOLE

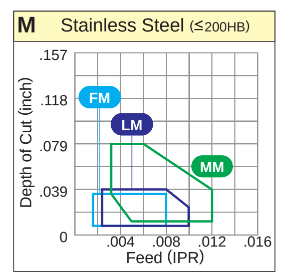
vc : Cutting speed
f : Feed
ap : Depth of cut.

Cutting Area		Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	FP	NX2525	540—785	.002—.008	.008—.036
	L	LP	NX2525	540—785	.003—.010	.008—.040
	M	MP	NX2525	460—655	.004—.012	.012—.079
General Cutting	F	FP	MC6015	605—1030	.002—.008	.008—.036
	L	LP	MC6015	605—1030	.003—.010	.008—.040
	M	MP	MC6015	510—850	.004—.012	.012—.079
Unstable Cutting	F	FP	MC6025	605—985	.002—.008	.008—.036
	L	LP	MC6025	605—985	.003—.010	.008—.040
	M	MP	MC6025	510—820	.004—.012	.012—.079

OPTIMUM GRADES AND CHIP BREAKERS FOR EXTERNAL TURNING



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting

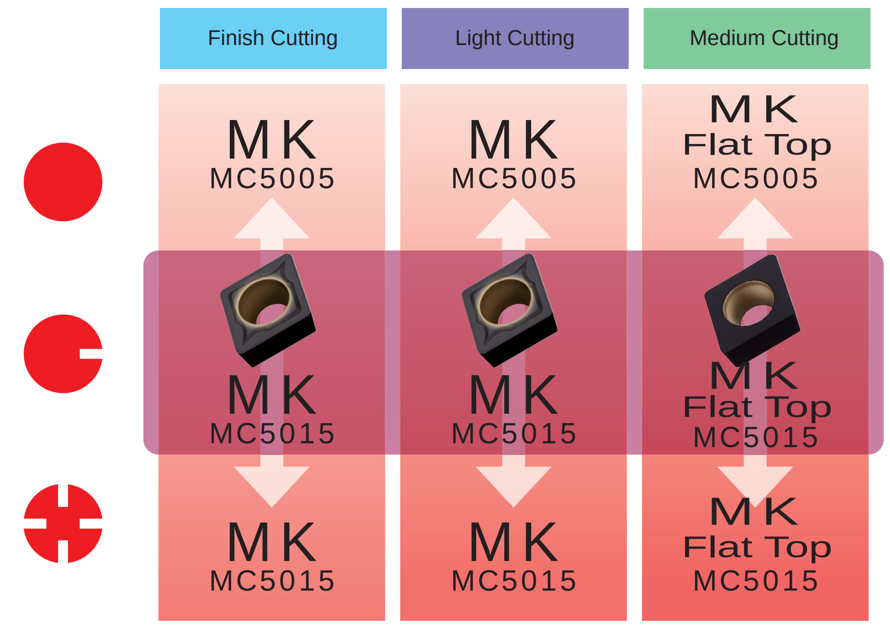


M Stainless Steel (EX. : AISI 304, AISI 306)

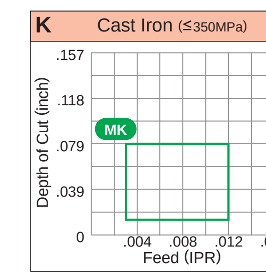
7° POSITIVE INSERTS WITH HOLE

vc : Cutting speed
f : Feed
ap : Depth of cut.

Cutting Area		Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	FM	VP15TF	245–410	.002–.008	.008–.036
	L	LM	MC7025	460–620	.003–.010	.008–.040
	M	MM	MC7025	395–525	.004–.012	.012–.079
General Cutting	F	FM	VP15TF	245–410	.002–.008	.008–.036
	L	LM	MC7025	460–620	.003–.010	.008–.040
	M	MM	MC7025	395–525	.004–.012	.012–.079
Unstable Cutting	F	FM	VP15TF	245–410	.002–.008	.008–.036
	L	LM	MP7035	280–440	.003–.010	.008–.040
	M	MM	MP7035	230–375	.004–.012	.012–.079



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting



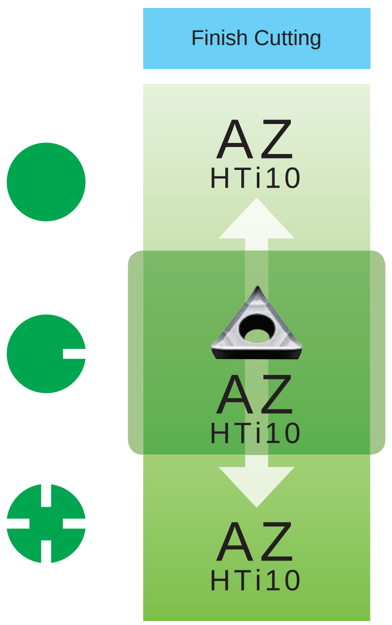
K Cast Iron • Ductile Cast Iron (EX. : AISI No 45 B)

7° POSITIVE INSERTS WITH HOLE

vc : Cutting speed
f : Feed
ap : Depth of cut.

Cutting Area		Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	MK	MC5005	540–870	.004–.012	.012–.079
	L	MK	MC5005	540–870	.004–.012	.012–.079
	M	MK, Flat Top	MC5005	540–870	.004–.012	.012–.079
General Cutting	F	MK	MC5015	490–745	.004–.012	.012–.079
	L	MK	MC5015	490–745	.004–.012	.012–.079
	M	MK, Flat Top	MC5015	490–745	.004–.012	.012–.079
Unstable Cutting	F	MK	MC5015	490–745	.004–.012	.012–.079
	L	MK	MC5015	490–745	.004–.012	.012–.079
	M	MK, Flat Top	MC5015	490–745	.004–.012	.012–.079

OPTIMUM GRADES AND CHIP BREAKERS FOR EXTERNAL TURNING



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting

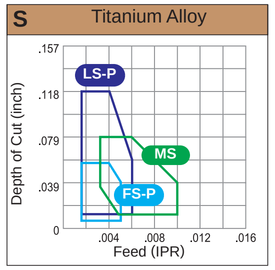
N Aluminum Alloy (EX. : A6061, A7075)

7° POSITIVE INSERTS WITH HOLE

vc : Cutting speed
f : Feed
ap : Depth of cut.

	Cutting Area	Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	AZ	HTi10	985—2295	.004—.016	.008—.119
General Cutting	F	AZ	HTi10	985—2295	.004—.016	.008—.119
Unstable Cutting	F	AZ	HTi10	985—2295	.004—.016	.008—.119

- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting



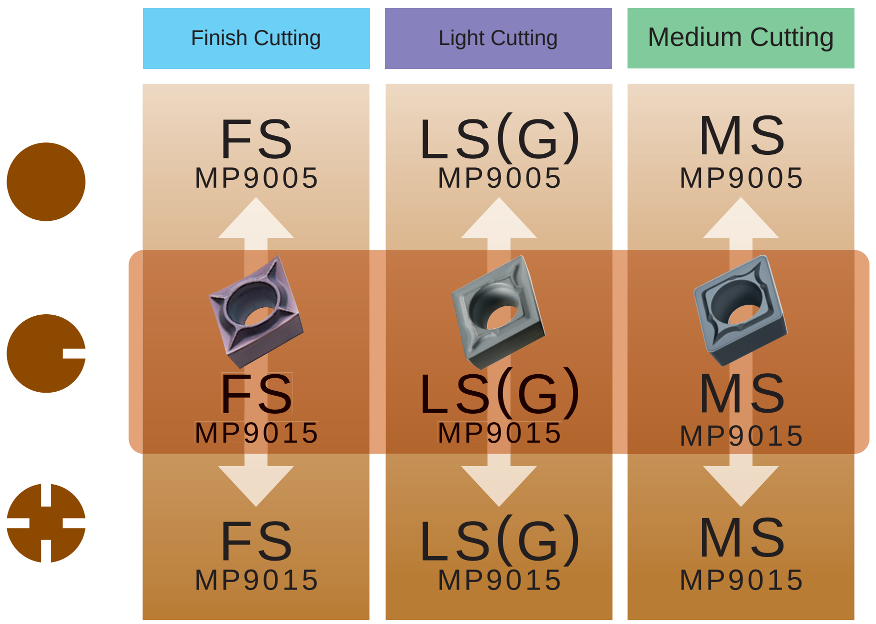
S Titanium Alloy (EX. : Ti-6Al-4V)

7° POSITIVE INSERTS WITH HOLE

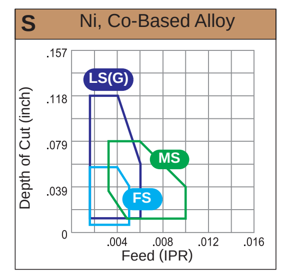
vc : Cutting speed
f : Feed
ap : Depth of cut.

	Cutting Area	Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	FS-P	MT9005	130—260	.002—.005	.008—.056
	L	LS-P	MT9005	130—260	.002—.006	.012—.119
	M	MS	MT9005	115—210	.003—.010	.012—.079
General Cutting	F	FS-P	MT9005	130—260	.002—.005	.008—.056
	L	LS-P	MT9005	130—260	.002—.006	.012—.119
	M	MS	MT9005	115—210	.003—.010	.012—.079
Unstable Cutting	F	FS-P	MT9005	130—260	.002—.005	.008—.056
	L	LS-P	MT9005	130—260	.002—.006	.012—.119
	M	MS	MT9005	115—210	.003—.010	.012—.079

OPTIMUM GRADES AND CHIP BREAKERS FOR EXTERNAL TURNING



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- L Light Cutting
- M Medium Cutting



S Ni, Co-Based Alloy (EX. : Inconel718)

7° POSITIVE INSERTS WITH HOLE

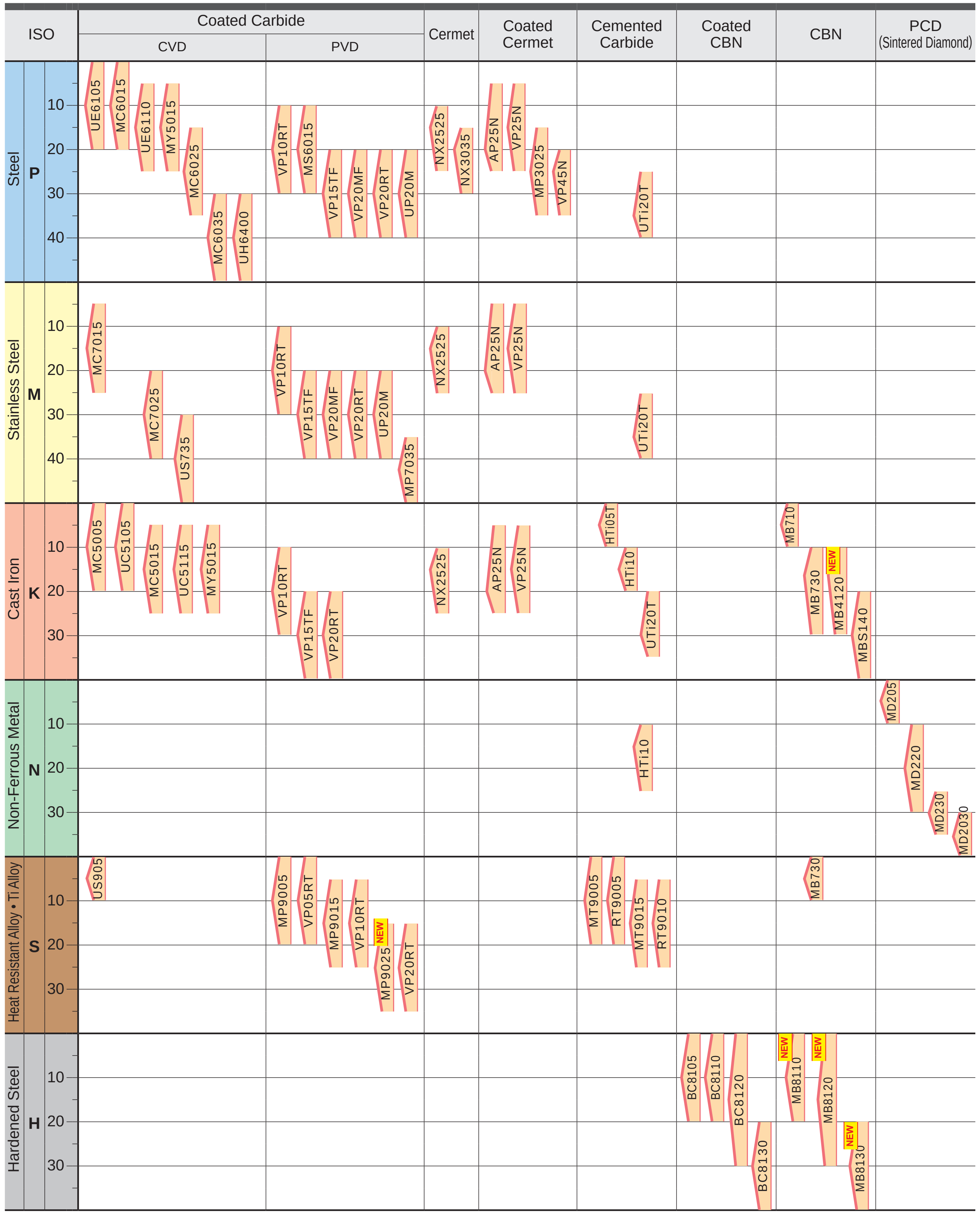
vc : Cutting speed
f : Feed
ap : Depth of cut.

	Cutting Area	Chip Breaker	Grade	1st Recommendation vc (SFM)	f (IPR)	ap (inch)
Stable Cutting	F	FS	MP9005	80−310	.002−.005	.008−.056
	L	LS(G)	MP9005	80−310	.002−.006	.012−.119
	M	MS	MP9005	65−260	.003−.010	.012−.079
General Cutting	F	FS	MP9015	65−245	.002−.005	.008−.056
	L	LS(G)	MP9015	65−245	.002−.006	.012−.119
	M	MS	MP9015	65−195	.003−.010	.012−.079
Unstable Cutting	F	FS	MP9015	65−245	.002−.005	.008−.056
	L	LS(G)	MP9015	65−245	.002−.006	.012−.119
	M	MS	MP9015	65−195	.003−.010	.012−.079

Memo

GRADES FOR TURNING

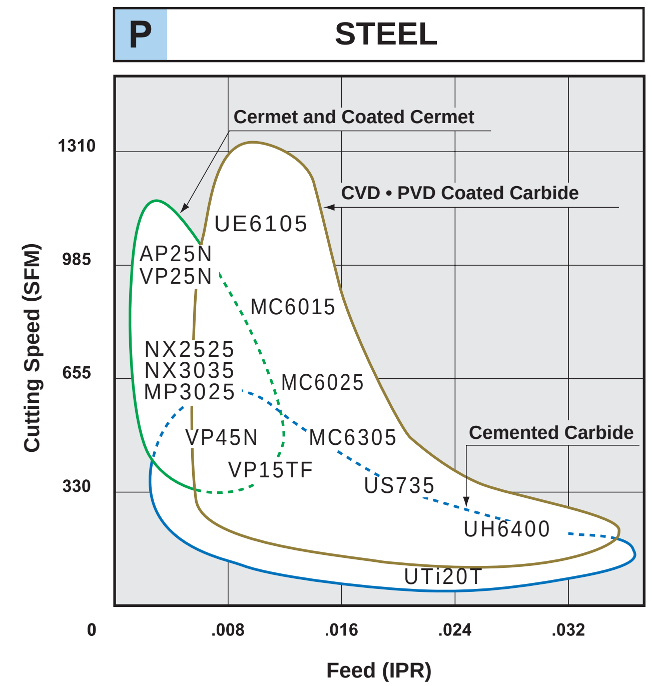
●INDEXABLE INSERT GRADES FOR TURNING

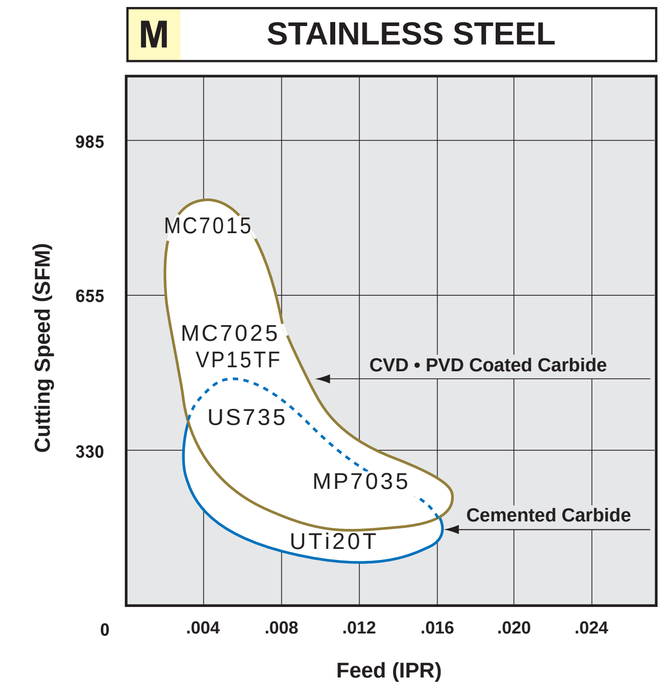


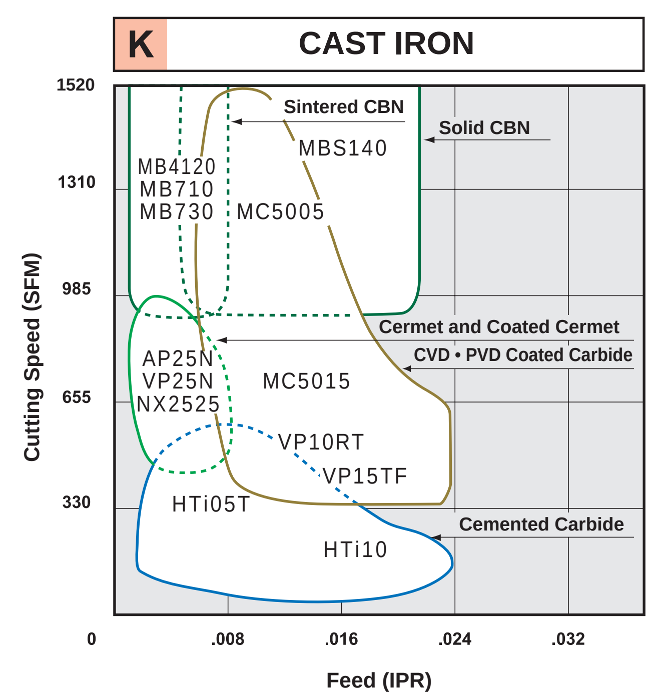
A

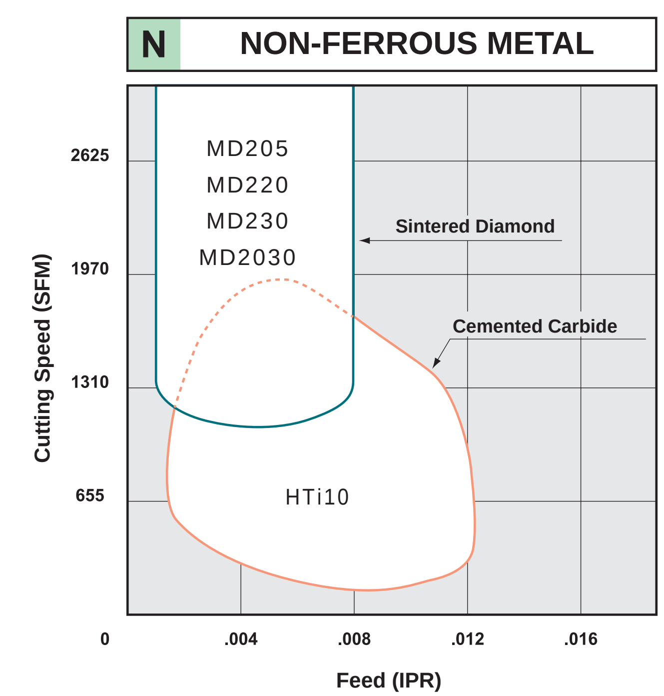
TURNING INSERTS

TURNING APPLICATION RANGE









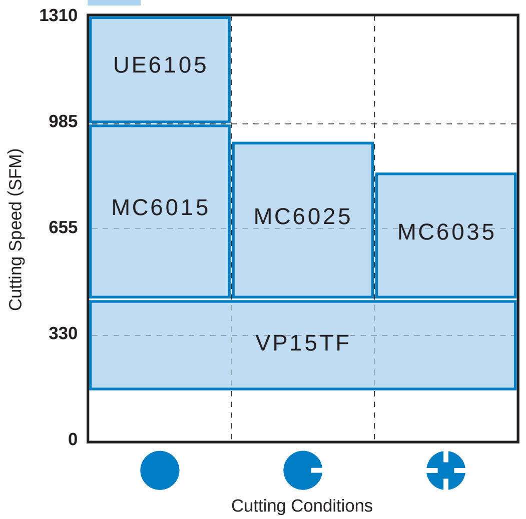
A

TURNING INSERTS

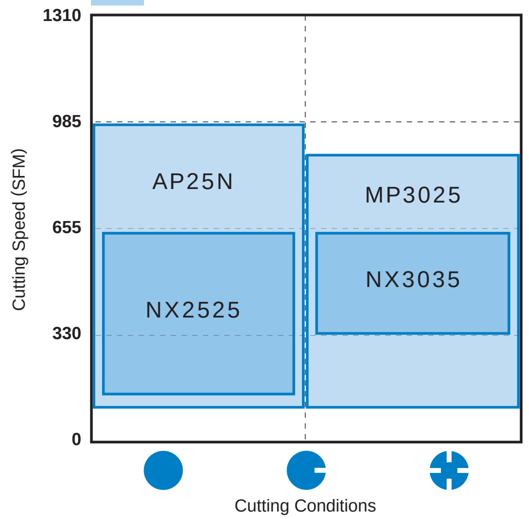
TURNING APPLICATION RANGE

●Recommendation of the insert grade based on cutting speed and conditions for each work material.

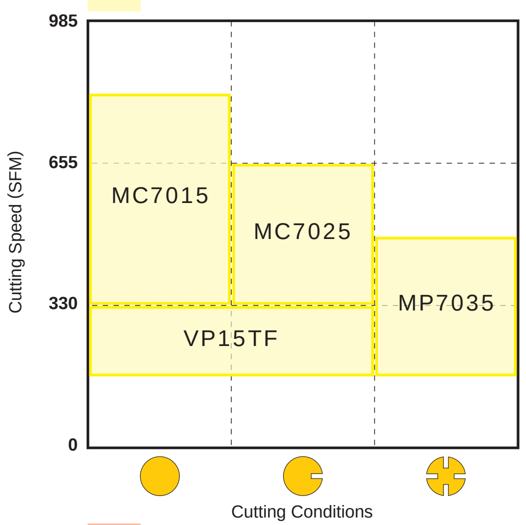
P STEEL (Medium-Rough Cutting)



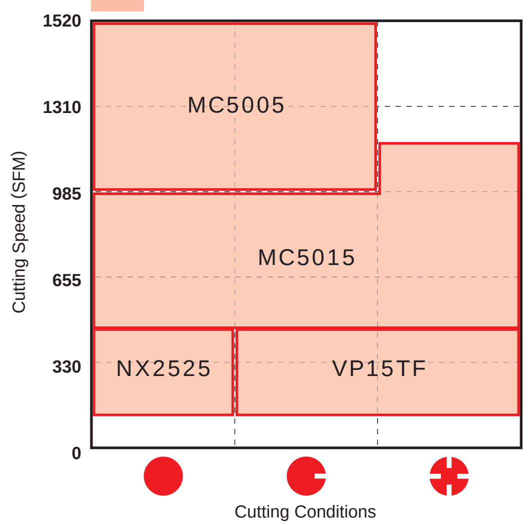
P STEEL (Finish Cutting)



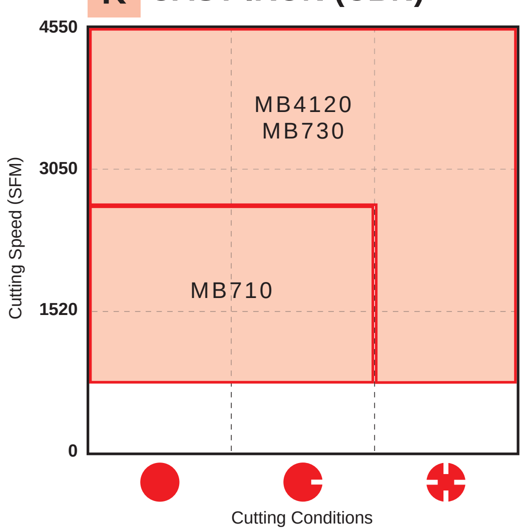
M STAINLESS STEEL



K CAST IRON



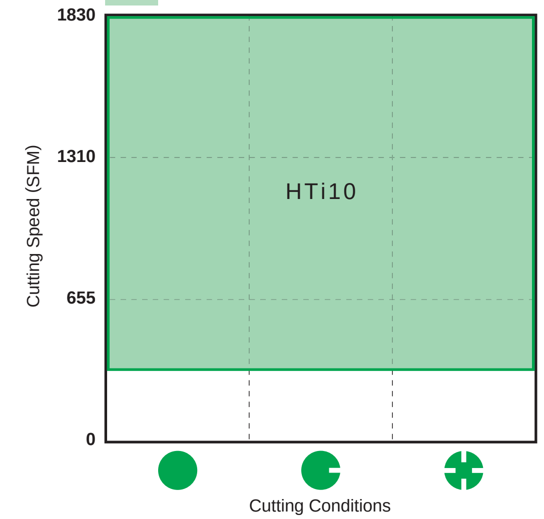
K CAST IRON (CBN)



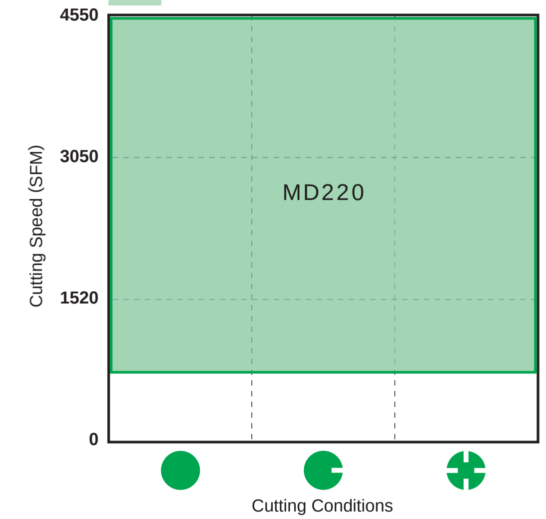
■CUTTING CONDITIONS

Stable Cutting	Continuous Cutting Constant Depth of Cut Pre-Machined Securely Clamped Component	
General Cutting		
Unstable Cutting	Heavy Interrupted Cutting Irregular Depth of Cut Low Clamping Rigidity	

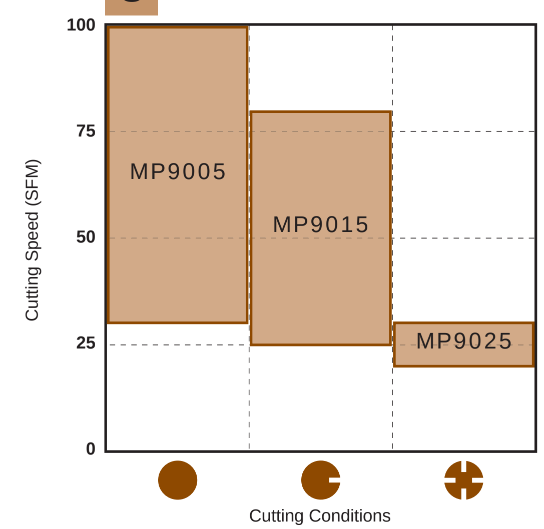
N NON-FERROUS METAL



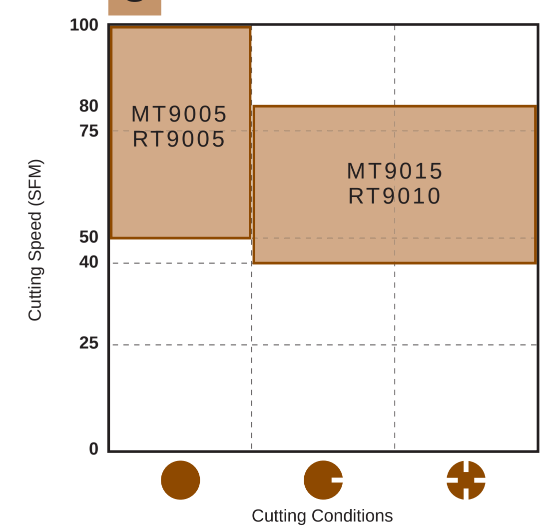
N NON-FERROUS METAL (PCD)



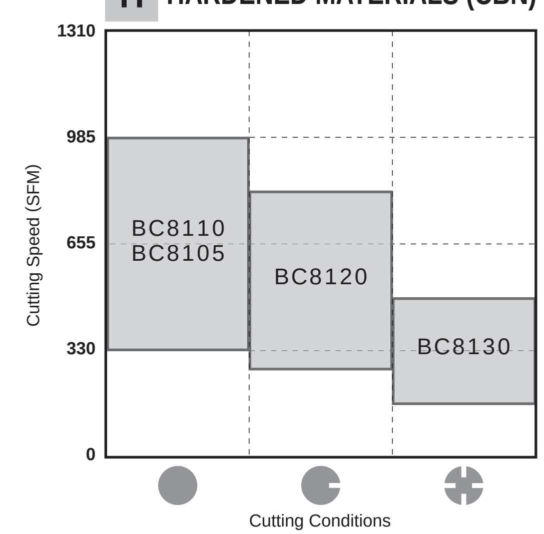
S HEAT RESISTANT ALLOY



S TITANIUM ALLOY



H HARDENED MATERIALS (CBN)



COATED CARBIDE (CVD)

- Special tough fibrous structure improves wear and fracture resistance.
- It covers a wide application range and thus reduces the number of tools required.

SELECTION STANDARD

TURNING

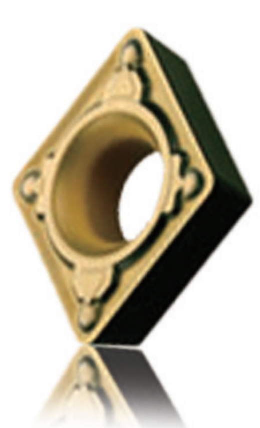
Work Material	Cutting Mode	Recommended Grade	Recommended Cutting Speed (SFM)	ISO	Application Range
P Steel	Continuous Cutting	UE6105	985 (655 — 1310)	P 10 20 30 40	UE6105
		MC6015	820 (490 — 1310)		MC6015
	Interrupted Cutting	MC6025	655 (330 — 920)		MC6025
		MC6035	490 (260 — 665)		MC6035
M Stainless Steel	Continuous Cutting	MC7015	655 (525 — 820)	M 10 20 30 40	MC7015
	Continuous and Interrupted Cutting	MC7025	490 (390 — 655)		MC7025
		US735	330 (260 — 390)		US735
K Cast Iron Ductile Cast Iron	Continuous Cutting	MC5005	985 (655 — 1310)	K 10 20 30	MC5005
	Interrupted Cutting	MC5015	820 (490 — 985)		MC5015
S Heat Resistant Alloy	Continuous and Interrupted Cutting	US905	260 (165 — 330)	S 5	US905

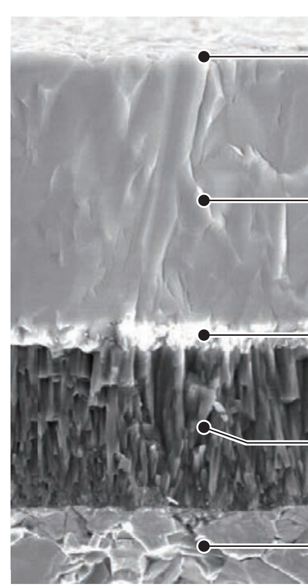
High reliability for a wide range of steel machining.

MC6015

Nano-Texture Technology
The optimized crystal growth in linear direction of Nano-texture coating technology maintains fine surface and provides outstanding wear and chipping under high speed cutting conditions.

TOUGH-Grip Technology
The interface between the layers is controlled at the nano level, allowing the TOUGH-grip layer extremely high levels of adhesion to prevent delamination.





Smooth coating surface
Prevents abnormal damage, welding and chipping

Ultra thick layer Nano-texture Al_2O_3
Delivers outstanding wear resistance even at high temperature

TOUGH-Grip
Prevents delamination of a coating

Nano-texture TiCN
Provides superior wear resistance and chipping resistance

Special carbide substrate
Prevents crack development
Stable tool life

GRADE CHARACTERISTICS

Work Material	Grade	Substrate Hardness (HRA)	Coating Layer Composition	Coating Layer Thickness
P Steel	UE6105	90.8	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
	MC6015	90.2	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
	UE6110	90.3	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
	MC6025	90.2	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
	MC6035	89.5	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
	UH6400	89.5	Accumulated $TiCN-Al_2O_3-Ti$ Compound	Thick
M Stainless Steel	MC7015	90.7	$TiCN-Al_2O_3-TiN$	Thin
	MC7025	89.4	$TiCN-Al_2O_3-TiN$	Thin
	US735	89.0	Ti Compound	Thin
K Cast Iron Ductile Cast Iron	MC5005	91.0	$TiCN-Al_2O_3$	Thick
	UC5105	92.2	$TiCN-Al_2O_3$	Thick
	MC5015	91.0	$TiCN-Al_2O_3$	Thick
	UC5115	91.0	$TiCN-Al_2O_3$	Thick
S Heat Resistant Alloy	US905	92.2	$TiCN-Al_2O_3-TiN$	Thin

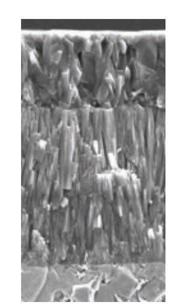
Note 1) Hardness shows representative value of the substrate.

For interrupted cutting, medium to low surface speeds

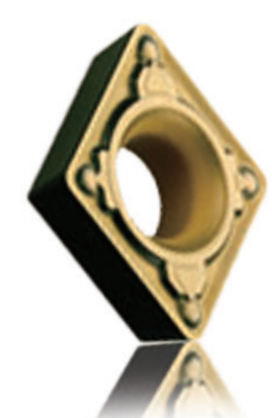
MC6035

Prevents severe damage for increased stability
The smooth coating surface provides excellent welding resistance.
With the thickened TiCN, MC6035 also achieves superior wear resistance for increased stability.

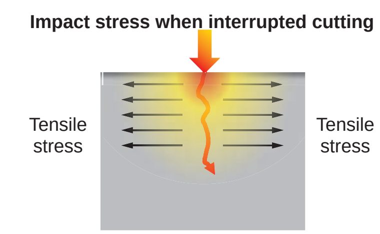
MC6035



MC6025

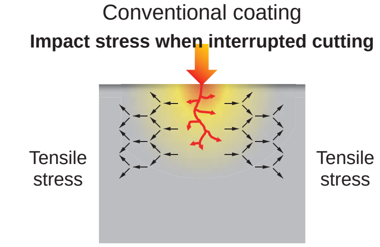


Reducing the effect of severe fracturing
By reducing the tensile stress in the coating layer during interrupted cutting, crack development caused by impact stress is prevented.



Conventional coating

Conventional products tend to result in fracturing because impact stress is transmitted deep into the coating layer during interrupted cutting.



MC6035

MC6035 has succeeded in alleviating tensile stress in the coating layer therefore, cracks that can develop by impact stress can be prevented when interrupted cutting.

A
TURNING INSERTS

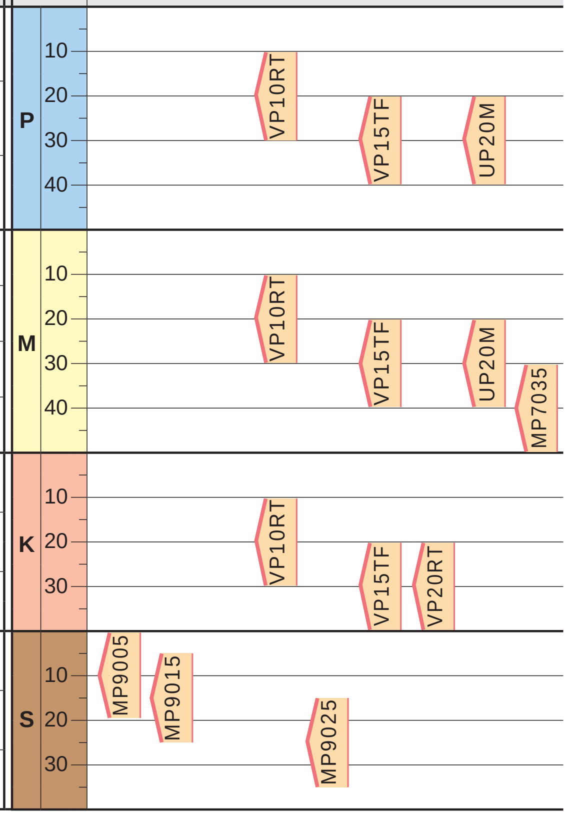
COATED CARBIDE (PVD)

- PVD coating prolongs tool life under the same cutting conditions compared to uncoated carbide.
- Coating of tools with sharp edges is possible without softening or changing the edge quality of the substrate.

SELECTION STANDARD

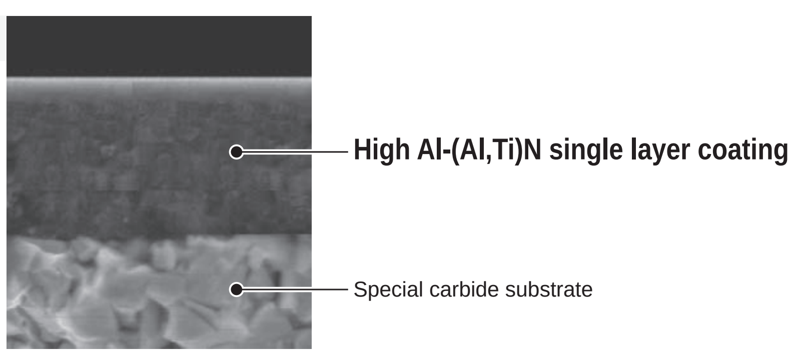
TURNING

	Work Material	Recommended Grade	Recommended Cutting Speed (SFM)	ISO
P	Steel	VP10RT	390 (330 – 490)	P
		VP15TF	390 (330 – 490)	
		UP20M	390 (330 – 490)	
M	Stainless Steel	VP10RT	390 (330 – 490)	M
		VP15TF	390 (330 – 490)	
		UP20M	390 (330 – 490)	
		MP7035	390 (330 – 490)	
K	Cast Iron	VP10RT	390 (330 – 490)	K
		VP15TF	390 (330 – 490)	
		VP20RT	390 (330 – 490)	
S	Heat Resistant Alloy	MP9005	195 (100 – 300)	S
		MP9015	160 (80 – 260)	
		MP9025	80 (65 – 100)	



ISO Turning Inserts for Difficult to Cut Materials

MP9005/MP9015/MP9025



ISO Grade	Grade	Concept	Application
S01	**MP9005**	Top-quality grade focusing on wear resistance	Heat Resistant Alloy Finish-Medium Cutting
S10	**MP9015**	First recommendation for general applications	Heat Resistant Alloy Medium-Rough Cutting
S30	**MP9025**	Prevents severe damage for increased stability	Heat Resistant Alloy Interrupted • Light-Rough Cutting

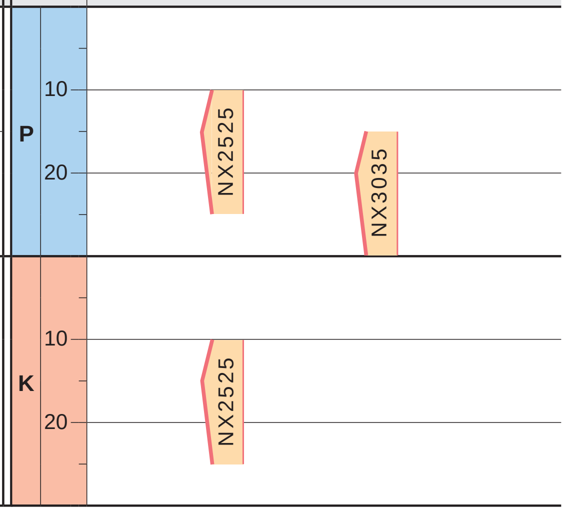
CERMET

- The optimized alloy structure and special alloy binder improves both wear and fracture resistance.
- It covers a wide application range and reduces the number of tools required.
- NX3035 for wet cutting.
- NX2525 for dry cutting.

SELECTION STANDARD

TURNING

	Work Material	Cutting Mode	Recommended Grade	Recommended Cutting Speed (SFM)	ISO
P	Steel	Continuous Cutting	NX2525	720 (590 – 820)	P
		Interrupted Cutting	NX3035	655 (620 – 850)	
K	Cast Iron Ductile Cast Iron	Finishing	NX2525	590 (490 – 690)	K



GRADE CHARACTERISTICS

Grade	Hardness (HRA)
NX2525	92.2
NX3035	91.5

Note 1) Hardness shows representative value of the substrate.

A
TURNING INSERTS

COATED CERMET

● Coated cermet (PVD coating) has superior wear and fracture resistance, and therefore provides a stable cutting performance.

■SELECTION STANDARD

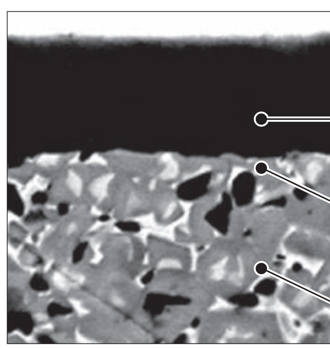
●TURNING

Work Material		Cutting Mode	Recommended Grade	Recommended Cutting Speed (SFM)	ISO	Application Range
P	Steel	Continuous Cutting	**VP25N** **AP25N**	785 (620 — 950)	P 10 20 30	VP25N, AP25N
		Interrupted Cutting	**MP3025**	755 (590 — 920)		MP3025
K	Cast Iron Ductile Cast Iron	Finishing	**VP25N** **AP25N**	525 (360 — 755)	K 10 20	VP25N, AP25N

Effective for production of small parts.

MP3025

MP3025 provides improved adhesion for coating layer due to the newly-developed special substrate. Uniform flank wear allows prolonged machining that maintains excellent surface finish.



CEMENTED CARBIDE

● UTi grades are available for steel and cast iron. HTi grades are available for non-ferrous and non-metal materials and are also suitable for cast iron.

A
TURNING INSERTS

■SELECTION STANDARD

●TURNING

Work Material		Recommended Grade	Recommended Cutting Speed (SFM)	ISO	Application Range
P	Steel	**UTi20T**	330 (195 — 425)	P 10 20 30	UTi20T
M	Stainless Steel	**UTi20T**	330 (195 — 425)	M 10 20 30	UTi20T
K	Cast Iron	**HTi05T**	395 (260 — 490)	K 10 20 30	HTi05T, HTi10, UTi20T
		HTi10	330 (165 — 490)		
		UTi20T	330 (165 — 490)		
N	Non-Ferrous Metal	**HTi10**	985 (330 — 1970)	N 10 20 30	HTi10
S	Heat Resistant Alloy Ti Alloy	**MT9005** **RT9005**	230 (165 — 330)	S 10 20 30	MT9005, RT9005, MT9015, RT9010
		MT9015 **RT9010**	195 (130 — 260)		

■MAIN COMPONENT AND APPLICATION

ISO	Main Component	Characteristics	Work Material
P M	WC-TiC-TaC-Co	Heat / deformation resistance.	Carbon steel, alloy steel, stainless steel and cast iron
K N	WC-Co	High rigidity and wear resistance.	Cast iron, non-ferrous metals, and non-metal
S	WC-Co	High heat resistance and wear resistance.	Heat resistant alloy, Ti alloy

■GRADE CHARACTERISTICS

ISO	Grade	Hardness (HRA)
P M	**UTi20T**	90.5
K N	**HTi05T**	92.5
	HTi10	92.0
S	**MT9005/RT9005**	92.2
	MT9015/RT9010	92.0

Note 1) Hardness shows representative value of the substrate.

MICRO-GRAIN CEMENTED CARBIDE

● Compared to general cemented carbide, micro-grain alloy has higher wear resistance and higher toughness.

SELECTION STANDARD

Cutting Tool	Recommended Grade	Work Material
Turning Inserts Milling Inserts Carbide Drills	**TF15**	Steel Cast Iron

GRADE CHARACTERISTICS

Grade	Grade Characteristics *		ISO	Wear Resistance	Fracture Resistance	Corrosion Resistance
	Hardness (HRA)	T.R.S (Gpa)				
TF15	91.0	4.0	K20	◎	○	◎

* After HIP

Note 1) Hardness shows representative value of the substrate.

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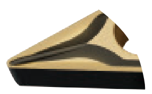
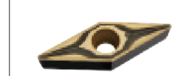
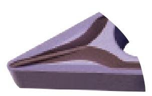
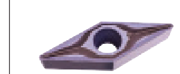
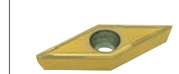
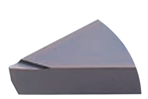
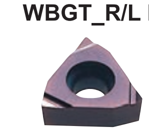
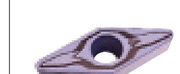
CLASSIFICATION

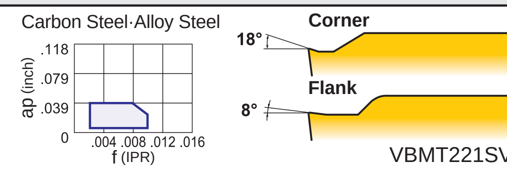
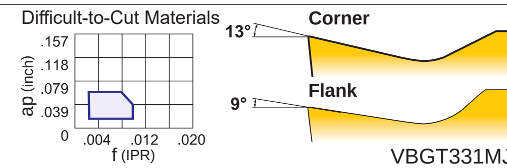
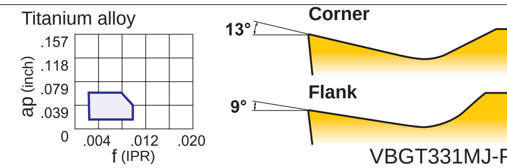
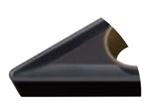
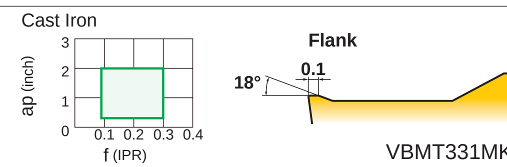
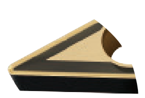
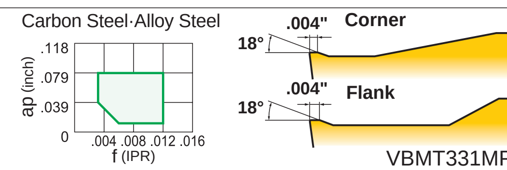
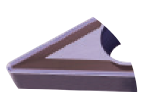
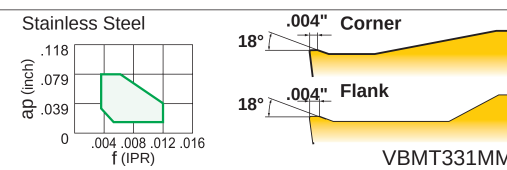
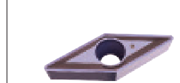
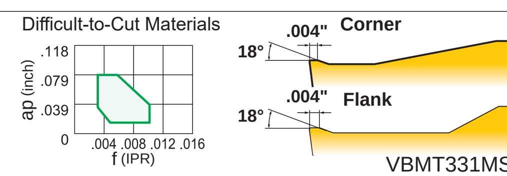
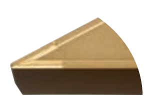
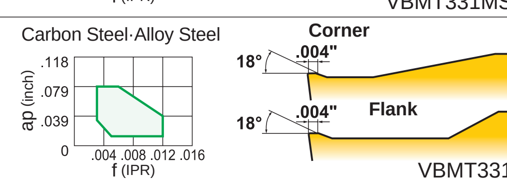
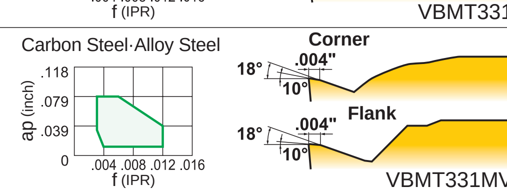
5° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Finish Cutting	M Class	**FP** 	**Recommendation for finishing carbon steel and alloy steel** Chip breaker peninsula controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.	Carbon Steel·Alloy Steel Corner 6° Flank 6° VBMT221FP					**VBMT_FP**  A179		
Finish Cutting	M Class	**FM** 	**Recommendation for finishing stainless steel** Chip breaker peninsula controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.	Stainless Steel Corner 6° Flank 6° VBMT221FM					**VBMT_FM**  A179		
Finish Cutting	M Class	**FV** 	**Recommendation for finishing carbon steel, alloy steel, mild steel and stainless steel** Suitable for low depth of cut and feed rate applications. Sharp cutting edge and low resistance design provide excellent cutting performance.	Carbon Steel·Alloy Steel Corner 18° Flank 8° VBMT221FV					**VBMT_FV**  A179		
Finish Cutting	G Class	**FJ** 	**Finishing difficult-to-cut materials** The curved cutting edges support changes in cutting depth, smooth chip discharge and disposal. The high rake angle is highly suitable for finishing difficult-to-cut materials.	Difficult-to-Cut Materials Corner 14° Flank 14° VBGT330.5FJ					**VBGT_FJ**  A179		
Finish Cutting	G Class	**FJ-P** 	**Finishing titanium alloy** Ideal for aluminum and copper. The sharp edge produces excellent surface finishes. The curved edge allows smooth chip discharge. The polished insert face prevents built up edge.	Titanium alloy Corner 14° Flank 14° VBGT330.5FJ-P					**VBGT_FJ-P**  A179		
Finish Cutting	G Class	**R/L F** 	**Finishing carbon steel and alloy steel** Angled chipbreaker controls chip flow. Sharp cutting edge produces excellent surface finishes.	Carbon Steel·Alloy Steel Flank 13° VBGT221RF					**VBGT_R/L F**  A180	**WBGT_R/L F**  A189	
Light Cutting	M Class	**LP** 	**Recommendation for light cutting of carbon and alloy steel** Sharp cutting edge due to a high rake angle. Prevents chip welding on cutting edge and controls cloudiness of surface finish. Chip breaker peninsula matched to depth of cut capability provides excellent chip control.	Carbon Steel·Alloy Steel Corner 18° Flank 8° VBMT221LP					**VBMT_LP**  A180		
Light Cutting	M Class	**LM** 	**Recommendation for light cutting of stainless steel** Sharp cutting edge due to a high rake angle. Prevents chip welding on cutting edge and controls cloudiness of surface finish. Chip breaker peninsula matched to depth of cut capability provides excellent chip control.	Stainless Steel Corner 18° Flank 8° VBMT221LM					**VBMT_LM**  A180		
Light Cutting	M Class	**LS** 	**Recommendation for light cutting of difficult-to-cut materials** Sharp cutting edge due to a large rake angle. Breaker protrusion suitable for depth of cut area achieves a wide range of chip control.	Difficult-to-Cut Materials Corner 18° Flank 8° VBMT221LS					**VBMT_LS**  A180		

Charts: ap (inch) .118 / .079 / .039 / 0; f (IPR) .004 .008 .012 .016

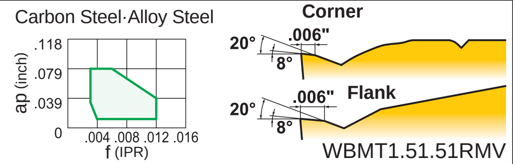
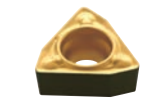
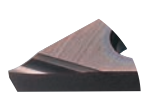
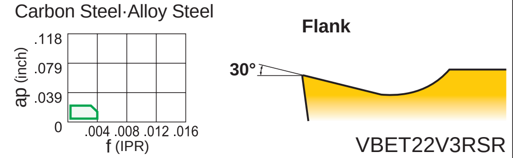
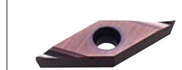
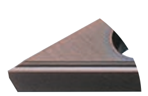
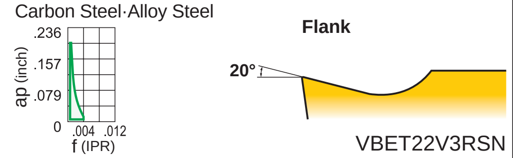
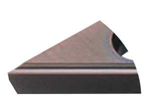
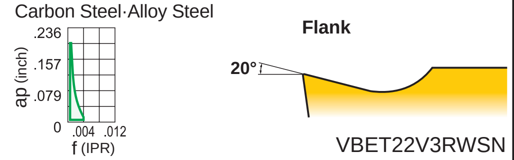
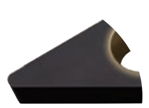
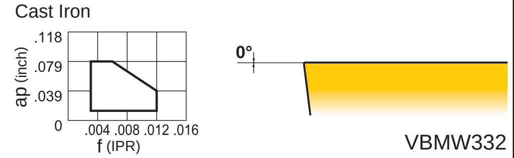
CLASSIFICATION

5° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Light Cutting	M Class	**SV** 	**Light cutting of carbon steel, alloy steel, mild steel and stainless steel** The double breaker design promotes chip discharge for mild steel low depth of cut a applications.						**VBMT_SV**  A180		
Light Cutting	G Class	**MJ** 	**Light cutting of difficult-to-cut materials Ideal for heat-resistant alloy and titanium alloy** The curved cutting edges support changes in cutting depth, smooth chip discharge and disposal. The high rake angle is highly suitable for finish-light cutting difficult-to-cut materials.						**VBGT_MJ**  A181		
Light Cutting	G Class	**MJ-P** 	**Light cutting for titanium alloy** Ideal for aluminum and copper. The sharp edge produces excellent surface finishes. The curved edge allows smooth chip discharge. The polished insert face prevents built up edge.						**VBGT_MJ-P**  A181		
Medium Cutting	M Class	**MK** 	**Recommendation for medium cutting of cast iron** Optimum balance between sharpness and high edge strength for general use.						**VBMT_MK**  A182		
Medium Cutting	M Class	**MP** 	**Recommendation for light cutting of carbon and alloy steel** Small, flat, land at cutting edge provides an excellent balance of wear and fracture resistance. The chip gullet decreases cutting resistance, reduces vibration and chip jamming in elevated depth of cut applications.						**VBMT_MP**  A181		
Medium Cutting	M Class	**MM** 	**Recommendation for medium cutting of stainless steel** Good balance of wear resistance and fracture resistance because of the flat land cutting edge. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depth of cut.						**VBMT_MM**  A182		
Medium Cutting	M Class	**MS** 	**Recommendation for medium cutting of difficult-to-cut materials** A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depth of cut.						**VBMT_MS**  A182		
Medium Cutting	M Class	**Standard** 	**Medium cutting of carbon steel, alloy steel and stainless steel** The high rake angle combined with a small flat land provide a balance of strength and sharpness.						**VBMT**  A182		
Medium Cutting	M Class	**MV** 	**Medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive land and the high rake angle provides sharp cutting edge performance. The double breakers and round-shaped dots in the rake face provide a wide range of chip control.						**VBMT_MV**  A182		

CLASSIFICATION

5° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Medium Cutting	M Class	**R/L MV** 	**Medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive land and the high rake angle provides sharp cutting edge performance. The double breakers and round-shaped dots in the rake face provide a wide range of chip control.	Carbon Steel·Alloy Steel  Corner .006" 20° 8° / .006" Flank 20° 8° WBMT1.51.51RMV						**WBMT_R/L MV**  A189	
Medium Cutting	E Class	**R/L SR** 	**Medium cutting for Swiss type lathe machining** Features a high angled chipbreaker. Low resistance insert design controls chip flow.	Carbon Steel·Alloy Steel  Flank 30° VBET22V3RSR					**VBET_R/L SR**  A183		
Medium Cutting	E Class	**R/L SN** 	**General purpose for Swiss type lathe machining** The parallel chipbreaker. Excellent chip control for low to medium feed rates.	Carbon Steel·Alloy Steel  Flank 20° VBET22V3RSN					**VBET_R/L SN**  A183		
Medium Cutting	E Class	**R/LW SN** 	**General purpose for Swiss type lathe machining** The parallel chipbreaker. Excellent chip control for low to medium feed rates. The wiper produces good surface finishes.	Carbon Steel·Alloy Steel  Flank 20° VBET22V3RWSN					**VBET_R/LW SN**  A183		
For Cast Iron	M Class	**Flat Top** 	**Heavy cutting of cast iron** Flat top. Most effective for unstable machining due to its high edge strength.	Cast Iron  0° VBMW332					**VBMW**  A183		

CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Rhombic 25°	Round
Finish Cutting	M Class	FP	**Recommendation for finishing carbon steel and alloy steel** Chip breaker peninsula controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.	Carbon Steel·Alloy Steel Corner 6° Flank 6° CCMT32.51FP	CCMT_FP A147	DCMT_FP A158	SCMT_FP A168	TCMT_FP A171	VCMT_FP A184			
Finish Cutting	M Class	FM	**Recommendation for finishing stainless steel** Chip breaker peninsula controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.	Stainless Steel Corner 6° Flank 6° CCMT32.51FM	CCMT_FM A147	DCMT_FM A158	SCMT_FM A168	TCMT_FM A171	VCMT_FM A184			
Finish Cutting	M Class	FV	**Recommendation for finishing carbon steel, alloy steel and mild steel** Sharp cutting edge and low resistance design provides excellent cutting performance. Suitable for low depth of cut and feed rate applications.	Carbon Steel·Alloy Steel Corner 18° Flank 8° CCMT32.51FV	CCMT_FV A147	DCMT_FV A158	SCMT_FV A168	TCMT_FV A171	VCMT_FV A184			
Finish Cutting	M Class	SVX	**Alternative chipbreaker for light cutting of carbon steel and alloy steel** Chip control is improved by having a chip breaker geometry suitable for copying.	Carbon Steel·Alloy Steel Corner 18° Flank 8° XCMT221SVX							XCMT_SVX A192	
Finish Cutting	G Class	FS	**Recommendation for finishing difficult-to-cut materials** Ideal for heat-resistant alloys, titanium alloys, and cobalt chrome alloys. Sharp cutting edges provide excellent surface precision and finish. Highly efficient chip discharge is possible due to curved cutting edges.	Difficult-to-Cut Materials Corner 14° Flank 9° CCGT32.50.5FS	CCGT_FS A147	DCGT_FS A159						
Finish Cutting	G Class	FS-P	**Recommendation for finishing titanium alloy** Ideal for titanium alloys and copper alloys. Sharp cutting edges provide excellent surface precision and finish. Highly efficient chip discharge is possible due to curved cutting edges. Polished (mirror-surface) finish of insert surfaces drastically improves welding resistance extending tool life.	Titanium alloy Corner 14° Flank 9° CCGT32.50.5FS-P	CCGT_FS-P A147	DCGT_FS-P A159						
Finish Cutting	G Class	FJ	**Recommendation for finishing difficult-to-cut materials** The curved cutting edges support changes in cutting depth and allow smooth chip discharge and disposal. The high rake angle is highly suitable for finishing difficult-to-cut materials.	Difficult-to-Cut Materials Corner 14° Flank 9° CCGT32.50.5FJ	CCGT_FJ A147	DCGT_FJ A158						
Finish Cutting	G Class	FJ-P	**Finishing titanium alloy** Ideal for aluminum and copper. The sharp edge produces excellent surface finishes. The curved edge allows smooth chip discharge. The polished insert face prevents built up edge.	Titanium alloy Corner 14° Flank 14° CCGT32.50.5FJ-P	CCGT_FJ-P A147	DCGT_FJ-P A158		TCGT_FJ-P A171		WCGT_FJ-P A190		
Finish Cutting	G Class	AZ	**Recommendation for aluminum alloy** The high rake angle and 3D curved cutting edge provides sharpness at the cutting point. Additionally the 3D shape of the rake face enables excellent chip control. The polished insert face prevents built up edge.	Aluminum Alloy Flank 30° DCGT32.50.5AZ	CCGT_AZ A147	DCGT_AZ A159		TCGT_AZ A171	VCGT_AZ A184			RCGT-AZ A167

Chart axes: ap (inch) .039 .079 .118 (.157 for AZ); f (IPR) .004 .008 .012 .016 (.004 .012 .020 for AZ)

CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Rhombic 25°	Round
Finish Cutting	G Class	R/L F	**Chipbreaker for finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 17° CCGT03S102L-F	CCGT_L F CCGH_R/L F A148, A149	DCGT_R/L F A159		TCGT_R/L F A172	VCGT_R/L F A184			
Finish Cutting	G Class	R/L	**Finishing** Angled chipbreaker. Excellent chip control at low feed rates.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 15° WCGT1.211R						WCGT_R/L A190		
Light Cutting	M Class	LP	**Recommendation for light cutting of carbon and alloy steel** Sharp cutting edge due to a high rake angle. Prevents chip welding on cutting edge and controls cloudiness of surface finish. Chip breaker peninsula matched to depth of cut capability provides excellent chip control.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 18° Flank 8° CCMT32.52LP	CCMT_LP A149	DCMT_LP A159	SCMT_LP A168	TCMT_LP A172	VCMT_LP A185			
Light Cutting	M Class	LM	**Recommendation for light cutting of stainless steel** Sharp cutting edge due to a high rake angle. Prevents chip welding on cutting edge and controls cloudiness of surface finish. Chip breaker peninsula matched to depth of cut capability provides excellent chip control.	Stainless Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 18° Flank 8° CCMT32.52LM	CCMT_LM A149	DCMT_LM A159	SCMT_LM A168	TCMT_LM A172	VCMT_LM A185			
Light Cutting	M Class	LS	**Recommendation for light cutting of difficult-to-cut materials** Sharp cutting edge due to a large rake angle. Breaker protrusion suitable for depth of cut area achieves a wide range of chip control.	Difficult-to-Cut Materials ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 18° Flank 8° CCMT32.52LS	CCMT_LS A149	DCMT_LS A160		TCMT_LS NEW A172	VCMT_LS A185			
Light Cutting	M Class	SV	**Alternative chipbreaker for light cutting of carbon steel, alloy steel, mild steel and stainless steel** The double breaker design promotes chip control in mild steel and low depth of cut machining applications.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 18° Flank 8° CCMH21.51SV	CCMH_SV A149	DCMT_SV A160			VCMT_SV A185			
Light Cutting	M Class	SW	**Wiper insert for light cutting of carbon steel, alloy steel, mild steel and stainless steel** The wiper allows up to two times higher feed. Positive land improves sharpness.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 20° .005" 12° Flank 16° .005" 8° CCMT32.51SW	CCMT_SW A149							
Light Cutting	G Class	R/L SS	**Chipbreaker for light cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low feed rates.	Carbon Steel·Alloy Steel ap (inch) .236 .157 .079 0; f (IPR) .004 .012 Flank 14° CCGT32.50.5RSS	CCGT_R/L SS A150	DCGT_R/L SS A160						
Light Cutting	G Class	LS	**Recommendation for light cutting of difficult-to-cut materials** Ideal for heat-resistant alloy and titanium alloy and cobalt chrome alloy. The parallel cutting edge. Breaker protrusion suitable for depth of cut area achieves a wide range of chip control.	Difficult-to-Cut Materials ap (inch) .157 .118 .079 .039 0; f (IPR) .004 .012 .020 Corner 12° Flank 6° CCGT32.51MLS	CCGT_LS A150	DCGT_LS A161			VCGT_LS A185			

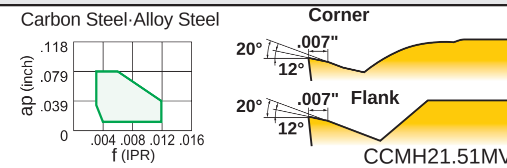
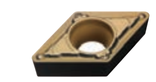
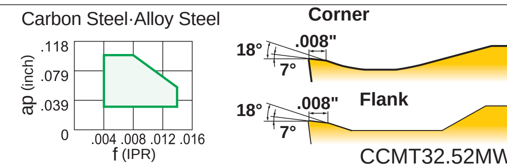
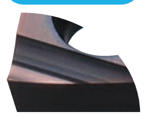
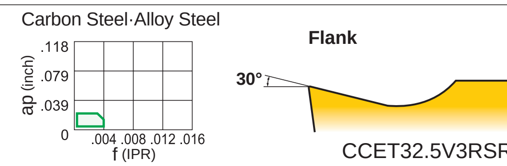
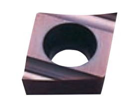
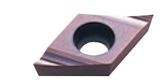
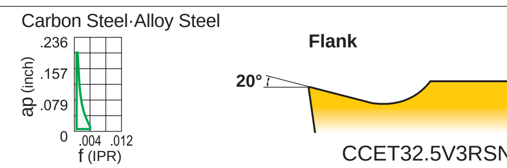
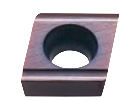
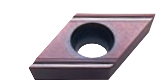
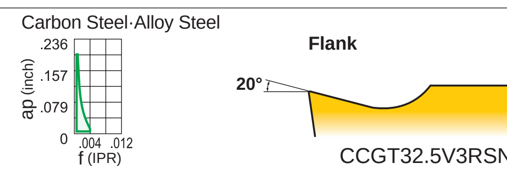
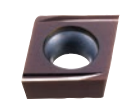
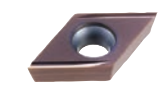
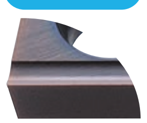
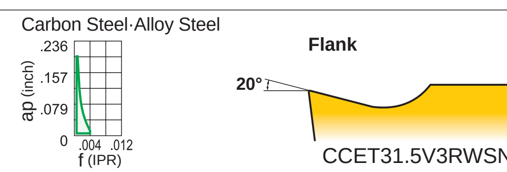
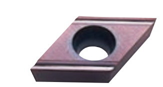
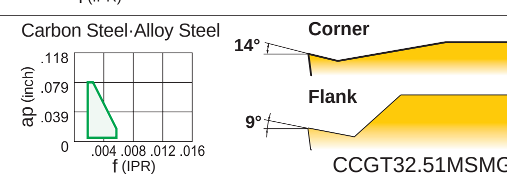
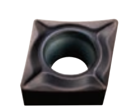
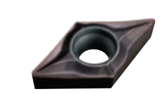
CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Rhombic 25°	Round
Light Cutting	G Class	LS-P	**Recommendation for light cutting of titanium alloy** Ideal for aluminum and copper. The parallel cutting edge. Breaker protrusion suitable for depth of cut area achieves a wide range of chip control. The polished insert face prevents built up edge.	Titanium alloy Corner 12° Flank 6° CCGT32.51MLS-P	CCGT_LS-P A151	DCGT_LS-P A161			VCGT_LS-P A185			
Light Cutting	G Class	MJ	**Light cutting of difficult-to-cut materials** **Ideal for heat-resistant alloy and titanium alloy** The curved cutting edges support changes in cutting depth-smooth chip discharge and disposal. The high rake angle is highly suitable for finish- light cutting difficult-to-cut materials.	Difficult-to-Cut Materials Corner 13° Flank 9° CCGT21.51MJ	CCGT_MJ A151	DCGT_MJ A161		TCGT_MJ A173		WCGT_MJ A190		
Light Cutting	G Class	MJ-P	**Light cutting for titanium alloy** Ideal for aluminum and copper. The sharp edge produces excellent surface finishes. The curved edge allows smooth chip discharge. The polished insert face prevents built up edge.	Titanium alloy Corner 13° Flank 9° CCGT21.51MJP	CCGT_MJ-P A151	DCGT_MJ-P A161		TCGT_MJ-P A173		WCGT_MJ-P A190		
Medium Cutting	M Class	MP	**Recommendation for medium cutting of carbon and alloy steel** The small flat land at cutting edge provides an excellent balance of wear and fracture resistance. The wide chip gullet decreases cutting resistance, reduces vibration and chip jamming in elevated depth of cut applications.	Carbon Steel·Alloy Steel Corner .004" 18° Flank .004" 18° CCMT32.52MP	CCMT_MP A151	DCMT_MP A161	SCMT_MP A168	TCMT_MP A173	VCMT_MP A185			
Medium Cutting	M Class	MM	**Recommendation for medium cutting of stainless steel** The small flat land at cutting edge provides an excellent balance of wear and fracture resistance. The wide chip gullet decreases cutting resistance, reduces vibration and chip jamming in elevated depth of cut applications.	Stainless Steel Corner .004" 18° Flank .004" 18° CCMT32.52MM	CCMT_MM A151	DCMT_MM A161	SCMT_MM A169	TCMT_MM A173	VCMT_MM A185			
Medium Cutting	M Class	MS	**First recommendation for medium cutting of difficult-to-cut materials** A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depth of cut.	Difficult-to-Cut Materials Corner .004" 18° Flank .004" 18° CCMT32.52MS	CCMT_MS A151	DCMT_MS A162	SCMT_MS NEW A169	TCMT_MS NEW A173	VCMT_MS A186			
Medium Cutting	M Class	MK	**Recommendation for medium cutting of cast iron** Optimum balance between sharpness and high edge strength for general use.	Cast Iron Flank .004" 18° CCMT32.52MK	CCMT_MK A152	DCMT_MK A162	SCMT_MK A169	TCMT_MK A173	VCMT_MK A186			
Medium Cutting	M Class	Standard	**Recommendation for medium cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** The high rake angle combined with a small, flat land provide a balance of strength and sharpness.	Carbon Steel·Alloy Steel Corner .004" 18° Flank .004" 18° CCMT32.52	CCMT A152	DCMT A162	SCMT A169	TCMT A174	VCMT A186	WCMT A190		RCMT A167
Medium Cutting	M Class	Standard		.008" 15° RCMX1204M0								RCMX A167

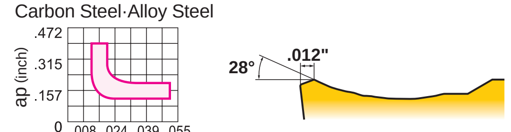
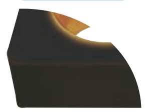
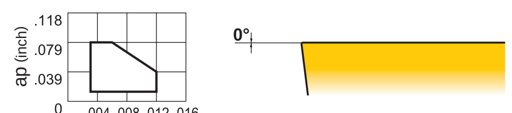
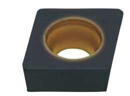
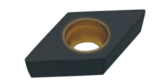
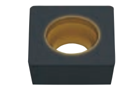
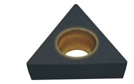
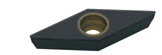
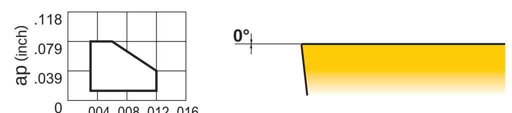
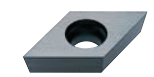
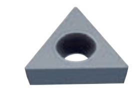
CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

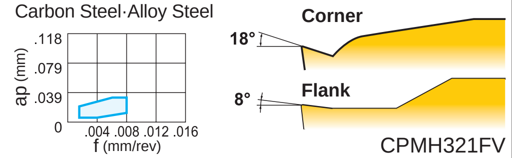
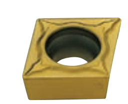
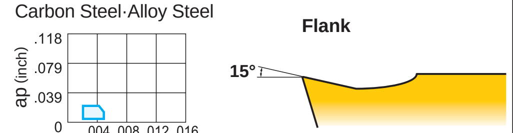
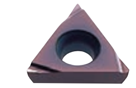
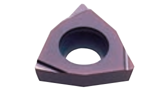
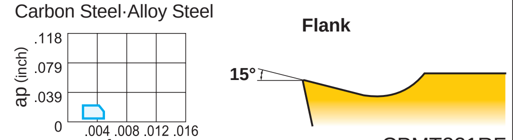
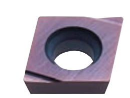
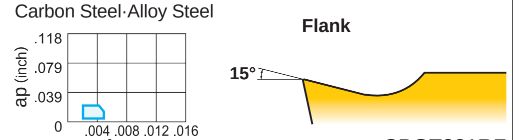
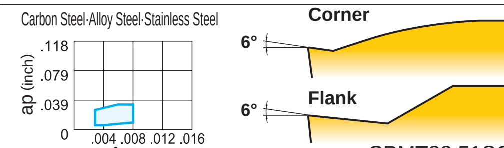
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Medium Cutting	M Class	**MV** 	**Alternative chipbreaker for medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive land and the high rake angle provides sharp cutting edge performance. The double breakers and round-shape in the rake face provide a wide range of chip control.		**CCMH_MV**  A152	**DCMT_MV**  A162			**VCMT_MV**  A186		
Medium Cutting	M Class	**MW** 	**Wiper insert for medium cutting of carbon steel, alloy steel, mild steel and stainless steel** The wiper allows up to two times higher feed. A wide chip pocket prevents chip jamming.		**CCMT_MW**  A152						
Medium Cutting	E Class	**R/L SR** 	**Medium cutting for Swiss style lathe machining** A wide angled chipbreaker. Low resistance insert design controls chip flow.		**CCET_R/L SR**  A153	**DCET_R/L SR**  A163					
Medium Cutting	E Class	**R/L SN** 	**General purpose for Swiss style lathe machining** The parallel chipbreaker. Excellent chip control at low to medium feed rates.		**CCET_R/L SN**  A153	**DCET_R/L SN**  A163					
Medium Cutting	G Class	**R/L SN** 	**General purpose for Swiss style lathe machining** The parallel chipbreaker. Excellent chip control for low to medium feed rates.		**CCGT_R/L SN**  A154	**DCGT_R/L SN**  A164					
Medium Cutting	E Class	**R/LW SN** 	**General purpose for Swiss style lathe machining** The parallel chipbreaker. Excellent chip control for low to medium feed rates. The wiper produces good surface finish.		**CCET_R/LW SN**  A154	**DCET_R/LW SN**  A164					
Medium Cutting	G Class	**SMG** 	**Medium cutting for Swiss style lathes machining** 3D molded chipbreaker provides good chip control. G class insert gives sharp cutting action, allowing high precision machining. Breaker geometry appropriate for copying and back turning. M = minus radius tolerance		**CCGT_SMG**  A155	**DCGT_SMG**  A165					

CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Heavy Cutting	M Class	**RR** 	**Heavy cutting of carbon steel and alloy steel** A wide groove chipbreaker prevents chips from jamming at large depths of cut. Small dimples improve chip control at small depths of cut.	Carbon Steel·Alloy Steel  RCMX2006M0-RR							**RCMX_RR**  A167
For Cast Iron	M Class	**Flat Top** 	**For cast iron** Most effective in unstable machining due to high edge strength.	Cast Iron  CCMW32.52	**CCMW**  A155	**DCMW**  A165	**SCMW**  A169	**TCMW**  A174	**VCMW**  A186		
For Cast Iron	G Class	**Flat Top** 	**For cast iron** Most effective in unstable machining due to high edge strength. G class tolerance for use on workpieces requiring close tolerances.	Cast Iron  CCGW32.5V0	**CCGW**  A155	**DCGW**  A165		**TCGW**  A174			

11° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Finish Cutting	M Class	**FV** 	**Recommendation for finishing carbon steel, alloy steel, mild steel and stainless steel** Suitable for low depth of cut and low feed rate applications. Sharp cutting edge and low resistance design achieves excellent cutting performance.	Carbon Steel·Alloy Steel  CPMH321FV	**CPMH_FV**  A156			**TPMH_FV**  A176			
Finish Cutting	G Class	**R/L FS** 	**Recommendation for finishing carbon steel, alloy steel, stainless steel, cast iron and aluminum alloy** Small angled chipbreaker. For precision finishing. Sharp cutting edge produces excellent surface finishes.	Carbon Steel·Alloy Steel  TPGH1.81.51RFS				**TPGH_R/L FS**  A176		**WPGT_R/L FS**  A191	
Finish Cutting	M Class	**R/L F** 	**Finishing carbon steel and alloy steel** Angled chipbreaker controls chip flow. Sharp cutting edge produces excellent surface finishes.	Carbon Steel·Alloy Steel  CPMT321RF	**CPMH_R/L F**  A156						
Finish Cutting	G Class	**R/L F** 	**Finishing carbon steel and alloy steel** Angled chipbreaker controls chip flow. Sharp cutting edge produces excellent surface finishes.	Carbon Steel·Alloy Steel  CPGT321RF	**CPGT_R/L F**  A156						
Finish Cutting	M Class	**SQ** 	**Finishing carbon steel, alloy steel and stainless steel** For small depth of cut and low feed.	Carbon Steel·Alloy Steel·Stainless Steel  CPMT32.51SQ	**CPMT_SQ**  A156			**TPMT_SQ**  A176			

CLASSIFICATION

11° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
Finish Cutting	G Class	R/L	**Chipbreaker for finishing** Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 10° TPGX1.81.51R				TPGX_R/L A177			
Finish Cutting	G Class	Standard	**Finishing aluminum alloy** Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Aluminum Alloy ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 25° CPGT321	CPGT A156						
Finish Cutting	M Class	L	**Finishing** Angled chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 10° TPMX1.81.51L				TPMX_L A177			
Finish Cutting	E Class	SRF	**Finishing** Lead chipbreaker controls chip flow. Sharp cutting edge produces excellent surface finishes.	Carbon Steel·Alloy Steel ap (mm) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Flank 15° VPET1.51.50.2RSRF					VPET_R/L SRF A188		
Finish Cutting	G Class	SMG	**Medium cutting for Swiss style lathes machining** 3D molded chipbreaker provides good chip control. G class insert gives sharp cutting action, allowing high precision machining. Breaker geometry appropriate for copying and back turning. M = minus radius tolerance	Carbon Steel·Alloy Steel ap (mm) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 11° Flank 11° VPGT1.51.50.2MSMG					VPGT_SMG A188		
Light Cutting	M Class	SV	**Recommendation for light cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** The double breaker design promotes chip discharge for mild steel and low depth of cut machining applications.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 18° Flank 8° CPMH32.51SV	CPMH_SV A156			TPMH_SV A177			
Medium Cutting	M Class	Standard	**Alternative chipbreaker for medium cutting of carbon steel, alloy steel and stainless steel** Standard, general purpose chipbreaker.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 10° Flank 10° CPMX321	CPMX A157		SPMT A170	TPMX A178			
Medium Cutting	M Class	MV	**Recommendation for medium cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** A positive land and the high rake angle provides sharp cutting edge performance. Double breakers in the rake face achieve a wide range of chip control.	Carbon Steel·Alloy Steel ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 20° .008" 8° Flank 20° .008" 8° CPMH321MV	CPMH_MV A157			TPMH_MV A178		WPMT_MV A191	
Medium Cutting	M Class	MQ	**Medium cutting of carbon steel, alloy steel and stainless steel** Can be used under a wide range of cutting conditions.	Copper ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016 Corner 20° .006" 6° Flank 20° .006" 6° CPMT32.51MQ	CPMT_MQ A157			TPMT_MQ A178			

CLASSIFICATION

11° POSITIVE INSERTS WITH HOLE

Application	Chipbreaker	Description	Chart	Model	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
For Cast Iron	Flat Top	**Heavy cutting of cast iron** Flat top. Most effective for unstable machining due to high edge strength.	Cast Iron; ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016; 0°	SPMW432			**SPMW** A170				
For Cast Iron	Flat Top	**For cast iron** Most effective in unstable machining due to high edge strength. G class tolerance allows use on workpieces requiring close tolerances.	Cast Iron; ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016; 0°	SPGX432			**SPGX** A170	**TPGX** A178			

15° POSITIVE INSERTS WITH HOLE

Application	Chipbreaker	Description	Chart	Model	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
For Aluminum Alloy	R/L	**For aluminum cutting** Angled chipbreaker. Sharp cutting edge produces excellent surface finishes.	Aluminum Alloy; ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016; Flank 20°	VDGX320.5R					**VDGX_R/L** A187		

20° POSITIVE INSERTS WITH HOLE

Application	Chipbreaker	Description	Chart	Model	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round
For Aluminum Alloy	R/L F	**For aluminum cutting** Angled chipbreaker. Sharp cutting edge produces excellent surface finishes.	Aluminum Alloy; ap (inch) .118 .079 .039 0; f (IPR) .004 .008 .012 .016; Flank 20°	DEGX431RF		**DEGX_R/L F** A166					
For Aluminum Alloy	R/L	**For aluminum cutting** Parallel chipbreaker. Sharp cutting edge produces excellent surface finishes.	Aluminum Alloy; ap (inch) .157 .118 .079 .039 0; f (IPR) .004 .012 .020; Flank 25°	DEGX431R		**DEGX_R/L** A166		**TEGX_R/L** A175			

RECOMMENDED CUTTING CONDITIONS

■ 7° POSITIVE INSERT TYPE

Breaker : **Std :** Standard **Flat :** Flat Top

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P									
Mild Steel (AISI ASTM A283, AISI 1010)	≤180HB	●	**F**	1	**FP**	**NX2525**	740–1050	.002–.008	.008–.035
		●	**F**	2	**FV**	**NX2525**	740–1050	.002–.008	.008–.035
		●	**F**	3	**R/L-F**	**MP3025**	755–1165	.002–.005	.004–.020
		●	**L**	1	**LP**	**NX2525**	740–1050	.002–.010	.008–.039
		●	**L**	2	**Std**	**UE6110**	690–1165	.003–.012	.012–.079
		●	**L**	3	**MV**	**MP3025**	620–970	.003–.012	.012–.079
		●	**L**	4	**Std**	**MP3025**	620–970	.003–.012	.012–.079
		●	**M**	1	**MP**	**NX2525**	605–885	.003–.012	.012–.079
		◐	**F**	1	**FP**	**MC6015**	820–1395	.002–.008	.008–.035
		◐	**F**	2	**FP**	**UE6110**	820–1395	.002–.008	.008–.035
		◐	**F**	3	**FP**	**MP3025**	755–1165	.002–.008	.008–.035
		◐	**F**	4	**FV**	**MP3025**	755–1165	.002–.008	.008–.035
		◐	**F**	5	**FV**	**NX3035**	720–1015	.002–.008	.008–.035
		◐	**L**	1	**LP**	**MC6015**	820–1395	.002–.010	.008–.039
		◐	**L**	2	**LP**	**UE6110**	820–1395	.002–.010	.008–.039
		◐	**L**	3	**LP**	**MP3025**	755–1165	.002–.010	.008–.039
		◐	**L**	4	**Std**	**UE6110**	690–1165	.003–.012	.012–.079
		◐	**L**	5	**SW**	**MC6015**	820–1395	.002–.009	.008–.059
		◐	**L**	6	**SW**	**MP3025**	755–1165	.002–.009	.008–.059
		◐	**M**	1	**MP**	**MC6015**	690–1165	.003–.012	.012–.079
		◐	**M**	2	**MP**	**UE6110**	690–1165	.003–.012	.012–.079
		◐	**M**	3	**MP**	**MP3025**	620–970	.003–.012	.012–.079
		◐	**M**	4	**MW**	**MC6015**	690–1165	.004–.014	.031–.098
		✤	**F**	1	**FP**	**MC6025**	820–1330	.002–.008	.008–.035
		✤	**L**	1	**LP**	**MC6025**	820–1330	.002–.010	.008–.039
		✤	**L**	2	**SV**	**MC6025**	820–1330	.002–.010	.008–.039
		✤	**L**	3	**SW**	**MC6025**	820–1330	.002–.009	.008–.059
		✤	**M**	1	**MP**	**MC6025**	690–1115	.003–.012	.012–.079
		✤	**M**	2	**MW**	**MC6025**	690–1115	.004–.014	.031–.098
Carbon Steel • Alloy Steel (AISI 1045, AISI 4140)	180–280HB	●	**F**	1	**FP**	**NX2525**	540–785	.002–.008	.008–.035
		●	**F**	2	**FV**	**NX2525**	540–785	.002–.008	.008–.035
		●	**F**	3	**R/L-F**	**MP3025**	560–850	.002–.005	.004–.020
		●	**L**	1	**LP**	**NX2525**	540–785	.002–.010	.008–.039
		●	**L**	2	**Std**	**UE6110**	510–850	.003–.012	.012–.079
		●	**L**	3	**MV**	**MP3025**	460–720	.003–.012	.012–.079
		●	**L**	4	**Std**	**MP3025**	460–720	.003–.012	.012–.079
		●	**L**	5	**SV**	**MP3025**	560–850	.002–.010	.008–.039
		●	**L**	6	**SW**	**MP3025**	560–850	.002–.009	.008–.059
		●	**M**	1	**MP**	**NX2525**	460–655	.003–.012	.012–.079
		●	**M**	2	**MW**	**MP3025**	460–720	.004–.014	.031–.098
		◐	**F**	1	**FP**	**MC6015**	605–1030	.002–.008	.008–.035
		◐	**F**	2	**FP**	**UE6110**	605–1030	.002–.008	.008–.035
		◐	**F**	3	**FP**	**MP3025**	560–850	.002–.008	.008–.035
		◐	**F**	4	**FV**	**MP3025**	560–850	.002–.008	.008–.035
		◐	**F**	5	**FV**	**NX3035**	525–755	.002–.008	.008–.035

CUTTING CONDITIONS : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
CUTTING AREA : **F** : Finish Cutting **L** : Light Cutting **M** : Medium Cutting **R** : Rough Cutting **H** : Heavy Cutting

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P									
Carbon Steel • Alloy Steel (AISI 1045, AISI 4140)	180–280HB	◐	**L**	1	**LP**	**MC6015**	605–1030	.002–.010	.008–.039
		◐	**L**	2	**LP**	**UE6110**	605–1030	.002–.010	.008–.039
		◐	**L**	3	**LP**	**MP3025**	560–850	.002–.010	.008–.039
		◐	**L**	4	**Std**	**UE6110**	510–850	.003–.012	.012–.079
		◐	**L**	5	**SW**	**MC6015**	605–1030	.002–.009	.008–.059
		◐	**L**	6	**SW**	**MP3025**	560–850	.002–.009	.008–.059
		◐	**M**	1	**MP**	**MC6015**	510–850	.003–.012	.012–.079
		◐	**M**	2	**MP**	**UE6110**	510–850	.003–.012	.012–.079
		◐	**M**	3	**MP**	**MP3025**	460–720	.003–.012	.012–.079
		◐	**M**	4	**MW**	**MC6015**	510–850	.004–.014	.031–.098
		✤	**F**	1	**FP**	**MC6025**	605–985	.002–.008	.008–.035
		✤	**L**	1	**LP**	**MC6025**	605–985	.002–.010	.008–.039
		✤	**L**	2	**SV**	**MC6025**	605–985	.002–.010	.008–.039
		✤	**L**	3	**SW**	**MC6025**	605–985	.002–.009	.008–.059
		✤	**M**	1	**MP**	**MC6025**	510–820	.003–.012	.012–.079
		✤	**M**	2	**MW**	**MC6025**	510–820	.004–.014	.031–.098
Carbon Steel • Alloy Steel (AISI 4340)	280–350HB	●	**M**	1	**MP**	**NX2525**	310–460	.003–.012	.012–.079
		◐	**M**	1	**MP**	**MC6015**	360–605	.003–.012	.012–.079
		◐	**M**	2	**MP**	**UE6110**	360–605	.003–.012	.012–.079
		◐	**M**	3	**MP**	**MP3025**	330–510	.003–.012	.012–.079
		✤	**M**	1	**MP**	**MC6025**	360–575	.003–.012	.012–.079

RECOMMENDED CUTTING CONDITIONS

■7° POSITIVE INSERT TYPE

Breaker : **Std :** Standard **Flat :** Flat Top

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
M									
Austenitic Stainless Steel (AISI 304, AISI 316)	≦200HB	●	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		●	F	2	Std	US735	230–440	.003–.012	.012–.079
		●	L	1	LM	MC7025	460–620	.002–.010	.008–.039
		●	L	2	Std	US735	230–440	.003–.012	.012–.079
		●	M	1	MM	MC7025	395–525	.003–.012	.012–.079
		◐	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		◐	F	2	Std	US735	230–440	.003–.012	.012–.079
		◐	L	1	LM	MC7025	460–620	.002–.010	.008–.039
		◐	L	2	Std	US735	230–440	.003–.012	.012–.079
		◐	M	1	MM	MC7025	395–525	.003–.012	.012–.079
		✤	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		✤	F	2	Std	US735	230–440	.003–.012	.012–.079
		✤	L	1	LM	MP7035	280–440	.002–.010	.008–.039
		✤	L	2	LM	VP15TF	245–410	.002–.010	.008–.039
		✤	L	3	Std	US735	230–440	.003–.012	.012–.079
		✤	M	1	MM	MP7035	230–375	.003–.012	.012–.079
		✤	M	2	MM	VP15TF	195–345	.003–.012	.012–.079
Austenitic Stainless Steel (AISI 304LN, AISI 316LN)	>200HB	●	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		●	F	2	Std	US735	195–360	.003–.012	.012–.079
		●	L	1	LM	MC7025	395–525	.002–.010	.008–.039
		●	L	2	Std	US735	195–360	.003–.012	.012–.079
		●	M	1	MM	MC7025	330–425	.003–.012	.012–.079
		◐	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		◐	F	2	Std	US735	195–360	.003–.012	.012–.079
		◐	L	1	LM	MC7025	395–525	.002–.010	.008–.039
		◐	L	2	Std	US735	195–360	.003–.012	.012–.079
		◐	M	1	MM	MC7025	330–425	.003–.012	.012–.079
		✤	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		✤	F	2	Std	US735	195–360	.003–.012	.012–.079
		✤	L	1	LM	MP7035	230–375	.002–.010	.008–.039
		✤	L	2	LM	VP15TF	195–345	.002–.010	.008–.039
		✤	L	3	Std	US735	195–360	.003–.012	.012–.079
		✤	M	1	MM	MP7035	195–310	.003–.012	.012–.079
		✤	M	2	MM	VP15TF	165–295	.003–.012	.012–.079
Two-phase Stainless Steel (AISI 329)	≦280HB	●	F	1	FM	VP15TF	165–280	.002–.008	.008–.035
		●	F	2	Std	US735	150–295	.003–.012	.012–.079
		●	L	1	LM	MC7025	310–425	.002–.010	.008–.039
		●	L	2	Std	US735	150–295	.003–.012	.012–.079
		●	M	1	MM	MC7025	260–345	.003–.012	.012–.079
		◐	F	1	FM	VP15TF	165–280	.002–.008	.008–.035
		◐	F	2	Std	US735	150–295	.003–.012	.012–.079
		◐	L	1	LM	MC7025	310–425	.002–.010	.008–.039
		◐	L	2	Std	US735	150–295	.003–.012	.012–.079
		◐	M	1	MM	MC7025	260–345	.003–.012	.012–.079
		✤	F	1	FM	VP15TF	165–280	.002–.008	.008–.035
		✤	F	2	Std	US735	150–295	.003–.012	.012–.079
		✤	L	1	LM	MP7035	180–295	.002–.010	.008–.039

CUTTING CONDITIONS : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
CUTTING AREA : **F** : Finish Cutting **L** : Light Cutting **M** : Medium Cutting **R** : Rough Cutting **H** : Heavy Cutting

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
M									
Two-phase Stainless Steel (AISI 329)	≦280HB	✤	L	2	LM	VP15TF	165–280	.002–.010	.008–.039
		✤	L	3	Std	US735	150–295	.003–.012	.012–.079
		✤	M	1	MM	MP7035	150–245	.003–.012	.012–.079
		✤	M	2	MM	VP15TF	130–230	.003–.012	.012–.079
Ferritic and Martensitic Stainless Steel (AISI 410, AISI 430)	≦200HB	●	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		●	F	2	Std	US735	230–440	.003–.012	.012–.079
		●	L	1	LM	MC7025	460–620	.002–.010	.008–.039
		●	L	2	Std	US735	230–440	.003–.012	.012–.079
		●	M	1	MM	MC7025	395–525	.003–.012	.012–.079
		◐	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		◐	F	2	Std	US735	230–440	.003–.012	.012–.079
		◐	L	1	LM	MC7025	460–620	.002–.010	.008–.039
		◐	L	2	Std	US735	230–440	.003–.012	.012–.079
		◐	M	1	MM	MC7025	395–525	.003–.012	.012–.079
		✤	F	1	FM	VP15TF	245–410	.002–.008	.008–.035
		✤	F	2	Std	US735	230–440	.003–.012	.012–.079
		✤	L	1	LM	MP7035	280–440	.002–.010	.008–.039
		✤	L	2	LM	VP15TF	245–410	.002–.010	.008–.039
		✤	L	3	Std	US735	230–440	.003–.012	.012–.079
		✤	M	1	MM	MP7035	230–375	.003–.012	.012–.079
		✤	M	2	MM	VP15TF	195–345	.003–.012	.012–.079
Ferritic and Martensitic Stainless Steel (AISI 431, AISI 420)	>200HB	●	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		●	F	2	Std	US735	195–360	.003–.012	.012–.079
		●	L	1	LM	MC7025	395–525	.002–.010	.008–.039
		●	L	2	Std	US735	195–360	.003–.012	.012–.079
		●	M	1	MM	MC7025	330–425	.003–.012	.012–.079
		◐	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		◐	F	2	Std	US735	195–360	.003–.012	.012–.079
		◐	L	1	LM	MC7025	395–525	.002–.010	.008–.039
		◐	L	2	Std	US735	195–360	.003–.012	.012–.079
		◐	M	1	MM	MC7025	330–425	.003–.012	.012–.079
		✤	F	1	FM	VP15TF	195–345	.002–.008	.008–.035
		✤	F	2	Std	US735	195–360	.003–.012	.012–.079
		✤	L	1	LM	MP7035	230–375	.002–.010	.008–.039
		✤	L	2	LM	VP15TF	195–345	.002–.010	.008–.039
		✤	L	3	Std	US735	195–360	.003–.012	.012–.079
		✤	M	1	MM	MP7035	195–310	.003–.012	.012–.079
		✤	M	2	MM	VP15TF	165–295	.003–.012	.012–.079
Hardened Stainless Steel (AISI 630, AISI 631)	<450HB	●	F	1	FM	VP15TF	130–230	.002–.008	.008–.035
		●	F	2	Std	US735	130–245	.003–.012	.012–.079
		●	L	1	LM	MC7025	260–345	.002–.010	.008–.039
		●	L	2	LS(M)	MP9015	345–460	.002–.008	.008–.039
		●	L	3	Std	US735	130–245	.003–.012	.012–.079
		●	M	1	MM	MC7025	210–280	.003–.012	.012–.079
		●	M	2	MS	MP9015	280–395	.003–.010	.012–.079

A

TURNING INSERTS

RECOMMENDED CUTTING CONDITIONS

■ 7° POSITIVE INSERT TYPE

Breaker : **Std :** Standard **Flat :** Flat Top

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
M									
Hardened Stainless Steel (AISI 630, AISI 631)	<450HB	◐	**F**	1	**FM**	**VP15TF**	130–230	.002–.008	.008–.035
		◐	**F**	2	**Std**	**US735**	130–245	.003–.012	.012–.079
		◐	**L**	1	**LM**	**MC7025**	260–345	.002–.010	.008–.039
		◐	**L**	2	**LS(M)**	**MP9015**	345–460	.002–.008	.008–.039
		◐	**L**	3	**Std**	**US735**	130–245	.003–.012	.012–.079
		◐	**M**	1	**MM**	**MC7025**	210–280	.003–.012	.012–.079
		◐	**M**	2	**MS**	**MP9015**	280–395	.003–.010	.012–.079
		✤	**F**	1	**FM**	**VP15TF**	130–230	.002–.008	.008–.035
		✤	**F**	2	**Std**	**US735**	130–245	.003–.012	.012–.079
		✤	**L**	1	**LM**	**MP7035**	150–245	.002–.010	.008–.039
		✤	**L**	2	**LM**	**VP15TF**	130–230	.002–.010	.008–.039
		✤	**L**	3	**Std**	**US735**	130–245	.003–.012	.012–.079
		✤	**M**	1	**MM**	**MP7035**	130–195	.003–.012	.012–.079
		✤	**M**	2	**MM**	**VP15TF**	115–195	.003–.012	.012–.079

CUTTING CONDITIONS : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
CUTTING AREA : **F** : Finish Cutting **L** : Light Cutting **M** : Medium Cutting **R** : Rough Cutting **H** : Heavy Cutting

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
K									
Gray Cast Iron (AISI No 45 B)	≤350MPa	●	**F**	1	**MK**	**MC5005**	540–870	.003–.012	.012–.079
		●	**L**	1	**MK**	**MC5005**	540–870	.003–.012	.012–.079
		●	**M**	1	**Flat**	**MC5005**	540–870	.003–.012	.012–.079
		◐	**F**	1	**MK**	**MC5015**	490–785	.003–.012	.012–.079
		◐	**F**	2	**Std**	**UC5115**	425–785	.003–.012	.012–.079
		◐	**L**	1	**MK**	**MC5015**	490–785	.003–.012	.012–.079
		◐	**L**	2	**Std**	**UC5115**	425–785	.003–.012	.012–.079
		◐	**M**	1	**Flat**	**MC5015**	490–785	.003–.012	.012–.079
		◐	**M**	2	**Flat**	**UC5115**	425–785	.003–.012	.012–.079
		✤	**F**	1	**MK**	**MC5015**	490–785	.003–.012	.012–.079
		✤	**F**	2	**Std**	**UC5115**	425–785	.003–.012	.012–.079
		✤	**L**	1	**MK**	**MC5015**	490–785	.003–.012	.012–.079
		✤	**L**	2	**Std**	**UC5115**	425–785	.003–.012	.012–.079
		✤	**M**	1	**Flat**	**MC5015**	490–785	.003–.012	.012–.079
		✤	**M**	2	**Flat**	**UC5115**	425–785	.003–.012	.012–.079
Ductile Cast Iron	≤450MPa	●	**F**	1	**MK**	**MC5005**	510–820	.003–.012	.012–.079
		●	**L**	1	**MK**	**MC5005**	510–820	.003–.012	.012–.079
		●	**M**	1	**Flat**	**MC5005**	510–820	.003–.012	.012–.079
		◐	**F**	1	**MK**	**MC5015**	460–755	.003–.012	.012–.079
		◐	**F**	2	**Std**	**UC5115**	410–740	.003–.012	.012–.079
		◐	**L**	1	**MK**	**MC5015**	460–755	.003–.012	.012–.079
		◐	**L**	2	**Std**	**UC5115**	410–740	.003–.012	.012–.079
		◐	**M**	1	**Flat**	**MC5015**	460–755	.003–.012	.012–.079
		◐	**M**	2	**Flat**	**UC5115**	410–740	.003–.012	.012–.079
		✤	**F**	1	**MK**	**MC5015**	460–755	.003–.012	.012–.079
		✤	**F**	2	**Std**	**UC5115**	410–740	.003–.012	.012–.079
		✤	**L**	1	**MK**	**MC5015**	460–755	.003–.012	.012–.079
		✤	**L**	2	**Std**	**UC5115**	410–740	.003–.012	.012–.079
		✤	**M**	1	**Flat**	**MC5015**	460–755	.003–.012	.012–.079
		✤	**M**	2	**Flat**	**UC5115**	410–740	.003–.012	.012–.079
	≤800MPa	●	**F**	1	**MK**	**MC5005**	460–740	.003–.012	.012–.079
		●	**L**	1	**MK**	**MC5005**	460–740	.003–.012	.012–.079
		●	**M**	1	**Flat**	**MC5005**	460–740	.003–.012	.012–.079
		◐	**F**	1	**MK**	**MC5015**	410–670	.003–.012	.012–.079
		◐	**F**	2	**Std**	**UC5115**	360–655	.003–.012	.012–.079
		◐	**L**	1	**MK**	**MC5015**	410–670	.003–.012	.012–.079
		◐	**L**	2	**Std**	**UC5115**	360–655	.003–.012	.012–.079
		◐	**M**	1	**Flat**	**MC5015**	410–670	.003–.012	.012–.079
		◐	**M**	2	**Flat**	**UC5115**	360–655	.003–.012	.012–.079
		✤	**F**	1	**MK**	**MC5015**	410–670	.003–.012	.012–.079
		✤	**F**	2	**Std**	**UC5115**	360–655	.003–.012	.012–.079
		✤	**L**	1	**MK**	**MC5015**	410–670	.003–.012	.012–.079
		✤	**L**	2	**Std**	**UC5115**	360–655	.003–.012	.012–.079
		✤	**M**	1	**Flat**	**MC5015**	410–670	.003–.012	.012–.079
		✤	**M**	2	**Flat**	**UC5115**	360–655	.003–.012	.012–.079

A

TURNING INSERTS

RECOMMENDED CUTTING CONDITIONS

■ 7° POSITIVE INSERT TYPE

Breaker : **Std :** Standard **Flat :** Flat Top

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
N									
Aluminum Alloy (A6061, A7075)	Si<5%	●	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	.008—.118
		◐	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
		✤	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
Aluminum Alloy (AC4B)	5%≦Si≦10%	●	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
		◐	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
		✤	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
Aluminum Alloy (ADC12, A390)	Si>10%	●	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
		◐	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118
		✤	**F**	1	**AZ**	**HTi10**	985—2295	.004—.016	008—.118

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
S									
Titanium Alloy (Ti-6Al-4V)	–	●	**F**	1	**FS-P**	**MT9005**	130–260	.002–.005	.008–.055
		●	**F**	2	**FJ**	**RT9010**	115–245	.002–.005	.008–.055
		●	**L**	1	**LS-P**	**MT9005**	130–260	.002–.006	.012–.118
		●	**L**	2	**LS(M)**	**MT9005**	130–260	.002–.008	.008–.039
		●	**M**	1	**MS**	**MT9005**	115–210	.003–.010	.012–.079
		◐	**F**	1	**FS-P**	**MT9005**	130–260	.002–.005	.008–.055
		◐	**F**	2	**FJ**	**RT9010**	115–245	.002–.005	.008–.055
		◐	**L**	1	**LS-P**	**MT9005**	130–260	.002–.006	.012–.118
		◐	**L**	2	**LS(M)**	**MT9005**	130–260	.002–.008	.008–.039
		◐	**M**	1	**MS**	**MT9005**	115–210	.003–.010	.012–.079
		✤	**F**	1	**FS-P**	**MT9005**	130–260	.002–.005	.008–.055
		✤	**F**	2	**FJ**	**RT9010**	115–245	.002–.005	.008–.055
		✤	**L**	1	**LS-P**	**MT9005**	130–260	.002–.006	.012–.118
		✤	**L**	2	**LS(M)**	**MT9005**	130–260	.002–.008	.008–.039
		✤	**M**	1	**MS**	**MT9005**	115–210	.003–.010	.012–.079
S									
Heat Resistant Alloy (Inconel718)	–	●	**F**	1	**FS**	**MP9005**	80–310	.002–.005	.008–.055
		●	**F**	2	**FJ**	**VP10RT**	65–150	.002–.005	.008–.055
		●	**L**	1	**LS(G)**	**MP9005**	80–310	.002–.006	.012–.118
		●	**L**	2	**LS(M)**	**MP9005**	80–310	.002–.008	.008–.039
		●	**M**	1	**MS**	**MP9005**	65–260	.003–.010	.012–.079
		◐	**F**	1	**FS**	**MP9015**	65–245	.002–.005	.008–.055
		◐	**F**	2	**FJ**	**VP10RT**	65–150	.002–.005	.008–.055
		◐	**L**	1	**LS(G)**	**MP9015**	65–245	.002–.006	.012–.118
		◐	**L**	2	**LS(M)**	**MP9015**	65–245	.002–.008	.008–.039
		◐	**M**	1	**MS**	**MP9015**	65–195	.003–.010	.012–.079
		✤	**F**	1	**FS**	**MP9015**	65–245	.002–.005	.008–.055
		✤	**F**	2	**FJ**	**VP10RT**	65–150	.002–.005	.008–.055
		✤	**L**	1	**LS(G)**	**MP9015**	65–245	.002–.006	.012–.118
		✤	**L**	2	**LS(M)**	**MP9015**	65–245	.002–.008	.008–.039
		✤	**M**	1	**MS**	**MP9015**	65–195	.003–.010	.012–.079

CUTTING CONDITIONS : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
CUTTING AREA : **F** : Finish Cutting **L** : Light Cutting **M** : Medium Cutting **R** : Rough Cutting **H** : Heavy Cutting

RECOMMENDED CUTTING CONDITIONS

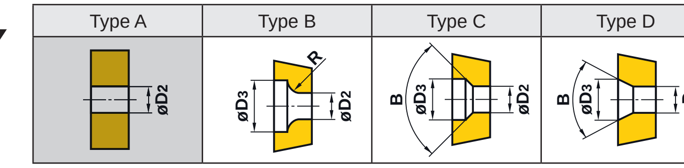
■ 11° POSITIVE INSERT TYPE

Breaker : **Std :** Standard **Flat :** Flat Top

Work Material	Hardness	Cutting Mode		Priority	Breaker	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P									
Mild Steel (AISI ASTM A283, AISI 1010)	≤180HB	●	F	1	R-R/L	NX2525	740–1050	.002–.005	.008–.024
		●	L	1	R-Std	NX2525	605–885	.003–.012	.012–.079
		●	M	1	R-Std	NX2525	605–885	.003–.012	.012–.079
		◐	F	1	R-R/L	NX2525	740–1050	.002–.005	.008–.024
		◐	L	1	R-Std	UE6110	690–1165	.003–.012	.012–.079
		◐	L	2	R-Std	MP3025	620–970	.003–.012	.012–.079
		◐	L	3	R-Std	NX3035	590–835	.003–.012	.012–.079
		◐	M	1	R-Std	UE6110	690–1165	.003–.012	.012–.079
		◐	M	2	R-Std	MP3025	620–970	.003–.012	.012–.079
		◐	M	3	R-Std	NX3035	590–835	.003–.012	.012–.079
		✤	F	1	R-R/L	UTi20T	375–540	.002–.005	.008–.024
		✤	L	1	N-Flat	UP20M	345–525	.003–.012	.012–.079
		✤	M	1	N-Flat	UP20M	345–525	.003–.012	.012–.079
Carbon Steel • Alloy Steel (AISI 1045, AISI 4140)	180 – 280HB	●	F	1	R-R/L	NX2525	540–785	.002–.005	.008–.024
		●	L	1	R-Std	NX2525	460–655	.003–.012	.012–.079
		●	M	1	R-Std	NX2525	460–655	.003–.012	.012–.079
		◐	F	1	R-R/L	NX2525	540–785	.002–.005	.008–.024
		◐	L	1	R-Std	UE6110	510–850	.003–.012	.012–.079
		◐	L	2	R-Std	MP3025	460–720	.003–.012	.012–.079
		◐	L	3	R-Std	NX3035	440–620	.003–.012	.012–.079
		◐	M	1	R-Std	UE6110	510–850	.003–.012	.012–.079
		◐	M	2	R-Std	MP3025	460–720	.003–.012	.012–.079
		◐	M	3	R-Std	NX3035	440–620	.003–.012	.012–.079
		✤	F	1	R-R/L	UTi20T	280–395	.002–.005	.008–.024
		✤	L	1	N-Flat	UP20M	260–395	.003–.012	.012–.079
		✤	M	1	N-Flat	UP20M	260–395	.003–.012	.012–.079

CUTTING CONDITIONS : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
CUTTING AREA : **F** : Finish Cutting **L** : Light Cutting **M** : Medium Cutting **R** : Rough Cutting **H** : Heavy Cutting

HOLE GEOMETRY



POSITIVE

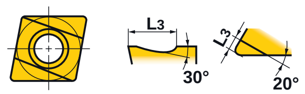
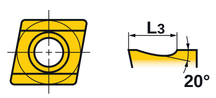
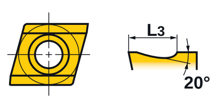
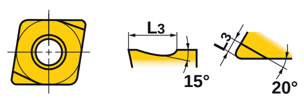
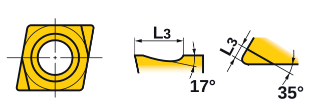
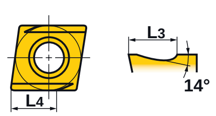
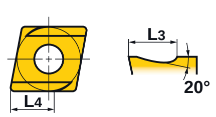
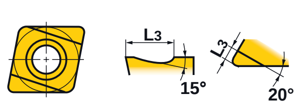
Insert Number		Dimensions (mm) D2	D3	B(°)	Hole Type
CCET	0602○○	2.8	3.8	R	B
	09T3○○	4.4	6.0	R	B
CCMH	0602○○	2.8	3.9	R	B
CCGT	03S1○○	2.0	2.9	R	B
	04T0○○	2.4	3.5	R	B
	0602○○	2.8	3.8	R	B
	09T3○○	4.4	6.0	R	B
	1204○○	5.5	7.5	R	B
CCMT	0602○○	2.8	3.8	R	B
	0803○○	3.4	4.5	R	B
	09T3○○	4.4	6.0	R	B
	1204○○	5.5	7.5	R	B
CCGW CCMW	03S1○○	2.0	2.9	R	B
	04T0○○	2.4	3.5	R	B
	0602○○	2.8	3.8	R	B
	09T3○○	4.4	6.0	R	B
	1204○○	5.5	7.5	R	B
CPGT	0802○○	3.4	4.5	R	B
	0903○○	4.4	6.0	R	B
CPMH	0802○○	3.5	5.3	78°	D
	0903○○	4.5	6.3	78°	D
CPMX	0802○○	3.5	5.6	78°	B
	0903○○	4.6	6.6	80°	B
DCET DCGT	0702○○	2.8	3.8	R	B
	11T3○○	4.4	6.0	R	B
DCGW DCMW DCMT	0702○○	2.8	3.8	R	B
	11T3○○	4.4	6.0	R	B
				R	B
SCMT SCMW	09T3○○	4.4	6.0	R	B
	1204○○	5.5	7.5	R	B
TCGT TCMT TCMW	0601○○	2.3	3.2	R	B
	0802○○	2.3	3.0	R	B
	0902○○	2.5	3.3	R	B
	1102○○	2.8	3.8	R	B
	1303○○	3.4	4.5	R	B
	16T3○○	4.4	6.0	R	B

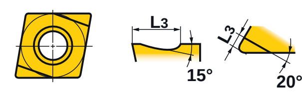
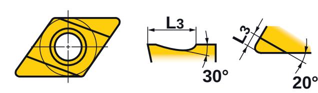
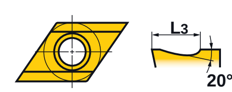
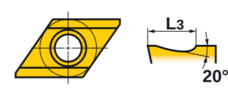
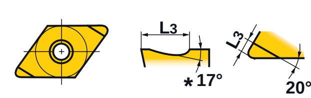
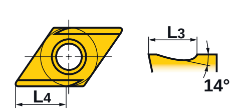
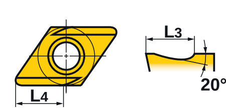
Insert Number		Dimensions (mm) D2	D3	B(°)	Hole Type
TPGX	0802○○	2.5	3.8	88°	C
	0902○○	3.0	4.3	88°	C
	1103○○	3.5	4.8	88°	C
TPMX	0902○○	3.2	4.3	88°	C
	1103○○	3.7	4.8	88°	C
TPGH TPMH	0802○○	2.4	4.0	78°	D
	0902○○	2.9	4.3	78°	D
	1103○○	3.4	4.8	78°	D
VBET VBGT VBMT	1103○○	2.9	3.8	R	B
	1604○○	4.4	6.0	R	B
VCGT VCMT VCMW	0802○○	2.4	3.2	R	B
	1103○○	2.8	3.8	R	B
	1604○○	4.4	6.0	R	B
VPET VPGT	0802○○	2.4	3.2	R	B
	1103○○	2.9	3.8	R	B
WBGT WBMT	0201○○	2.3	3.2	R	B
	L302○○	2.3	3.2	R	B
WCGT WCMT	0201○○	2.3	3.0	R	B
	L302○○	2.3	3.0	R	B
	0402○○	2.8	3.8	R	B
	06T3○○	4.4	6.0	R	B
WPGT WPMT	0402○○	2.8	3.8	R	B
	0603○○	4.4	6.0	R	B
XCMT	1503○○	2.8	3.8	R	B

PRECISION BREAKER SYSTEM

STANDARD OF INSERTS WITH HAND OF TOOL

● POSITIVE INSERTS

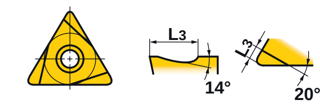
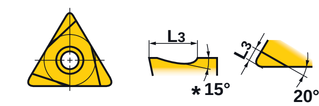
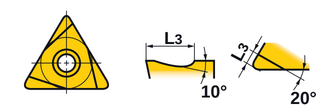
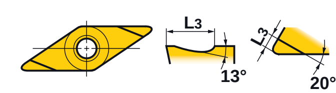
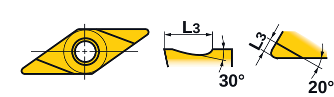
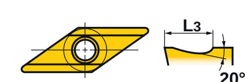
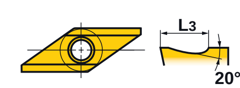
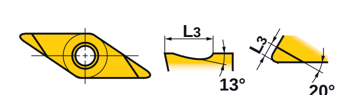
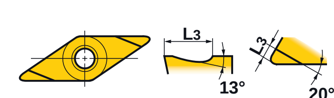
Geometry	Insert Number	L_3	L_4
 Right hand insert shown.	CCET 0602V3R/L-SR	2.2	—
	060201R/L-SR	2.2	—
	060202R/L-SR	2.2	—
	060204R/L-SR	2.2	—
	09T3V3R/L-SR	3.2	—
	09T301R/L-SR	3.2	—
	09T302R/L-SR	3.2	—
	09T304R/L-SR	3.2	—
 Right hand insert shown.	CCET 060200R/L-SN	1.0	—
	0602V3R/L-SN	1.0	—
	060201R/L-SN	1.0	—
	060202R/L-SN	1.0	—
	060204R/L-SN	1.0	—
	09T300R/L-SN	1.5	—
	09T3V3R/L-SN	1.5	—
	09T301R/L-SN	1.5	—
	09T302R/L-SN	1.5	—
	09T304R/L-SN	1.5	—
 Right hand insert shown.	CCET 0602V3R/LW-SN	1.0	—
	09T3V3R/LW-SN	1.5	—
 Right hand insert shown.	CCGH 060202R/L-F	1.2	—
	060204R/L-F	1.4	—
 Right hand insert shown.	CCGT 03S1V3L-F	0.8	—
	03S101L-F	0.8	—
	03S102L-F	0.8	—
	03S104L-F	0.8	—
	04T0V3L-F	1.0	—
	04T001L-F	1.0	—
	04T002L-F	1.0	—
	04T004L-F	1.0	—
 Right hand insert shown.	CCGT 0602V3R/L-SS	1.0	3.0
	060201R/L-SS	1.0	3.0
	060202R/L-SS	1.0	3.0
	09T3V3R/L-SS	1.0	5.0
	09T301R/L-SS	1.0	5.0
	09T302R/L-SS	1.0	5.0
 Right hand insert shown.	CCGT 0602V3R-SN	1.0	3.0
	060201R/L-SN	1.0	3.0
	060202R/L-SN	1.0	3.0
	09T3V3R/L-SN	1.5	5.0
	09T301R/L-SN	1.5	5.0
	09T302R/L-SN	1.5	5.0
	09T304R/L-SN	1.5	5.0
 Right hand insert shown.	CPGT 080204R/L-F	0.6	—
	090302R/L-F	0.8	—
	090304R/L-F	0.8	—

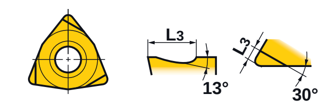
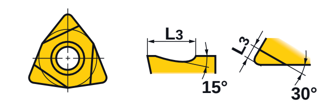
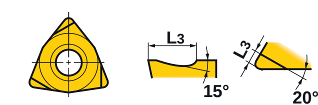
Geometry	Insert Number	L_3	L_4
 Right hand insert shown.	CPMH 080204R/L-F	1.0	—
	090304R/L-F	1.4	—
 Right hand insert shown.	DCET 0702V3R/L-SR	2.5	—
	070201R/L-SR	2.5	—
	070202R/L-SR	2.5	—
	070204R/L-SR	2.5	—
	11T3V3R/L-SR	3.7	—
	11T301R/L-SR	3.7	—
	11T302R/L-SR	3.7	—
	11T304R/L-SR	3.7	—
 Right hand insert shown.	DCET 070200R/L-SN	1.0	—
	0702V3R/L-SN	1.0	—
	070201R/L-SN	1.0	—
	070202R/L-SN	1.0	—
	070204R/L-SN	1.0	—
	11T300R/L-SN	1.5	—
	11T3V3R/L-SN	1.5	—
	11T301R/L-SN	1.5	—
	11T302R/L-SN	1.5	—
	11T304R/L-SN	1.5	—
 Right hand insert shown.	DCET 0702V3R/LW-SN	1.0	—
	11T3V3R/LW-SN	1.5	—
 ★DCGT11T3○○type : 14° Right hand insert shown.	DCGT 070202R/L-F	1.0	—
	070204R/L-F	1.0	—
	11T302R/L-F	1.0	—
	11T304R/L-F	1.0	—
 Right hand insert shown.	DCGT 0702V3R/L-SS	1.0	3.5
	070201R/L-SS	1.0	3.5
	070202R/L-SS	1.0	3.5
	11T3V3R-SS	1.0	6.5
	11T301R-SS	1.0	6.5
	11T302R-SS	1.0	6.5
 Right hand insert shown.	DCGT 0702V3R-SN	1.0	3.5
	070201R-SN	1.0	3.5
	070202R/L-SN	1.0	3.5
	11T3V3R/L-SN	1.5	6.5
	11T301R/L-SN	1.5	6.5
	11T302R/L-SN	1.5	6.5
	11T304R/L-SN	1.5	6.5

PRECISION BREAKER SYSTEM

STANDARD OF INSERTS WITH HAND OF TOOL

● POSITIVE INSERTS

Geometry	Insert Number	L_3	L_4
 Left hand insert shown.	TCGT 0601V3L-F	1.0	—
	060101L-F	1.0	—
	060102R/L-F	1.0	—
	060104R/L-F	1.0	—
 ★TPGH1603○○type : 14° Right hand insert shown.	TPGH 080202R/L-FS	0.9	—
	080204R/L-FS	0.9	—
	090202R/L-FS	1.0	—
	090204R/L-FS	1.0	—
	110302R/L-FS	1.4	—
	110304R/L-FS	1.4	—
 Right hand insert shown.	TPGX 080202R/L	1.3	—
	080204R/L	1.3	—
	090202R/L	1.6	—
	090204R/L	1.6	—
	090208L	1.4	—
	110302R/L	1.8	—
	110304R/L	1.8	—
	110308R/L	1.8	—
 Right hand insert shown.	VBGT 110302R/L-F	1.0	—
	110304R/L-F	1.0	—
	160402R/L-F	1.5	—
	160404R/L-F	1.5	—
 Right hand insert shown.	VBET 1103V3R/L-SR	2.5	—
	110301R/L-SR	2.5	—
	110302R/L-SR	2.5	—
	110304R/L-SR	2.5	—
 Right hand insert shown.	VBET 110300R/L-SN	1.0	—
	1103V3R/L-SN	1.0	—
	110301R/L-SN	1.0	—
	110302R/L-SN	1.0	—
	110304R/L-SN	1.0	—
 Right hand insert shown.	VBET 1103V3R/LW-SN	1.0	—
 Right hand insert shown.	VCGT 080202R/L-F	0.8	—
	080204R/L-F	0.8	—
 Right hand insert shown.	VPET 080201R/L-SRF	0.8	—
	080202R/L-SRF	0.8	—
	1103V3R/L-SRF	1.0	—
	110301R/L-SRF	1.0	—
	110302R/L-SRF	1.0	—

Geometry	Insert Number	L_3	L_4
 Left hand insert shown.	WBGT 0201V3L-F	1.0	—
	020101L-F	1.0	—
	020102L-F	1.0	—
	020104L-F	1.0	—
	L302V3L-F	1.0	—
	L30201L-F	1.0	—
	L30202R/L-F	1.0	—
	L30204R/L-F	1.0	—
 Right hand insert shown.	WCGT 020102R/L	1.0	—
	020104R/L	1.0	—
	L30202L	1.0	—
	L30204L	1.0	—
		1.0	
 Right hand insert shown.	WPGT 040204L-FS	1.0	—
	060304R/L-FS	1.0	—

HOW TO READ THE STANDARD OF SMALL TOOLS

●How this section page is organized

①Organized according to the cutting mode of small tools.
(Refer to the inside title on the next page.)
②Shown as Turning → External Grooving → External Cutting Off → Threading → Boring.

TYPE OF TOOL HOLDER
indicates the first four letters of the order number, as well as cutting applications.

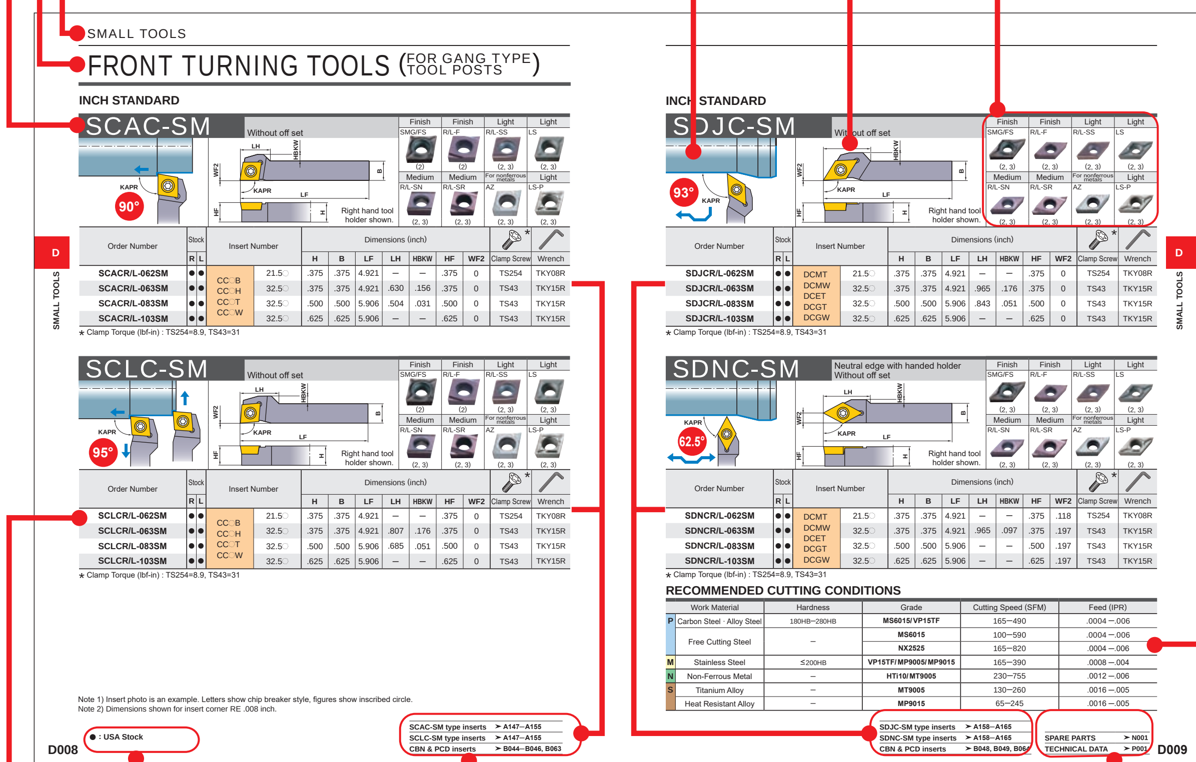
APPLICATION

PRODUCT SECTION

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict the available machining applications such as external turning, copying, facing, chamfering, threading, and grooving together with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages giving details of inserts that are applicable to the product.

PAGE REFERENCE
· SPARE PARTS
· TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

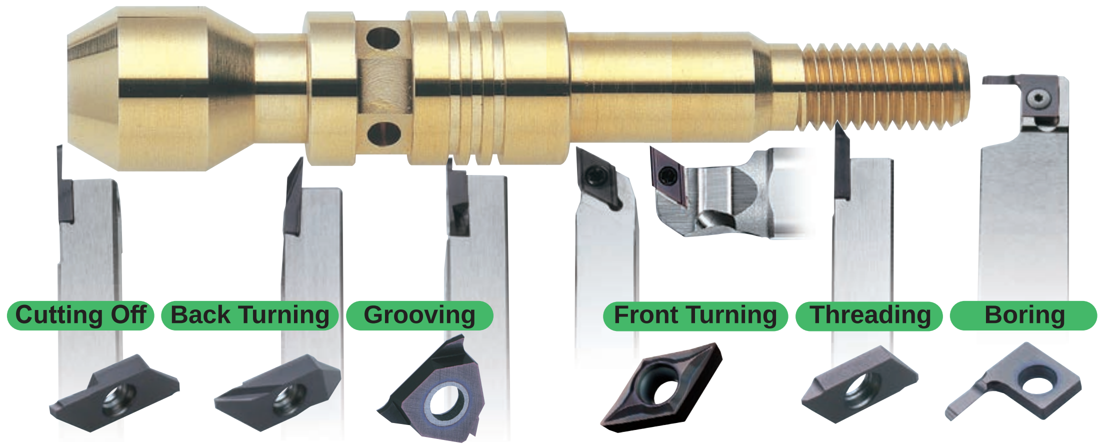
RECOMMENDED CUTTING CONDITIONS
for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M and N.

●To Order : Please specify order number and hand of tool (right/left).

TURNING
SMALL TOOLS

OUTLINE OF SMALL TOOLS

TOOLS FOR GANG TYPE AUTOMATIC LATHES (FOR EXTERNAL TURNING AND BORING)



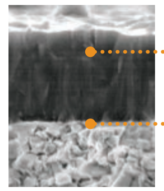
PVD Coated Cemented Carbide Grade for Carbon Steel

MS6015 NEW

Skilled at pure iron, carbon steel and free cutting steel turning and achieving implemented stable finished surfaces and excellent dimensional accuracy.

	MS6015	Conventional
Coating	TiCN multilayer	TiAlN
Hardness (HV)	3,000	2,800
Wear Coefficient (Carbon Steel)	Low	High
Base Material Hardness (HRA)	92.0	92.0
T.R.S (GPa)	2.0	2.0

Ti-C-N Multilayer Coating



Superior wear and welding resistance and demonstrating the best possible results for carbon steel.

Minute multilayers remarkably improve welding.

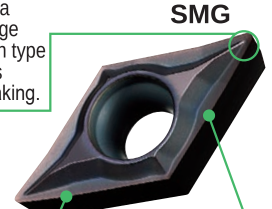
● Molded breaker insert

Nose radii designed with minus tolerance

- Suitable for small parts applications that often require minus tolerance dimensions.
- The order number is shown with the letter "M" that indicates minus tolerance. ex) DCGT32.50.2MFS
- The radius value is printed on the side of the insert label for easy recognition.

A combination of a curved cutting edge and the protrusion type breaker promotes efficient chip breaking.

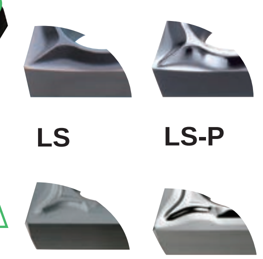
SMG



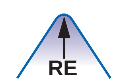
Curved cutting edge

Sharp cutting edge

FS FS-P LS LS-P



● Tolerance Corner R



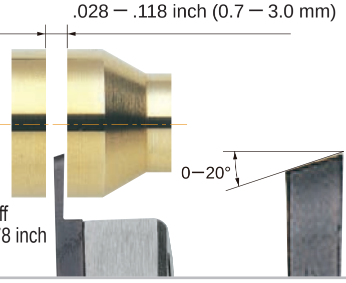
E class
RE $^{0}_{-.0008}$ inch

The letter "M" insert
RE $^{0}_{-.002}$ inch

(Conventional G-class insert RE ± .004 inch)

● Cutting Off

Cutting edge width .028 — .118 inch (0.7 — 3.0 mm)

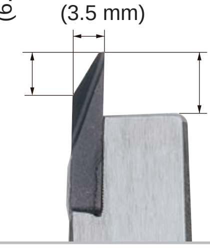


Max. Cutting Off diameter ϕ1.378 inch (ϕ35 mm)

● Back Turning

Effective cutting edge length — .236 inch (6.0 mm)

.138 inch (3.5 mm)



Over hang — .295 inch (7.5 mm)

Inserts for Molded Back Turning

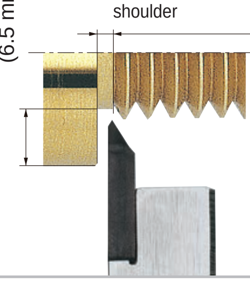
SMB Breaker

NEW

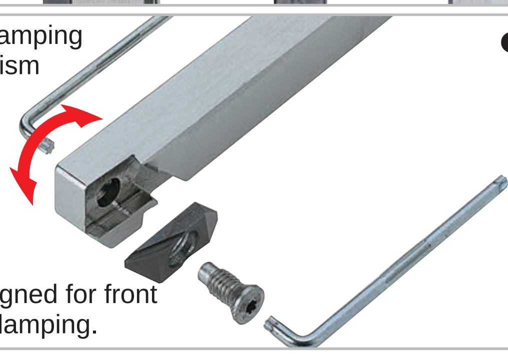
● Threading

Step difference .256 inch (6.5 mm)

Can machine to the shoulder



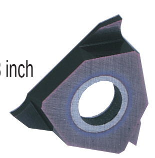
● Back Clamping Mechanism

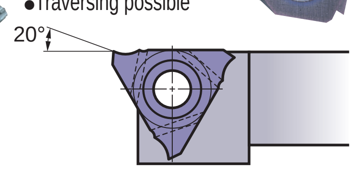


Screw designed for front and back clamping.

● Grooving

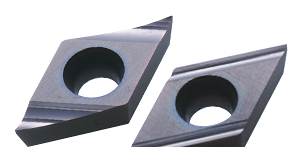
- 3-cornered
- Groove width .012– .118 inch (0.3-3.0 mm)
- Traversing possible





● Front Turning

- ISO E class accuracy inserts
- A wide variety of small corner R inserts
- Rake angle 30°



Tools for a very wide range of small parts machining

External Turning	Tools for front turning, back turning, grooving, threading, and cutting off
Internal Turning	Tools for boring, internal grooving and internal threading
Drilling	Drills
End Milling	End Mills

Tools for front turning, back turning, grooving, threading, and cutting off

Tool Post Type	Gang type, Turret type Radial type
Tool Size	Square holder : .375—.625 inch (8 — 16 mm) Round holder : ≤ ϕ1 inch (ϕ25.4 mm)

Indexable inserts developed under the concept of "high quality, high efficiency and long tool life."

High Quality	E class tolerance, sharp cutting edge, high accuracy small corner R, smooth surface finish
Long Tool Life	PVD coating MS6015/VP15TF/MP9005/MP9015
High Efficiency	Regrinding not necessary due to the employment of indexable inserts. A wide variety of top cutting edge geometries

INTERNAL TURNING TOOLS

Solid type MICRO-MINI TWIN Boring Bars

Minimum cutting diameter ϕ 2.2 mm–

Boring
Grooving
Threading

Round Shank

Square Shank

MICRO-DEX Boring Bars

Minimum cutting diameter ϕ5.0 mm–

Minimum cutting diameter ϕ .39 inch–

DIMPLE BAR

TOOLS FOR CAM TYPE AUTOMATIC LATHES

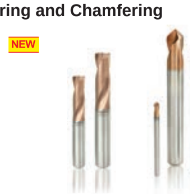
- The most suitable for the use with cam type automatic lathes (radial pattern tool posts)
- The most suitable for machining of small parts with work diameter 5mm or smaller
- Single holder for front turning, back turning, grooving, threading and cutting off operations

DRILLING TOOLS

Solid Carbide Drill
MVS/MVE

Solid Carbide Flat Bottom Drills
MFE NEW

Solid Carbide Drills for Centering and Chamfering
DLE NEW



Micro Solid Carbide Center Drills
MSP

Solid Gun Drill
Micro Solid Carbide Gun Drill with through coolant holes
MGS

END MILLING TOOLS

Solid Carbide End Mill
MSTAR End Mill Series

Vibration Control End Mills for Machining Difficult-to-Cut Materials
SMART MIRACLE End Mill Series

CLASSIFICATION (EXTERNAL TURNING)

GANG TYPE TOOL POSTS

●FRONT TURNING

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
SCAC-SM Inch ➔ D008 Metric ➔ D012	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 90°
SCLC-SM Inch ➔ D008 Metric ➔ D012	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 95°
SDJC-SM Inch ➔ D009 Metric ➔ D013	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 93°
SDNC-SM Inch ➔ D009 Metric ➔ D013	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 62.5°
SVLP-SM Inch ➔ D010 Metric ➔ D014	.375 x .375 x 5.000 .500 x .500 x 6.000 .625 x .625 x 6.000	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 95°
SVJB-SM Inch ➔ D010 Metric ➔ D014	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 93°
SVJC-SM Inch ➔ D011 Metric ➔ D015	.375 x .375 x 4.500 .500 x .500 x 4.500 .625 x .625 x 4.500	10x10x120 12x12x120 16x16x120	KAPR 93°
SVPP-SM Metric ➔ D015	–	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 117.5°
SVVB-SM Inch ➔ D011 Metric ➔ D015	.375 x .375 x 4.921 .500 x .500 x 5.906 .625 x .625 x 5.906	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	KAPR 72.5°

●BACK TURNING

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
BTAH (Edge Length) .110, .138, .197 inch 2.8, 3.5, 5.0 mm Inch ➔ D016 Metric ➔ D019	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTBH (Edge Length) .177, .236 inch 4.5, 6.0 mm Inch ➔ D017 Metric ➔ D020	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
BTVH (Edge Length) .295 inch 7.5 mm Inch ➔ D018 Metric ➔ D021	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	KAPR 53°

●THREADING

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
TTAH Inch ➔ D035 Metric ➔ D036	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
MMTE Inch ➔ D038	.375 x .375 x 4.724 .500 x .500 x 4.724	–	

●GROOVING

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
GTAH (Grooving Width) .012-.055 inch 0.3-3.0 mm Inch ➔ D022 Metric ➔ D024	.375 x .375 x 3.150 .500 x .500 x 3.150 .500 x .500 x 4.724 .625 x .625 x 4.724	8 x 8 x 80 8 x 8 x 120 10 x 10 x 80 10 x 10 x 120 12 x 12 x 80 12 x 12 x 120 16 x 16 x 120	U Type E Type VT Type
GTBH (Grooving Width) .057-.089 inch 1.45-3.0 mm Inch ➔ D022 Metric ➔ D024	.375 x .375 x 3.150 .375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	10 x 10 x 80 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	U Type E Type VT Type
GTCH (Grooving Width) .098-.118 inch 2.5-3.0 mm Inch ➔ D022 Metric ➔ D024	.375 x .375 x 3.150 .375 x .375 x 4.724	10 x 10 x 80 10 x 10 x 120	U Type E Type VT Type

Note 1) For GY style lathes please refer page F018 or F042.

●CUTTING OFF

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
CTAH (Max.Cut Off Diameter) .472 inch 12 mm Inch ➔ D026 Metric ➔ D028	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTAH-S (Max.Cut Off Diameter) .472 inch 12 mm Inch ➔ D026 Metric ➔ D028	.375 x .375 x 3.150 .500 x .500 x 3.150	10 x 10 x 80	
CTBH (Max.Cut Off Diameter) .630 inch 16 mm Inch ➔ D030 Metric ➔ D031	.375 x .375 x 4.724 .500 x .500 x 4.724 .625 x .625 x 4.724	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTCH (Max.Cut Off Diameter) .787 inch 20 mm Metric ➔ D032	–	10 x 10 x 120 12 x 12 x 120	
CTDH (Max.Cut Off Diameter) .906-1.378 inch 23-35 mm Metric ➔ D033	–	16 x 16 x 120 16 x 16 x 125	
CTEH (Max.Cut Off Diameter) .906-1.378 inch 23-35 mm Metric ➔ D034	–	16 x 16 x 120 16 x 16 x 125	

OPPOSITE TOOL POSTS

●DIMPLE SLEEVE HOLDER

Name of Tool Holder	Shank Size (DCON x LF) Inch	Shank Size (DCON x LF) Metric	Geometry
SH Inch ➔ D039 Metric ➔ D040	.625 x 3.937 .750 x 4.921 .787 x 4.921 .866 x 4.921 1.000 x 5.906	ϕ15.875 x 100 ϕ19.05 x 125 ϕ20 x 125 ϕ22 x 125 ϕ25.4 x 150	KAPR 93°

Name of Tool Holder	Shank Size (inch) (H x B x LF)	Geometry
SVVB Inch ➔ C028	.375 x .375 x 2.500 .500 x .500 x 3.000 .625 x .625 x 4.000	KAPR 72.5°
SVHB Inch ➔ C029	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 17.5°

TURRET TYPE TOOL POSTS

●FRONT TURNING

Name of Tool Holder	Shank Size (inch) (H x B x LF)	Geometry
SCLC Inch ➔ C030	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 95°
SDJC Inch ➔ C031	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 93°
SDNC Inch ➔ C031	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 62.5°
SSSC Inch ➔ C034	.500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 45°
STGC Inch ➔ C035	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 91°
STFC Inch ➔ C035	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 91°
SVJC Inch ➔ C036	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 93°
SVPC Inch ➔ C036	.500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 117.5°
SVJB Inch ➔ C028	.375 x .375 x 2.500 .500 x .500 x 3.500 .625 x .625 x 4.000	KAPR 93°

RADIAL TYPE TOOL POSTS

Name of Tool Holder	Tool Size (H x B x LF) Inch	Tool Size (H x B x LF) Metric	Geometry
CSVH (Front Turning) Inch ➔ D041 Metric ➔ D044	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Front Turning Copying) Inch ➔ D041 Metric ➔ D044	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Back Turning) Inch ➔ D042 Metric ➔ D045	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Back Turning Copying) Inch ➔ D042 Metric ➔ D045	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Cutting Off) Inch ➔ D042 Metric ➔ D045	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Grooving) Inch ➔ D043 Metric ➔ D046	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	
CSVH (Threading) Inch ➔ D043 Metric ➔ D046	.375 x .375 x 5.512 .500 x .500 x 5.512	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x10 x 140 12 x12 x 140	

CLASSIFICATION (INTERNAL TURNING)

Min. Cutting Dia.	Name of Tool Holder	Features	KAPR = 75°	KAPR = 93°					KAPR = 95°		KAPR = 107.5°–117.5°		KAPR = 142°	Grooving	Threading	Selection Standard					
			KAPR	KAPR					KAPR		KAPR		KAPR			Economical	Low Cutting Resistance	Vibration Resistance	Coolant Thru	Specialized	Small Diameter Cutting
ϕ3.0 mm (ϕ.118 inch)	**For Gang Type Tool Posts SBAH**	● The minimum cutting diameter is ϕ3 mm (.118 inch). ● Tools for Gang type Swiss type lathes.		SBAH E047 → D047																◎	◎
ϕ2.2 mm – ϕ7.2 mm (ϕ.087 – ϕ.283 inch)	**MICRO-MINI TWIN Boring Bars** (Solid Carbide)	● The minimum cutting diameter is ϕ2.2 mm (.087 inch). ● Two cutting edges type. ● Continuous cutting from boring to facing. ● With or without a chip breaker.							CB◌◌RS(-B) E032				CR◌◌RS-01(-B) E033	CG◌◌RS-◌◌(-B) F241	CT◌◌RSM◌◌(B) G034	◎	◎	◎			◎
ϕ3.2 mm – ϕ5.2 mm (ϕ.126 – ϕ.205 inch)	**MICRO-MINI Boring Bars** (Solid Carbide)	● The minimum cutting diameter is from ϕ3.2 mm (.126 inch). ● Single cutting edge type. ● l/d is 5 times the diameter. ● Cutting edge can be shaped according to the application. Thus, it covers a wide cutting range. (threading, grooving, copying, etc.)		C◌◌FR-BLS E031													◎	◎			◎
ϕ5.0 mm – ϕ8.0 mm (ϕ.197 – ϕ.315 inch)	**MICRO-DEX Boring Bars**	● The minimum cutting diameter is from ϕ5 mm (.197 inch). ● 7°positive insert. ● Carbide shank type. ● Easy-to-use tool geometries. ● Suitable for small workpiece. ● l/d is 5 times the diameter.					SWUB E029		SCLC E029								◎	◎			◎
ϕ.390 inch – ϕ.977 inch	**SCREW CLAMP DIMPLE BAR** (Heavy Metal Shank) (Steel Shank)	● The minimum cutting diameter is ϕ.390 inch. ● 7°, 11° positive insert. ● Excellent vibration resistance due to light dimple head. ● Coolant thru type.		M-FSDUC E008	M/S-FSTUP M E007 S E007	M-FSVUB/C E009	M-FSWUB/P E009		M/S-FSCLC/P M E006 S E006		M-FSDQC E008	M-FSVPB/C E010	M-FSVJC E010				◎	◎	◎		
ϕ.228 inch – ϕ.937 inch	**Screw Clamp Type Boring Bars** (Steel Shank)	● Two wall pocket. ● 7° positive insert, low cutting force. ● Screw clamp type. ● Steel, heavy metal and carbide shanks are available in various diameters.	S-SSKC E015	S-SDUC E014	S-STUC E015		S-SWUC E019		S-SCLC E012		S-SDQC E013	S-SVQC E016				◎	○	○			
ϕ.200 inch – ϕ.750 inch	**Screw Clamp Type Boring Bars** (Heavy Metal Shank)								M-SCLC E012	M-SWLO E020							○	○			
ϕ.228 inch – ϕ.797 inch	**Screw Clamp Type Boring Bars** (Carbide Shank)				C-STUC E016				C-SCLC E013	C-SWLO E019	C-SDQC E014						○	◎			
ϕ.390 inch – ϕ.790 inch	**SL5 Type Boring Bars**	● Multi-functional bar for threading, grooving and boring. ● Minimum bore ϕ.390 inch. ● Rigid insert retention.												S-SL5N F239	S-SL5N G032		○	○			○
ϕ10 mm – ϕ20 mm (ϕ.394 – ϕ.787 inch)	**F Type Boring Bars (FSL51,52)**	● The minimum cutting diameter is ϕ10 mm (.394 inch). ● Single holder can be equipped with grooving inserts and threading inserts.												FSL51, FSL52 F238	FSL51, FSL52 G031		○	○			○

Note 1) Products with blue color symbol have carbide shank.

Note 2) ◎: 1st recommendation. ○: 2nd recommendation.

D SMALL TOOLS

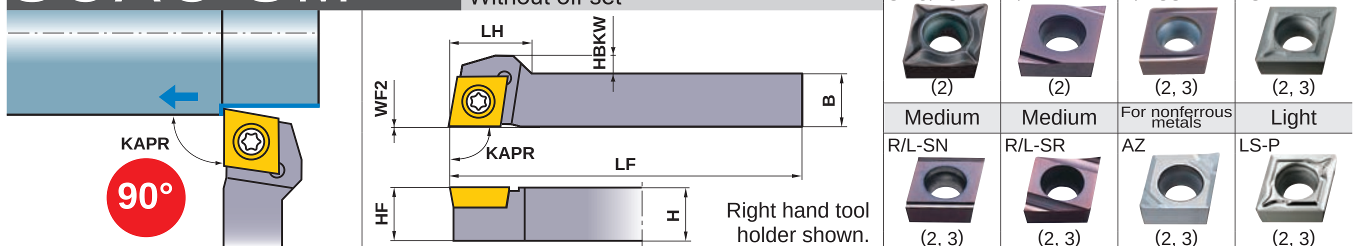
D SMALL TOOLS

FRONT TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

SCAC-SM

Without off set



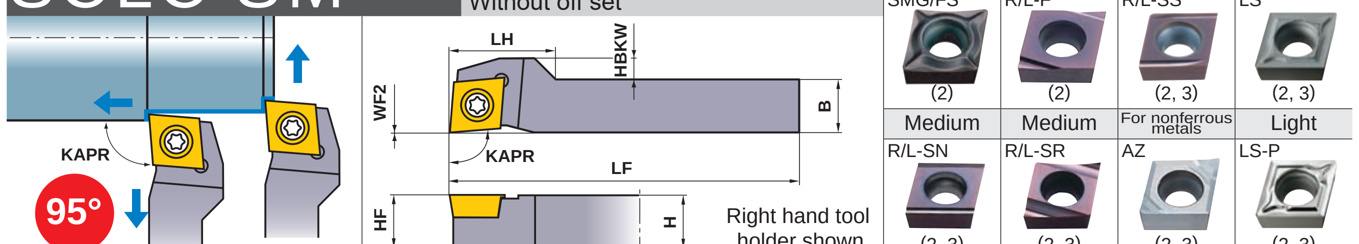
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SCACR/L-062SM	●	●	CC○B CC○H CC○T CC○W	21.5○	.375	.375	4.921	—	—	.375	0	TS254	TKY08R
SCACR/L-063SM	●	●		32.5○	.375	.375	4.921	.630	.156	.375	0	TS43	TKY15R
SCACR/L-083SM	●	●		32.5○	.500	.500	5.906	.504	.031	.500	0	TS43	TKY15R
SCACR/L-103SM	●	●		32.5○	.625	.625	5.906	—	—	.625	0	TS43	TKY15R

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

SCLC-SM

Without off set



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SCLCR/L-062SM	●	●	CC○B CC○H CC○T CC○W	21.5○	.375	.375	4.921	—	—	.375	0	TS254	TKY08R
SCLCR/L-063SM	●	●		32.5○	.375	.375	4.921	.807	.176	.375	0	TS43	TKY15R
SCLCR/L-083SM	●	●		32.5○	.500	.500	5.906	.685	.051	.500	0	TS43	TKY15R
SCLCR/L-103SM	●	●		32.5○	.625	.625	5.906	—	—	.625	0	TS43	TKY15R

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

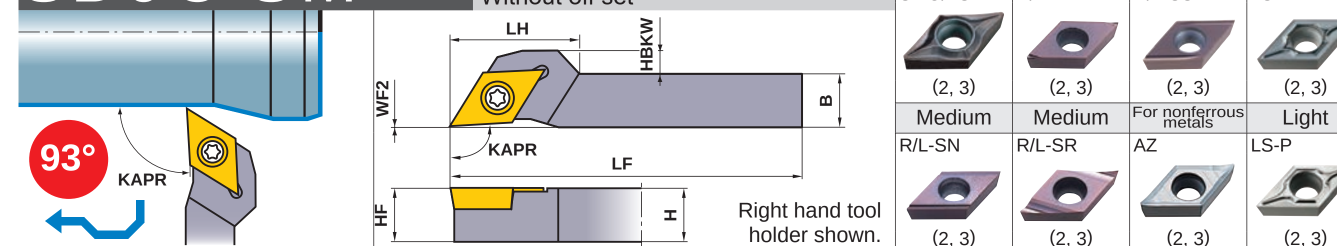
Note 1) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.
Note 2) Dimensions shown for insert corner RE .008 inch.

● : USA Stock

INCH STANDARD

SDJC-SM

Without off set



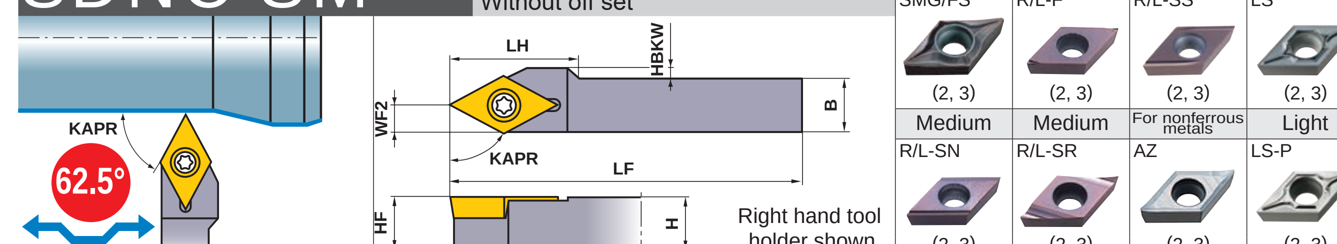
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SDJCR/L-062SM	●	●	DCMT DCMW DCET DCGT DCGW	21.5○	.375	.375	4.921	—	—	.375	0	TS254	TKY08R
SDJCR/L-063SM	●	●		32.5○	.375	.375	4.921	.965	.176	.375	0	TS43	TKY15R
SDJCR/L-083SM	●	●		32.5○	.500	.500	5.906	.843	.051	.500	0	TS43	TKY15R
SDJCR/L-103SM	●	●		32.5○	.625	.625	5.906	—	—	.625	0	TS43	TKY15R

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

SDNC-SM

Neutral edge with handed holder
Without off set



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SDNCR/L-062SM	●	●	DCMT DCMW DCET DCGT DCGW	21.5○	.375	.375	4.921	—	—	.375	.118	TS254	TKY08R
SDNCR/L-063SM	●	●		32.5○	.375	.375	4.921	.965	.097	.375	.197	TS43	TKY15R
SDNCR/L-083SM	●	●		32.5○	.500	.500	5.906	—	—	.500	.197	TS43	TKY15R
SDNCR/L-103SM	●	●		32.5○	.625	.625	5.906	—	—	.625	.197	TS43	TKY15R

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

RECOMMENDED CUTTING CONDITIONS

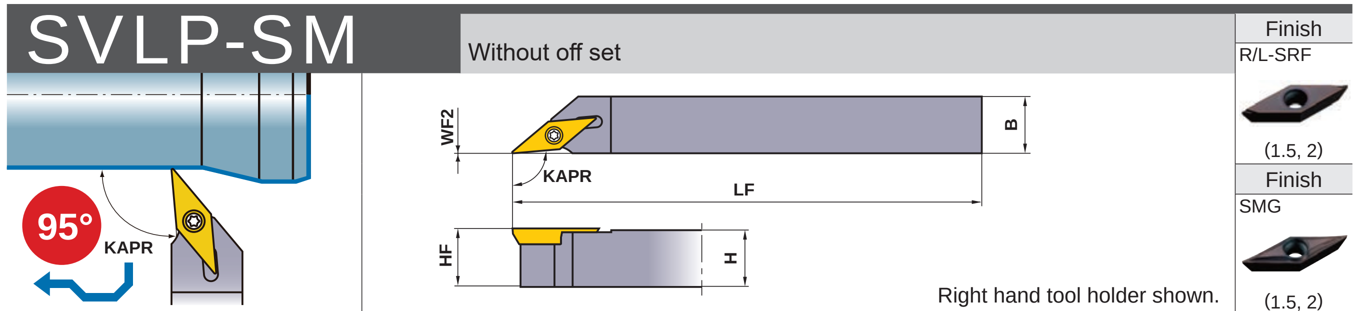
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	MS6015/VP15TF	165–490	.0004–.006
	Free Cutting Steel	–	MS6015	100–590	.0004–.006
			NX2525	165–820	.0004–.006
M	Stainless Steel	≤200HB	VP15TF/MP9005/MP9015	165–390	.0008–.004
N	Non-Ferrous Metal	–	HTi10/MT9005	230–755	.0012–.006
S	Titanium Alloy	–	MT9005	130–260	.0016–.005
	Heat Resistant Alloy	–	MP9015	65–245	.0016–.005

FRONT TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

SVLP-SM

Without off set



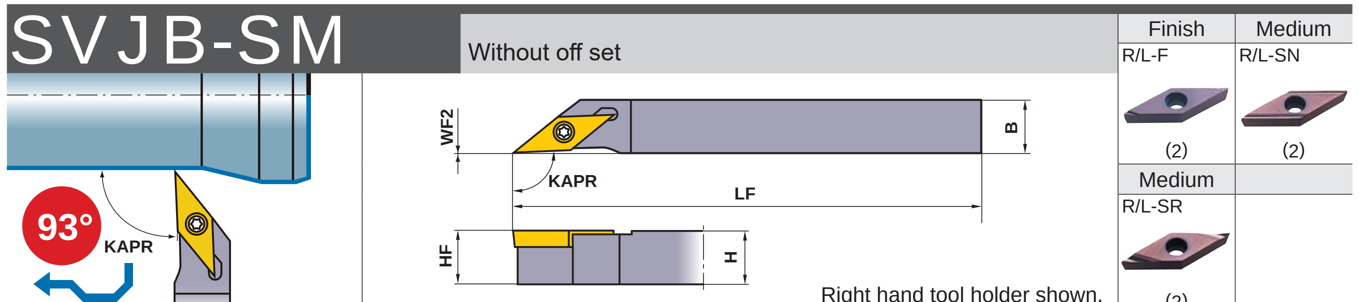
Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw*	Wrench
SVLPR-061.5SM	●		VPET VPGT	1.51.5	.375	.375	5.000	.375	0	TS202	TKY06R
SVLPR-081.5SM	●			1.51.5	.500	.500	6.000	.500	0	TS202	TKY06R
SVLPR/L-062SM	●	●		22	.375	.375	5.000	.375	0	TS255	TKY08R
SVLPR/L-082SM	●	●		22	.500	.500	6.000	.500	0	TS255	TKY08R
SVLPR/L-102SM	●	●		22	.625	.625	6.000	.625	0	TS255	TKY08R

Dimensions (inch): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS202=5.3, TS255=8.9

SVJB-SM

Without off set



Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw*	Wrench
SVJBR/L-062SM	●	●	VBMT VBET VBGT VBGW	22	.375	.375	4.921	.375	0	TS255	TKY08R
SVJBR/L-082SM	●	●		22	.500	.500	5.906	.500	0	TS255	TKY08R
SVJBR/L-102SM	●	●		22	.625	.625	5.906	.625	0	TS255	TKY08R

Dimensions (inch): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9

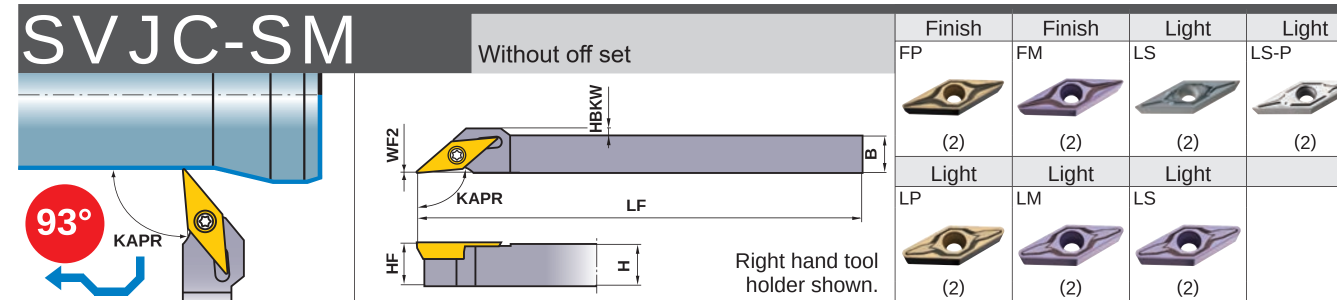
Note 1) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.
Note 2) Dimensions shown for insert corner RE .008 inch.

● : USA Stock

INCH STANDARD

SVJC-SM

Without off set



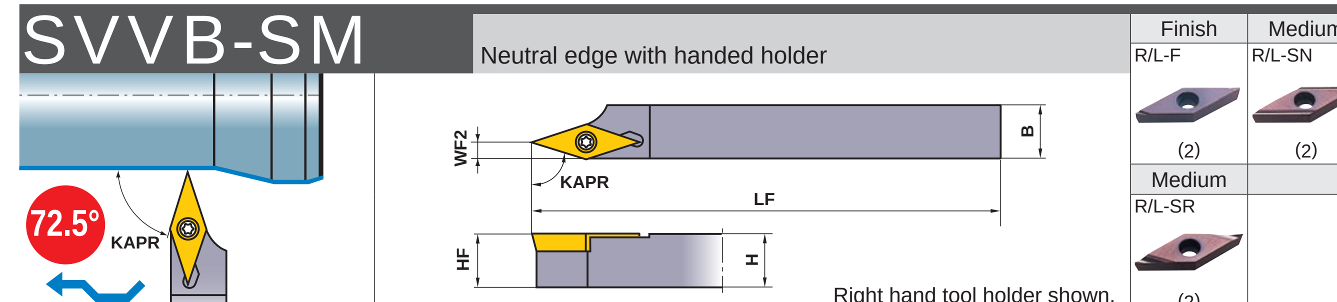
Order Number	Stock R	Stock L	Insert Number		H	B	LF	HBKW	HF	WF2	Clamp Screw*	Wrench
SVJCR/L-062B-SM	●	●	VCMW VCMT VCGT	22	.375	.375	4.500	–	.375	0	TS255	TKY08R
SVJCR/L-062.5B-SM	●	●		2.52	.375	.375	4.500	.079	.375	0	TS32	TKY08R
SVJCR/L-082B-SM	●	●		22	.500	.500	4.500	–	.500	0	TS255	TKY08R
SVJCR/L-082.5B-SM	●	●		2.52	.500	.500	4.500	–	.500	0	TS32	TKY08R
SVJCR/L-102B-SM	●	●		22	.625	.625	4.500	–	.625	0	TS255	TKY08R
SVJCR/L-102.5B-SM	●	●		2.52	.625	.625	4.500	–	.625	0	TS32	TKY08R

Dimensions (inch): H, B, LF, HBKW, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9, TS32=8.9

SVVB-SM

Neutral edge with handed holder



Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw*	Wrench
SVVBR/L-062SM	●	●	VBET VBGT VBMT VBGW	22	.375	.375	4.921	.375	.118	TS255	TKY08R
SVVBR/L-082SM	●	●		22	.500	.500	5.906	.500	.118	TS255	TKY08R
SVVBR/L-102SM	●	●		22	.625	.625	5.906	.625	.118	TS255	TKY08R

Dimensions (inch): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	MS6015/VP15TF	165–490	.0004–.006
	Free Cutting Steel	–	MS6015	100–590	.0004–.006
			NX2525	165–820	.0004–.006
M	Stainless Steel	≤200HB	VP15TF/MP9005/MP9015	165–390	.0008–.004
N	Non-Ferrous Metal	–	HTi10/MT9005	230–755	.0012–.006
S	Titanium Alloy	–	MT9005	130–260	.0016–.005
	Heat Resistant Alloy	–	MP9015	65–245	.0016–.005

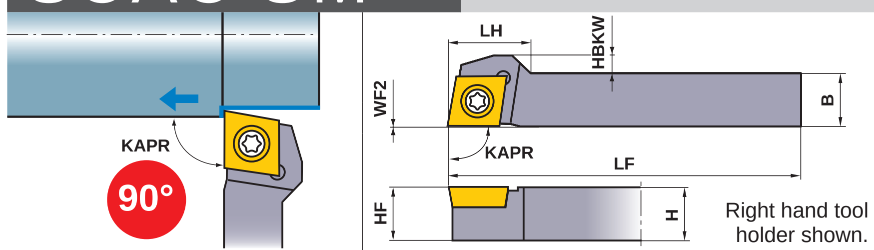
D
SMALL TOOLS

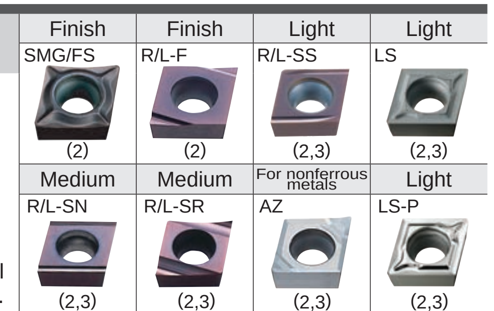
FRONT TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

SCAC-SM

Without off set





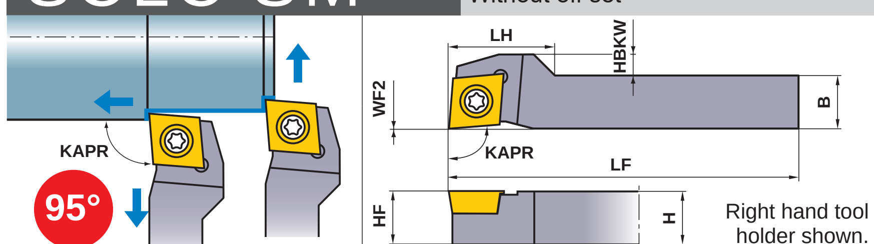
Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SCACR/L0808K06-SM	●	●	CC◌B CC◌H CC◌T CC◌W	21.5◌	8	8	125	11	1.6	8	0	TS254	TKY08R
SCACR/L1010K06-SM	●	●		21.5◌	10	10	125	—	—	10	0	TS254	TKY08R
SCACR/L1010K09-SM	●	●		32.5◌	10	10	125	16	3.5	10	0	TS43	TKY15R
SCACR/L1212M09-SM	●	●		32.5◌	12	12	150	14	1.5	12	0	TS43	TKY15R
SCACR/L1616M09-SM	●	●		32.5◌	16	16	150	—	—	16	0	TS43	TKY15R

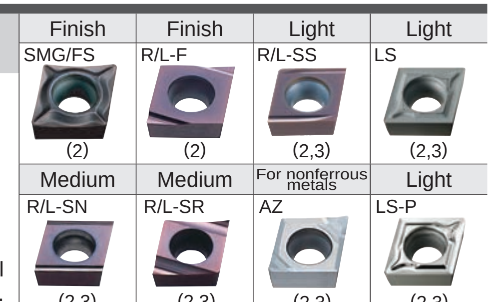
Dimensions (mm)

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

SCLC-SM

Without off set





Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SCLCR/L0808K06-SM	●	●	CC◌B CC◌H CC◌T CC◌W	21.5◌	8	8	125	11	2.1	8	0	TS254	TKY08R
SCLCR/L1010K06-SM	●	●		21.5◌	10	10	125	—	—	10	0	TS254	TKY08R
SCLCR/L1010K09-SM	●	●		32.5◌	10	10	125	20	4	10	0	TS43	TKY15R
SCLCR/L1212M09-SM	●	●		32.5◌	12	12	150	18	2	12	0	TS43	TKY15R
SCLCR/L1616M09-SM	●	●		32.5◌	16	16	150	—	—	16	0	TS43	TKY15R

Dimensions (mm)

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

Note 1) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.
Note 2) Dimensions shown for insert corner RE .008 inch.

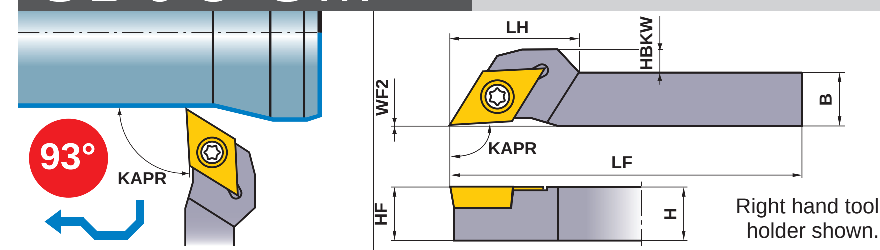
● : USA Stock

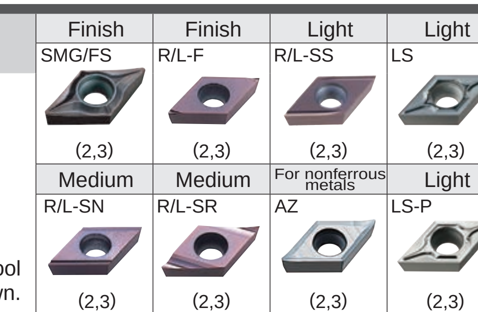
D
SMALL TOOLS

METRIC STANDARD

SDJC-SM

Without off set





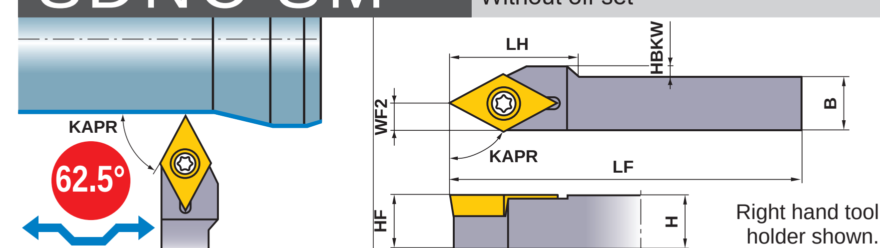
Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SDJCR/L0808K07-SM	●	●	DCMT DCMW DCET DCGT DCGW	21.5◌	8	8	125	15	2	8	0	TS254	TKY08R
SDJCR/L1010K07-SM	●	●		21.5◌	10	10	125	—	—	10	0	TS254	TKY08R
SDJCR/L1010K11-SM	●	●		32.5◌	10	10	125	24	4	10	0	TS43	TKY15R
SDJCR/L1212M11-SM	●	●		32.5◌	12	12	150	22	2	12	0	TS43	TKY15R
SDJCR/L1616M11-SM	●	●		32.5◌	16	16	150	—	—	16	0	TS43	TKY15R

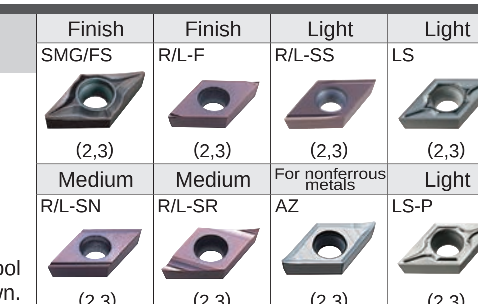
Dimensions (mm)

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

SDNC-SM

Neutral edge with handed holder
Without off set





Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HBKW	HF	WF2	Clamp Screw*	Wrench
SDNCR/L0808K07-SM	●	●	DCMT DCMW DCET DCGT DCGW	21.5◌	8	8	125	—	—	8	3	TS254	TKY08R
SDNCR/L1010K07-SM	●	●		21.5◌	10	10	125	—	—	10	3	TS254	TKY08R
SDNCR/L1010K11-SM	●	●		32.5◌	10	10	125	24	2	10	5	TS43	TKY15R
SDNCR/L1212M11-SM	●	●		32.5◌	12	12	150	—	—	12	5	TS43	TKY15R
SDNCR/L1616M11-SM	●	●		32.5◌	16	16	150	—	—	16	5	TS43	TKY15R

Dimensions (mm)

* Clamp Torque (lbf-in) : TS254=8.9, TS43=31

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	**MS6015/VP15TF**	165—490	.0004—.006
P	Free Cutting Steel	—	**MS6015**	100—590	.0004—.006
P			**NX2525**	165—820	.0004—.006
M	Stainless Steel	≤200HB	**VP15TF/MP9005/MP9015**	165—390	.0008—.004
N	Non-Ferrous Metal	—	**HTi10/MT9005**	230—755	.0012—.006
S	Titanium Alloy	—	**MT9005**	130—260	.0016—.005
S	Heat Resistant Alloy	—	**MP9015**	65—245	.0016—.005

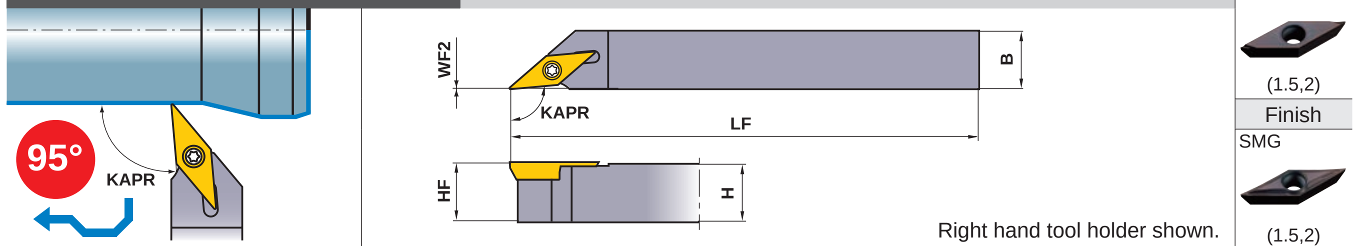
D
SMALL TOOLS

FRONT TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

SVLP-SM

Without off set



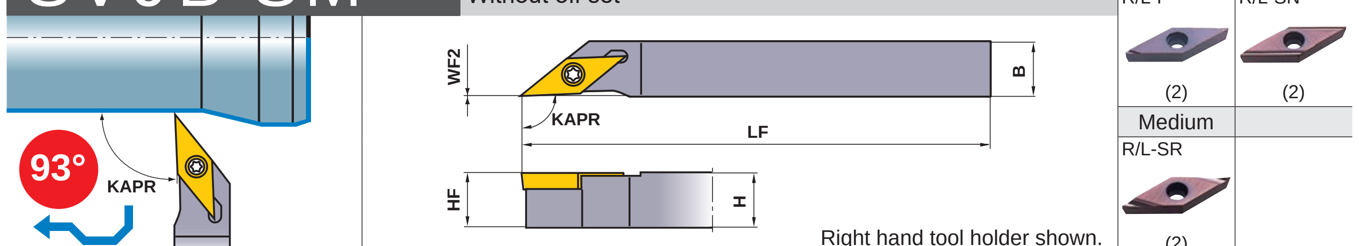
Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw *	Wrench
SVLPR/L1010K08-SM	●	●	VPET VPGT	1.51.5◌	10	10	125	10	0	TS202	TKY06R
SVLPR/L1212M08-SM	●	●		1.51.5◌	12	12	150	12	0	TS202	TKY06R
SVLPR/L1010K11-SM	●	●		22◌	10	10	125	10	0	TS255	TKY08R
SVLPR/L1212M11-SM	●	●		22◌	12	12	150	12	0	TS255	TKY08R
SVLPR/L1616M11-SM	●	●		22◌	16	16	150	16	0	TS255	TKY08R

Dimensions (mm): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS202=5.3, TS255=8.9

SVJB-SM

Without off set



Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw *	Wrench
SVJBR/L1010K11-SM	●	●	VBMT VBET VBGT VBGW	22◌	10	10	125	10	0	TS255	TKY08R
SVJBR/L1212M11-SM	●	●		22◌	12	12	150	12	0	TS255	TKY08R
SVJBR/L1616M11-SM	●	●		22◌	16	16	150	16	0	TS255	TKY08R

Dimensions (mm): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	**MS6015/VP15TF**	165—490	.0004—.006
	Free Cutting Steel	–	**MS6015**	100—590	.0004—.006
			NX2525	165—820	.0004—.006
M	Stainless Steel	≤200HB	**VP15TF/MP9005/MP9015**	165—390	.0008—.004
N	Non-Ferrous Metal	–	**HTi10/MT9005**	230—755	.0012—.006
S	Titanium Alloy	–	**MT9005**	130—260	.0016—.005
	Heat Resistant Alloy	–	**MP9015**	65—245	.0016—.005

Note 1) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.
Note 2) Dimensions shown for insert corner RE .008 inch.
● **: USA Stock**

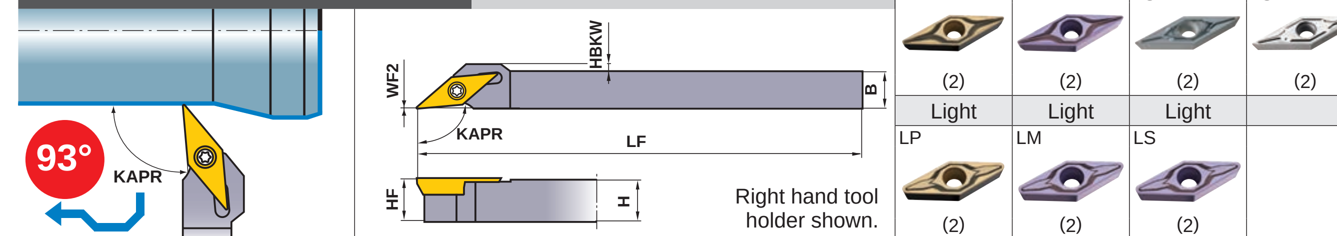
D

SMALL TOOLS

METRIC STANDARD

SVJC-SM

Without off set

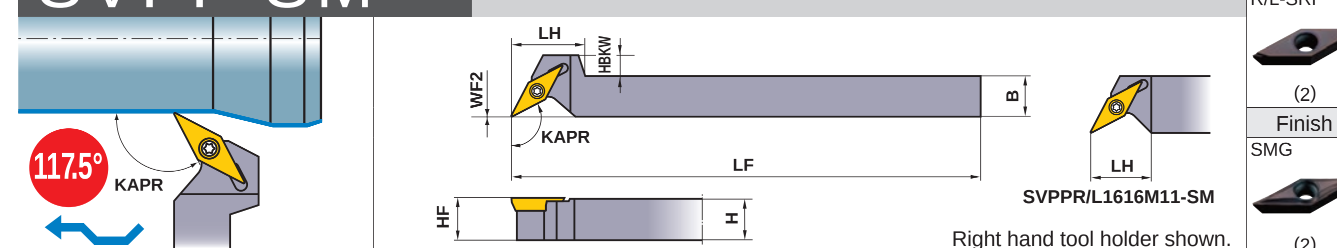


Order Number	Stock R	Stock L	Insert Number		H	B	LF	HBKW	HF	WF2	Clamp Screw *	Wrench
SVJCR/L1010JX11-SM	●	●	VCMW VCMT VCGT	22◌	10	10	120	–	10	0	TS255	TKY08R
SVJCR/L1010JX13-SM	●	●		2.52◌	10	10	120	2	10	0	TS32	TKY08R
SVJCR/L1212JX11-SM	●	●		22◌	12	12	120	–	12	0	TS255	TKY08R
SVJCR/L1212JX13-SM	●	●		2.52◌	12	12	120	–	12	0	TS32	TKY08R
SVJCR/L1616JX11-SM	●	●		22◌	16	16	120	–	16	0	TS255	TKY08R
SVJCR/L1616JX13-SM	●	●		2.52◌	16	16	120	–	16	0	TS32	TKY08R

Dimensions (mm): H, B, LF, HBKW, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9, TS32=8.9

SVPP-SM



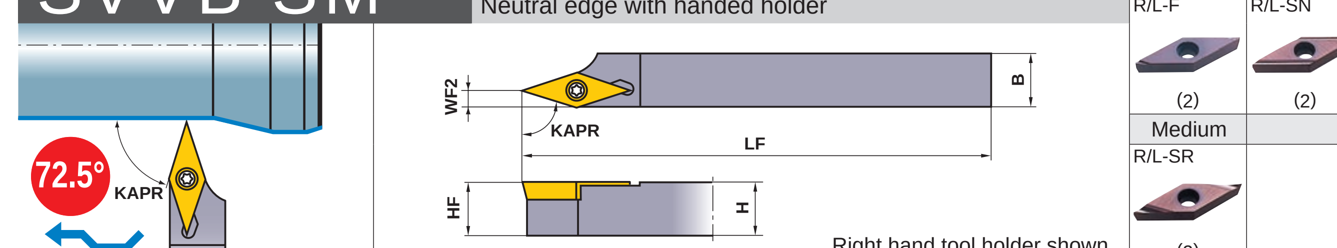
Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HBKW	HF	WF2	Clamp Screw *	Wrench
SVPPR/L1010K11-SM	●	●	VPET VPGT	22◌	10	10	125	20	8	10	0	TS255	TKY08R
SVPPR/L1212M11-SM	●	●		22◌	12	12	150	20	6	12	0	TS255	TKY08R
SVPPR/L1616M11-SM	●	●		22◌	16	16	150	17	–	16	0	TS255	TKY08R

Dimensions (mm): H, B, LF, LH, HBKW, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9

SVVB-SM

Neutral edge with handed holder



Order Number	Stock R	Stock L	Insert Number		H	B	LF	HF	WF2	Clamp Screw *	Wrench
SVVBR/L1010K11-SM	●	●	VBET VBGT VBMT VBGW	22◌	10	10	125	10	3	TS255	TKY08R
SVVBR/L1212M11-SM	●	●		22◌	12	12	150	12	3	TS255	TKY08R
SVVBR/L1616M11-SM	●	●		22◌	16	16	150	16	3	TS255	TKY08R

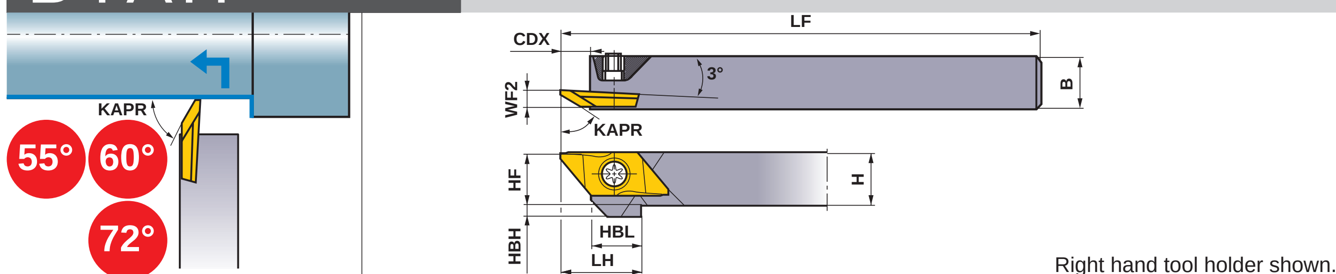
Dimensions (mm): H, B, LF, HF, WF2

* Clamp Torque (lbf-in) : TS255=8.9

BACK TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

BTAH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HF	WF2	HBH	HBL	CDX	Clamp Screw *	Wrench
BTAHR/L-062	●	●		5528◌◌R/L-B	.375	.375	4.724	.591	.375	.138	.125	.374	.217	NS402W	NKY15S
BTAHR/L-082	●	●	BTAT	6035◌◌R/L-B 605000RX	.500	.500	4.724	.591	.500	.138	–	.374	.217	NS403W	NKY15S
BTAHR/L-102	●			7235◌◌R-SMB	.625	.625	4.724	.591	.625	.138	–	.374	.217	NS403W	NKY15S

Dimensions (inch)

* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

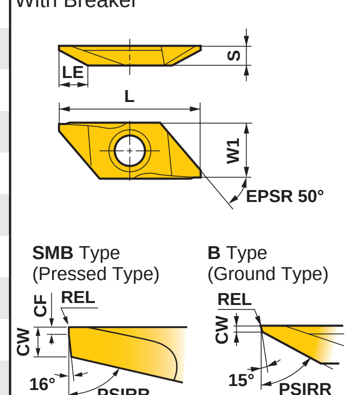
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	Coated MS6015 (NEW)	PSIRR/L*	REL	CF	L	W1	CW	S	LE* (inch)	Geometry
NEW BTAT7235V5R-SMB	R	●		72°	.002	.012	.787	.315	.055	.098	.138	With Breaker
NEW BTAT723501MR-SMB	R	●		72°	.003	.012	.787	.315	.055	.098	.138	
NEW BTAT723502MR-SMB	R	●		72°	.007	.012	.787	.315	.055	.098	.138	
BTAT552800R-B	R	●	●	55°	.000	.000	.787	.315	.020	.098	.110	
BTAT552800L-B	L	●		55°	.000	.000	.787	.315	.020	.098	.110	
BTAT552801R-B	R	●	●	55°	.004	.000	.787	.315	.020	.098	.110	
BTAT552801L-B	L	●		55°	.004	.000	.787	.315	.020	.098	.110	
BTAT603500R-B	R	●	●	60°	.000	.000	.787	.315	.020	.098	.138	
BTAT603500L-B	L	●		60°	.000	.000	.787	.315	.020	.098	.138	
NEW BTAT603501MR-B	R		●	60°	.003	.000	.787	.315	.020	.098	.138	
BTAT603501R-B	R	●	●	60°	.004	.000	.787	.315	.020	.098	.138	
BTAT603501L-B	L	●		60°	.004	.000	.787	.315	.020	.098	.138	
BTAT605000RX	R	●		60°	.000	.000	.787	.315	.049	.098	.197	Without Breaker

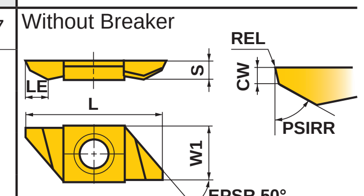
Dimensions(inch)

With Breaker



Right hand insert shown.

Without Breaker



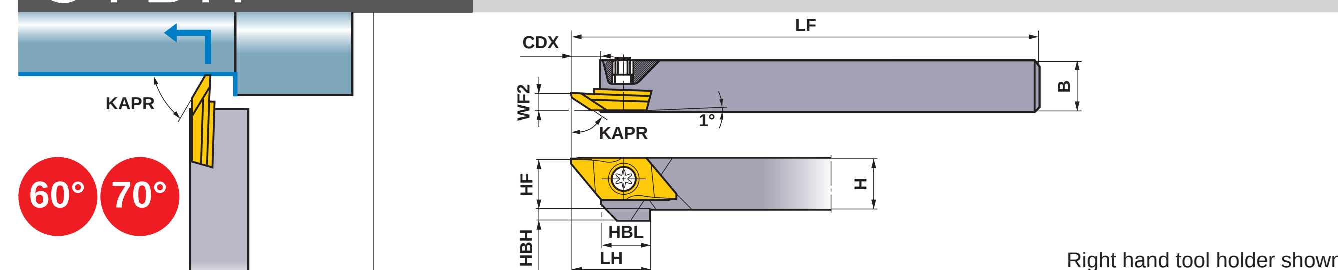
* Numeric value set insert on holder.
Note 1) REL, PSIRR dimensions for Right Hand Tool and RER, PSIRL dimensions for Left Hand Tool.

● = NEW

● : USA Stock
<5 inserts in one case>

INCH STANDARD

CTBH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HF	WF2	HBH	HBL	CDX	Clamp Screw *	Wrench
CTBHR/L-062	●	●		60450◌R/L-B	.375	.375	4.724	.768	.375	.133	.125	.472	.295	NS402W	NKY15S
CTBHR/L-082	●	●	BTBT	606000R/L	.500	.500	4.724	.768	.500	.133	–	.472	.295	NS403W	NKY15S
CTBHR/L-102	●	●		7055◌◌R-SMB	.625	.625	4.724	.768	.625	.133	–	.472	.295	NS403W	NKY15S

Dimensions (inch)

* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

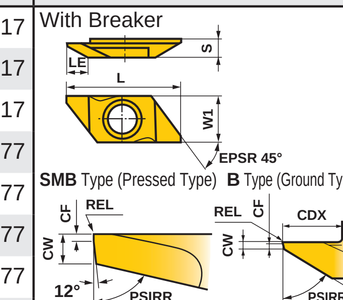
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	Coated MS6015 (NEW)	PSIRR/L*	REL	CF	L	W1	CW	S	CDX	LE*	Geometry
NEW BTBT7055V5R-SMB	R	●		70°	.002	.012	.984	.370	.053	.138	.256	.217	With Breaker
NEW BTBT705501MR-SMB	R	●		70°	.003	.012	.984	.370	.053	.138	.256	.217	
NEW BTBT705502MR-SMB	R	●		70°	.007	.012	.984	.370	.053	.138	.256	.217	
BTBT604500R-B	R	●	●	60°	.000	.008	.984	.370	.028	.138	.217	.177	
BTBT604500L-B	L	●		60°	.000	.008	.984	.370	.028	.138	.217	.177	
NEW BTBT604501MR-B	R		●	60°	.003	.012	.984	.370	.028	.138	.217	.177	
BTBT604501R-B	R	●	●	60°	.004	.012	.984	.370	.028	.138	.217	.177	
BTBT604501L-B	L	●		60°	.004	.012	.984	.370	.028	.138	.217	.177	
BTBT606000R	R	●		60°	.000	.008	.984	.370	.028	.138	.276	.236	Without Breaker
BTBT606000L	L	●		60°	.000	.008	.984	.370	.028	.138	.276	.236	

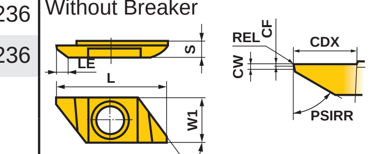
Dimensions(inch)

With Breaker



Right hand insert shown.

Without Breaker



Right hand insert shown.

* Numeric value set insert on holder.
Note 1) REL, PSIRR dimensions for Right Hand Tool and RER, PSIRL dimensions for Left Hand Tool.

● = NEW

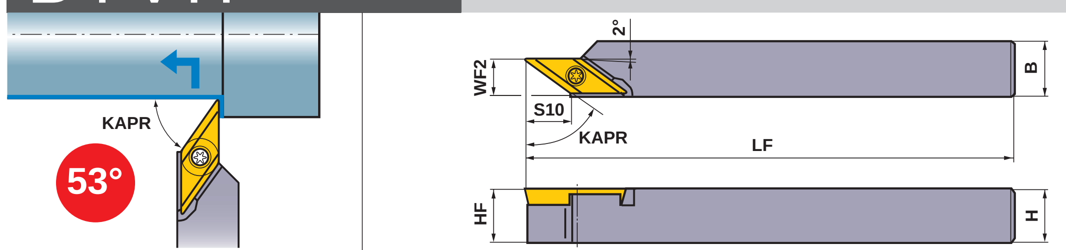
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	**MS6015 / VP15TF**	165–490	.0004–.006
P	Free Cutting Steel	–	**MS6015**	100–590	.0004–.006
M	Stainless Steel	≤200HB	**VP15TF**	165–395	.0008–.004
N	Non-Ferrous Metal	–	**MS6015**	230–755	.0012–.006

BACK TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

BTVH



Right hand tool holder only.

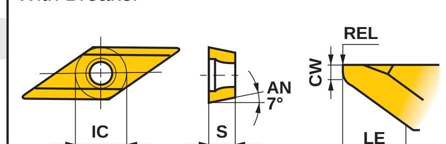
Order Number	Stock R	Insert Number		Dimensions (inch) H	B	LF	HF	WF2	S10	Clamp Screw *	Wrench
BTVHR-062	●	BTVT	5375◌◌R-B	.375	.375	4.724	.375	.295	.335	NS251	NKY15R
BTVHR-082	●			.500	.500	4.724	.500	.295	.335	NS251	NKY15R
BTVHR-102	●			.625	.625	4.724	.625	.295	.335	NS251	NKY15R

* Clamp Torque (lbf-in) : NS251=6.2

Note 1) Set the maximum depth of cut at under 30% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	Dimensions (inch) IC	S	REL	CW	LE * (inch)	Geometry
BTVT5375V5R-B	R	●	.250	.125	.002	.020	.295	With Breaker
BTVT537501R-B	R	●	.250	.125	.004	.020	.295	



* Numeric value set insert on holder.

RECOMMENDED CUTTING CONDITIONS

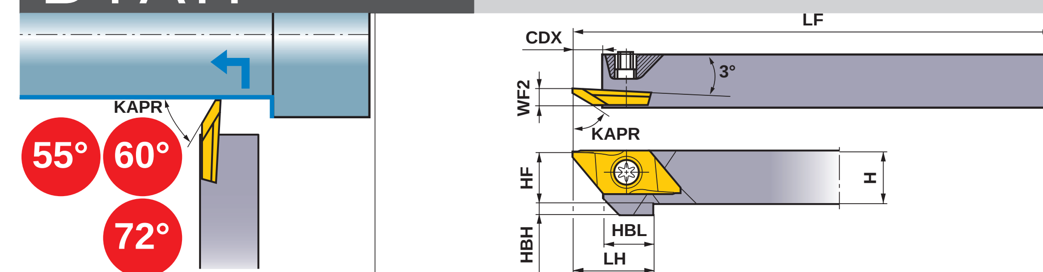
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	**VP15TF**	165—490	.0004—.006
	Free Cutting Steel	—	**VP15TF**	100—590	.0004—.006
M	Stainless Steel	≤200HB	**VP15TF**	165—395	.0008—.004
N	Non-Ferrous Metal	—	**VP15TF**	230—755	.0012—.006

● : USA Stock

<5 inserts in one case>

METRIC STANDARD

BTAH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H	B	LF	LH	HF	WF2	HBH	HBL	CDX	Clamp Screw *	Wrench
BTAHR/L0810-50	●	●	BTAT	5528◌◌R/L-B	8	10	120	15	8	3.5	4	9.5	5.5	NS402W	NKY15S
BTAHR/L1010-50	●	●		6035◌◌R/L-B	10	10	120	15	10	3.5	2	9.5	5.5	NS402W	NKY15S
BTAHR/L1212-50	●	●		605000RX	12	12	120	15	12	3.5	—	9.5	5.5	NS403W	NKY15S
BTAHR/L1616-50	●			7235◌◌R-SMB	16	16	120	15	16	3.5	—	9.5	5.5	NS403W	NKY15S

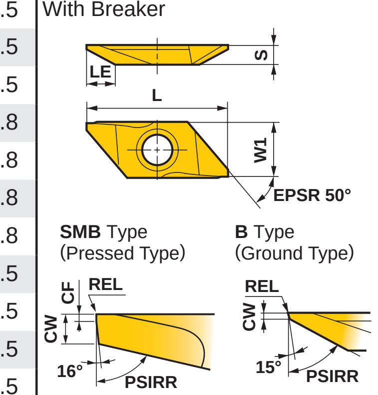
* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

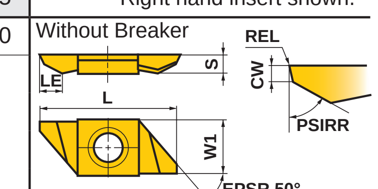
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.

Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	NEW MS6015	Dimensions (mm) PSIRR/L *	RER/L	CF	L	W1	CW	S	LE * (mm)	Geometry
NEW BTAT7235V5R-SMB	R	●		72°	0.05	0.3	20	8	1.4	2.5	3.5	With Breaker
NEW BTAT723501MR-SMB	R	●		72°	0.08	0.3	20	8	1.4	2.5	3.5	
NEW BTAT723502MR-SMB	R	●		72°	0.18	0.3	20	8	1.4	2.5	3.5	
BTAT552800R-B	R	●	●	55°	0	0	20	8	0.5	2.5	2.8	
BTAT552800L-B	L	●		55°	0	0	20	8	0.5	2.5	2.8	
BTAT552801R-B	R	●	●	55°	0.1	0	20	8	0.5	2.5	2.8	
BTAT552801L-B	L	●		55°	0.1	0	20	8	0.5	2.5	2.8	
BTAT603500R-B	R	●	●	60°	0	0	20	8	0.5	2.5	3.5	
BTAT603500L-B	L	●		60°	0	0	20	8	0.5	2.5	3.5	
NEW BTAT603501MR-B	R		●	60°	0.08	0	20	8	0.5	2.5	3.5	
BTAT603501R-B	R	●	●	60°	0.1	0	20	8	0.5	2.5	3.5	
BTAT603501L-B	L	●		60°	0.1	0	20	8	0.5	2.5	3.5	Right hand insert shown.
BTAT605000RX	R	●		60°	0	0	20	8	1.25	2.5	5.0	Without Breaker





* Numeric value set insert on holder.

Note 1) REL, PSIRR dimensions for Right Hand Tool and RER, PSIRL dimensions for Left Hand Tool.

● = NEW

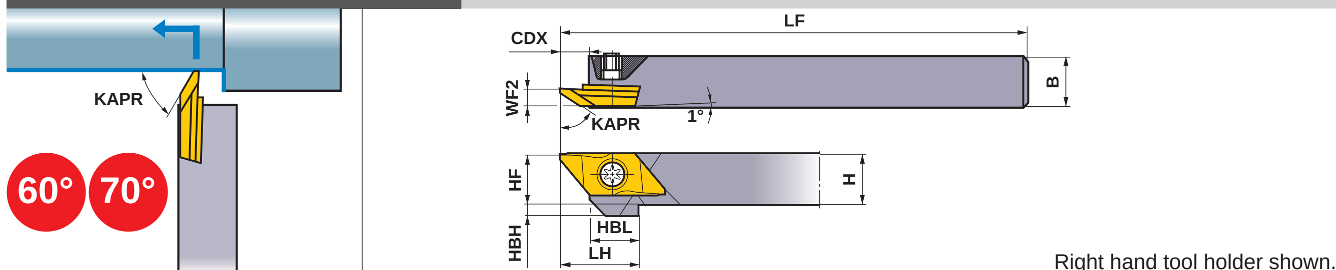
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	**MS6015/VP15TF**	165—490	.0004—.006
	Free Cutting Steel	—	**MS6015**	100—590	.0004—.006
M	Stainless Steel	≤200HB	**VP15TF**	165—395	.0008—.004
N	Non-Ferrous Metal	—	**MS6015**	230—755	.0012—.006

BACK TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

CTBH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	LF	LH	HF	WF2	HBH	HBL	CDX	Clamp Screw *	Wrench
CTBHR/L1010-160	●	●	BTBT	60450◌R/L-B	10	10	120	19.5	10	3.4	2	12	7.5	NS402W	NKY15S
CTBHR/L1212-160	●	●	BTBT	606000R/L	12	12	120	19.5	12	3.4	—	12	7.5	NS403W	NKY15S
CTBHR/L1616-160	●	●	BTBT	7055◌◌R-SMB	16	16	120	19.5	16	3.4	—	12	7.5	NS403W	NKY15S

(Dimensions (mm): H–CDX)

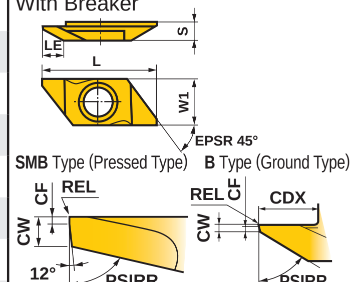
⁎ Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	Coated NEW MS6015	PSIRR/L*	RER/L	CF	L	W1	CW	S	CDX	LE* (mm)	Geometry
NEW BTBT7055V5R-SMB	R	●		70°	0.05	0.3	25	9.4	1.35	3.5	6.5	5.5	With Breaker
NEW BTBT705501MR-SMB	R	●		70°	0.08	0.3	25	9.4	1.35	3.5	6.5	5.5	
NEW BTBT705502MR-SMB	R	●		70°	0.18	0.3	25	9.4	1.35	3.5	6.5	5.5	
BTBT604500R-B	R	●	●	60°	0	0.2	25	9.4	0.7	3.5	5.5	4.5	
BTBT604500L-B	L	●		60°	0	0.2	25	9.4	0.7	3.5	5.5	4.5	
NEW BTBT604501MR-B	R		●	60°	0.08	0.3	25	9.4	0.7	3.5	5.5	4.5	
BTBT604501R-B	R	●	●	60°	0.1	0.3	25	9.4	0.7	3.5	5.5	4.5	
BTBT604501L-B	L	●		60°	0.1	0.3	25	9.4	0.7	3.5	5.5	4.5	
BTBT606000R	R	●		60°	0	0.2	25	9.4	0.7	3.5	7	6.0	Without Breaker
BTBT606000L	L	●		60°	0	0.2	25	9.4	0.7	3.5	7	6.0	

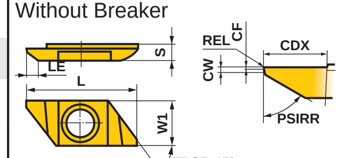
(Dimensions (mm): PSIRR/L–CDX)

With Breaker



Right hand insert shown.

Without Breaker



Right hand insert shown.

⁎ Numeric value set insert on holder.
Note 1) REL, PSIRR dimensions for Right Hand Tool and RER,PSIRL dimensions for Left Hand Tool.

● = NEW

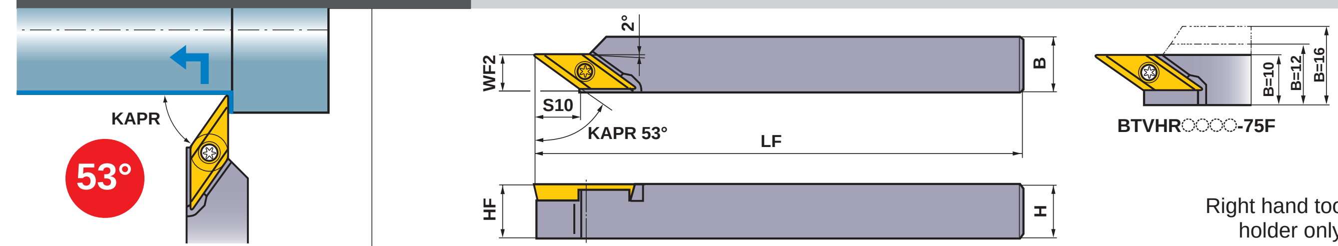
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	MS6015/VP15TF	165—490	.0004—.006
P	Free Cutting Steel	—	MS6015	100—590	.0004—.006
M	Stainless Steel	≤200HB	VP15TF	165—395	.0008—.004
N	Non-Ferrous Metal	—	MS6015	230—755	.0012—.006

● : USA Stock
<5 inserts in one case>

METRIC STANDARD

BTVH



Right hand tool holder only.

Order Number	Stock R	Insert Number		H	B	LF	HF	WF2	S10	Clamp Screw *	Wrench
BTVHR1010-75	●	BTVT	5375◌◌R-B	10	10	120	10	7.5	8.5	NS251	NKY15S
BTVHR1212-75	●	BTVT	5375◌◌R-B	12	12	120	12	7.5	8.5	NS251	NKY15S
BTVHR1616-75	●	BTVT	5375◌◌R-B	16	16	120	16	7.5	8.5	NS251	NKY15S
BTVHR1010-75F	●	BTVT	5375◌◌R-B	10	10	120	10	10.0	8.5	NS251	NKY15S
BTVHR1212-75F	●	BTVT	5375◌◌R-B	12	12	120	12	10.0	8.5	NS251	NKY15S
BTVHR1616-75F	●	BTVT	5375◌◌R-B	16	16	120	16	10.0	8.5	NS251	NKY15S

(Dimensions (mm): H–S10)

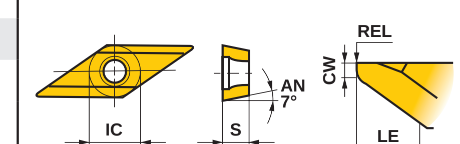
⁎ Clamp Torque (lbf-in) : NS251=6.2
Note 1) Set the maximum depth of cut at under 30% of the effective cutting edge length (LE).
Note 2) For high load machining, F type is recommended.

INSERTS

Order Number	Hand	Coated VP15TF	IC	S	REL	CW	LE* (mm)	Geometry
BTVT5375V5R-B	R	●	6.35	3.18	0.05	0.5	7.5	With Breaker
BTVT537501R-B	R	●	6.35	3.18	0.1	0.5	7.5	

(Dimensions (mm): IC–CW)

With Breaker



⁎ Numeric value set insert on holder.

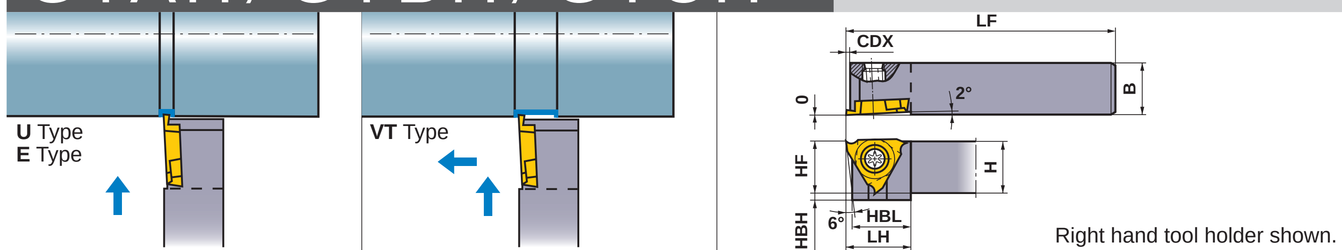
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	VP15TF	165—490	.0004—.006
P	Free Cutting Steel	—	VP15TF	100—590	.0004—.006
M	Stainless Steel	≤200HB	VP15TF	165—395	.0008—.004
N	Non-Ferrous Metal	—	VP15TF	230—755	.0012—.006

GROOVING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

GTAH, GTBH, GTCH



Right hand tool holder shown.

	Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	CDX*1	LH	HBH	HBL	Cutting Width (inch)	Clamp Screw *2	Wrench
Long Shank	GTBHR/L-063	●	●	GTAT	○○○○	.375	.375	.375	4.724	.118	.591	.156	.528	.057–.118	NS404W	NKY158
Long Shank	GTBHR/L-083	●	●	GTBT	○○○○	.500	.500	.500	4.724	.118	.591	.020	.528	.057–.118	NS404W	NKY158
Long Shank	GTBHR/L-103	●	●	GTCT	○○○○	.625	.625	.625	4.724	.118	.591	–	.528	.057–.118	NS404W	NKY158

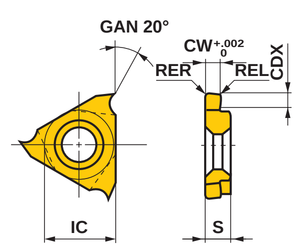
Dimensions (inch): H, B, HF, LF, CDX, LH, HBH, HBL

*1 It is not possible to machine depths over CDX dimensions(Max. Groove Depth).
*2 Clamp Torque (lbf-in) : NS404W=6.2
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.

INSERTS

Order Number	Hand	Coated VP15TF	CW	CDX*1	RER/L	IC	S	Geometry
GTAT03006V3R-U	R	●	.012	.024	.001	.375	.125	**U** Type Breaker (Grooving) For general use
GTAT03006V3L-U	L	●	.012	.024	.001	.375	.125	
GTAT05012V5R-U	R	●	.020	.047	.002	.375	.125	
GTAT05012V5L-U	L	●	.020	.047	.002	.375	.125	
GTAT07520V5R-U	R	●	.030	.079	.002	.375	.125	
GTAT07520V5L-U	L	●	.030	.079	.002	.375	.125	
GTAT09520V5R-U	R	●	.037	.079	.002	.375	.125	
GTAT09520V5L-U	L	●	.037	.079	.002	.375	.125	
GTAT10020V5R-U	R	●	.039	.079	.002	.375	.125	
GTAT10020V5L-U	L	●	.039	.079	.002	.375	.125	
GTAT10320V5R-U	R	●	.041	.079	.002	.375	.125	
GTAT12520V5R-U	R	●	.049	.079	.002	.375	.125	
GTAT12520V5L-U	L	●	.049	.079	.002	.375	.125	
GTBT14530V5R-U	R	●	.057	.118	.002	.375	.125	
GTBT14530V5L-U	L	●	.057	.118	.002	.375	.125	
GTBT15030V5R-U	R	●	.059	.118	.002	.375	.125	
GTBT15030V5L-U	L	●	.059	.118	.002	.375	.125	
GTBT17530V5R-U	R	●	.069	.118	.002	.375	.125	
GTBT17530V5L-U	L	●	.069	.118	.002	.375	.125	
GTBT20030V5R-U	R	●	.079	.118	.002	.375	.125	
GTBT20030V5L-U	L	●	.079	.118	.002	.375	.125	
GTCT25030V5R-U	R	●	.098	.118	.002	.375	.125	
GTCT25030V5L-U	L	●	.098	.118	.002	.375	.125	

Dimensions (inch): CW, CDX, RER/L, IC, S



Right hand insert shown.

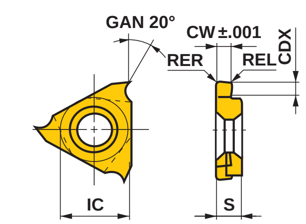
● : USA Stock
<5 inserts in one case>

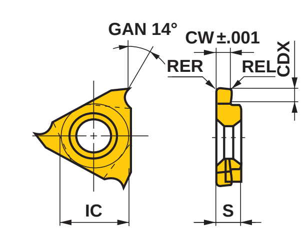
D
SMALL TOOLS

INSERTS

Order Number	Hand	Coated VP15TF	Coated VP15KZ	CW	CDX	RER/L	IC	S	Max. Depth of Cut (inch)	Geometry
GTAT03306V3R-E	R	●		.013	.024	.001	.375	.125		**E** Type Breaker (Grooving) For precision cutting
GTAT03306V3L-E	L	●		.013	.024	.001	.375	.125		
GTAT04312V3R-E	R	●		.017	.047	.001	.375	.125		
GTAT04312V3L-E	L	●		.017	.047	.001	.375	.125		
GTAT05312V5R-E	R	●		.021	.047	.002	.375	.125		
GTAT05312V5L-E	L	●		.021	.047	.002	.375	.125		
GTAT07520V5R-E	R	●		.030	.079	.002	.375	.125		
GTAT07520V5L-E	L	●		.030	.079	.002	.375	.125		
GTAT09520V5R-E	R	●		.037	.079	.002	.375	.125		
GTAT09520V5L-E	L	●		.037	.079	.002	.375	.125		
GTAT10020V5R-E	R	●		.039	.079	.002	.375	.125		
GTAT10020V5L-E	L	●		.039	.079	.002	.375	.125		
GTAT1002001R-E	R	●		.039	.079	.004	.375	.125		
GTAT1002001L-E	L	●		.039	.079	.004	.375	.125		
GTAT12020V5R-E	R	●		.047	.079	.002	.375	.125		
GTAT12020V5L-E	L	●		.047	.079	.002	.375	.125		
GTAT1202001R-E	R	●		.047	.079	.004	.375	.125		
GTAT1202001L-E	L	●		.047	.079	.004	.375	.125		
GTAT14020V5R-E	R	●		.055	.079	.002	.375	.125		
GTAT14020V5L-E	L	●		.055	.079	.002	.375	.125		
GTBT15030V5R-E	R	●		.059	.118	.002	.375	.125		
GTBT15030V5L-E	L	●		.059	.118	.002	.375	.125		
GTBT1503001R-E	R	●		.059	.118	.004	.375	.125		
GTBT1503001L-E	L	●		.059	.118	.004	.375	.125		
GTBT18030V5R-E	R	●		.071	.118	.002	.375	.125		
GTBT18030V5L-E	L	●		.071	.118	.002	.375	.125		
GTBT20030V5R-E	R	●		.079	.118	.002	.375	.125		
GTBT20030V5L-E	L	●		.079	.118	.002	.375	.125		
GTBT2003001R-E	R	●		.079	.118	.004	.375	.125		
GTBT2003001L-E	L	●		.079	.118	.004	.375	.125		
GTBT22530V5R-E	R	●		.089	.118	.002	.375	.125		
GTBT22530V5L-E	L	●		.089	.118	.002	.375	.125		
GTCT25030V5R-E	R	●		.098	.118	.002	.375	.125		
GTCT25030V5L-E	L	●		.098	.118	.002	.375	.125		
GTCT27530V5R-E	R	●		.108	.118	.002	.375	.125		
GTCT27530V5L-E	L	●		.108	.118	.002	.375	.125		
GTCT30030V5R-E	R	●		.118	.118	.002	.375	.125		
GTCT30030V5L-E	L	●		.118	.118	.002	.375	.125		Right hand insert shown.
GTAT0330600R-VT	R		●	.013	.024	0	.375	.125	.010	**VT** Type Breaker (Grooving, Profiling)
GTAT0431200R-VT	R		●	.017	.047	0	.375	.125	.035	
GTAT0532000R-VT	R		●	.021	.079	0	.375	.125	.063	
GTAT0652000R-VT	R		●	.026	.079	0	.375	.125	.063	
GTAT0752000R-VT	R		●	.030	.079	0	.375	.125	.063	
GTAT0802000R-VT	R		●	.031	.079	0	.375	.125	.063	
GTAT0852000R-VT	R		●	.033	.079	0	.375	.125	.063	
GTAT0952000R-VT	R		●	.037	.079	0	.375	.125	.063	
GTAT1002000R-VT	R		●	.039	.079	0	.375	.125	.063	
GTAT1102000R-VT	R		●	.043	.079	0	.375	.125	.063	
GTAT1202000R-VT	R		●	.047	.079	0	.375	.125	.063	
GTAT1302000R-VT	R		●	.051	.079	0	.375	.125	.063	
GTAT1402000R-VT	R		●	.055	.079	0	.375	.125	.063	
GTBT1503000R-VT	R		●	.059	.118	0	.375	.125	.106	
GTBT2003000R-VT	R		●	.079	.118	0	.375	.125	.106	

Dimensions (inch): CW, CDX, RER/L, IC, S





RECOMMENDED CUTTING CONDITIONS

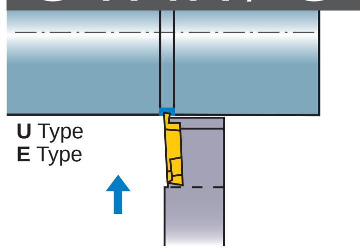
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	VP15TF/VP15KZ	165–490	.0004–.0035
P	Free Cutting Steel	–	VP15TF/VP15KZ	100–590	.0004–.0035
M	Stainless Steel	≦200HB	VP15TF/VP15KZ	165–395	.0008–.002
N	Non-Ferrous Metal	–	VP15TF/VP15KZ	230–755	.0012–.004

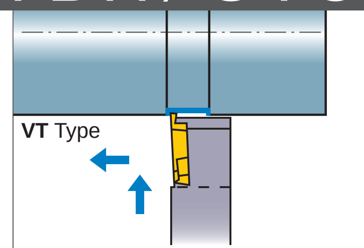
D
SMALL TOOLS

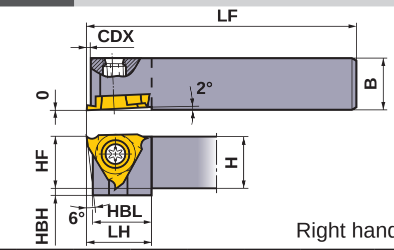
GROOVING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

GTAH, GTBH, GTCH







Right hand tool holder shown.

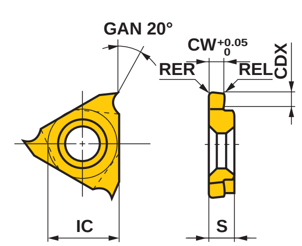
	Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	CDX*1	LH	HBH	HBL	Cutting Width (mm)	Clamp Screw *2	Wrench
Standard Shank	GTAHR/L0808-20S	★	★	GTAT / GTBT*1 / GTCT*1	○○○○	8	8	8	80	2	15	5	12.9	0.3−3.0	NS404W	NKY15S
	GTAHR/L1010-20S	★	★		○○○○	10	10	10	80	2	15	3	12.9	0.3−3.0	NS404W	NKY15S
	GTAHR/L1212-20S	★	★		○○○○	12	12	12	80	2	15	1	12.9	0.3−3.0	NS404W	NKY15S
	GTBHR/L1010-30S	★	★	GTBT. GTCT	○○○○	10	10	10	80	3	15	3	13.4	1.45−3.0	NS404W	NKY15S
	GTCHR/L1010-30S	★	★	GTCT	○○○○	10	10	10	80	3	15	3	13.4	2.5−3.0	NS404W	NKY15S
Long Shank	GTAHR/L0808-20	★	★	GTAT / GTBT*1 / GTCT*1	○○○○	8	8	8	120	2	15	5	12.9	0.3−3.0	NS404W	NKY15S
	GTAHR/L1010-20	★	★		○○○○	10	10	10	120	2	15	3	12.9	0.3−3.0	NS404W	NKY15S
	GTAHR/L1212-20	★	★		○○○○	12	12	12	120	2	15	1	12.9	0.3−3.0	NS404W	NKY15S
	GTAHR/L1616-20	★	★		○○○○	16	16	16	120	2	15	—	12.9	0.3−3.0	NS404W	NKY15S
	GTBHR/L1010-30	●	●	GTBT. GTCT	○○○○	10	10	10	120	3	15	3	13.4	1.45−3.0	NS404W	NKY15S
	GTBHR/L1212-30	●	●		○○○○	12	12	12	120	3	15	1	13.4	1.45−3.0	NS404W	NKY15S
	GTBHR/L1616-30	●	●		○○○○	16	16	16	120	3	15	—	13.4	1.45−3.0	NS404W	NKY15S
	GTCHR/L1010-30	★	★	GTCT	○○○○	10	10	10	120	3	15	3	13.4	2.5−3.0	NS404W	NKY15S

*1 It is not possible to machine depths over CDX dimensions(Max. Groove Depth).
*2 Clamp Torque (lbf-in) : NS404W=6.2
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.

INSERTS

Order Number	Hand	Coated VP15TF	CW	CDX*1	RER/L	IC	S
GTAT03006V3R-U	R	●	0.3	0.6	0.03	9.525	3.18
GTAT03006V3L-U	L	●	0.3	0.6	0.03	9.525	3.18
GTAT05012V5R-U	R	●	0.5	1.2	0.05	9.525	3.18
GTAT05012V5L-U	L	●	0.5	1.2	0.05	9.525	3.18
GTAT07520V5R-U	R	●	0.75	2.0	0.05	9.525	3.18
GTAT07520V5L-U	L	●	0.75	2.0	0.05	9.525	3.18
GTAT09520V5R-U	R	●	0.95	2.0	0.05	9.525	3.18
GTAT09520V5L-U	L	●	0.95	2.0	0.05	9.525	3.18
GTAT10020V5R-U	R	●	1.0	2.0	0.05	9.525	3.18
GTAT10020V5L-U	L	●	1.0	2.0	0.05	9.525	3.18
GTAT10320V5R-U	R	●	1.03	2.0	0.05	9.525	3.18
GTAT12520V5R-U	R	●	1.25	2.0	0.05	9.525	3.18
GTAT12520V5L-U	L	●	1.25	2.0	0.05	9.525	3.18
GTBT14530V5R-U	R	●	1.45	3.0	0.05	9.525	3.18
GTBT14530V5L-U	L	●	1.45	3.0	0.05	9.525	3.18
GTBT15030V5R-U	R	●	1.5	3.0	0.05	9.525	3.18
GTBT15030V5L-U	L	●	1.5	3.0	0.05	9.525	3.18
GTBT17530V5R-U	R	●	1.75	3.0	0.05	9.525	3.18
GTBT17530V5L-U	L	●	1.75	3.0	0.05	9.525	3.18
GTBT20030V5R-U	R	●	2.0	3.0	0.05	9.525	3.18
GTBT20030V5L-U	L	●	2.0	3.0	0.05	9.525	3.18
GTCT25030V5R-U	R	●	2.5	3.0	0.05	9.525	3.18
GTCT25030V5L-U	L	●	2.5	3.0	0.05	9.525	3.18

Geometry: **U** Type Breaker (Grooving)
For general use



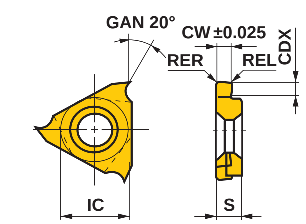
Right hand insert shown.

● : USA Stock ★ : Stocked in Japan
<5 inserts in one case>

INSERTS

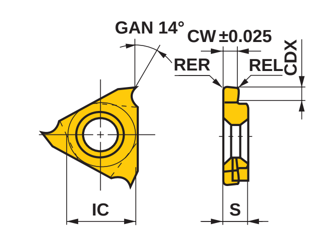
Order Number	Hand	Coated VP15TF	Coated VP15KZ	CW	CDX	RER/L	IC	S	Max. Depth of Cut (mm)
GTAT03306V3R-E	R	●		0.33	0.6	0.03	9.525	3.18	
GTAT03306V3L-E	L	●		0.33	0.6	0.03	9.525	3.18	
GTAT04312V3R-E	R	●		0.43	1.2	0.03	9.525	3.18	
GTAT04312V3L-E	L	●		0.43	1.2	0.03	9.525	3.18	
GTAT05312V5R-E	R	●		0.53	1.2	0.05	9.525	3.18	
GTAT05312V5L-E	L	●		0.53	1.2	0.05	9.525	3.18	
GTAT07520V5R-E	R	●		0.75	2.0	0.05	9.525	3.18	
GTAT07520V5L-E	L	●		0.75	2.0	0.05	9.525	3.18	
GTAT09520V5R-E	R	●		0.95	2.0	0.05	9.525	3.18	
GTAT09520V5L-E	L	●		0.95	2.0	0.05	9.525	3.18	
GTAT10020V5R-E	R	●		1.0	2.0	0.05	9.525	3.18	
GTAT10020V5L-E	L	●		1.0	2.0	0.05	9.525	3.18	
GTAT1002001R-E	R	●		1.0	2.0	0.1	9.525	3.18	
GTAT1002001L-E	L	●		1.0	2.0	0.1	9.525	3.18	
GTAT12020V5R-E	R	●		1.2	2.0	0.05	9.525	3.18	
GTAT12020V5L-E	L	●		1.2	2.0	0.05	9.525	3.18	
GTAT1202001R-E	R	●		1.2	2.0	0.1	9.525	3.18	
GTAT1202001L-E	L	●		1.2	2.0	0.1	9.525	3.18	
GTAT14020V5R-E	R	●		1.4	2.0	0.05	9.525	3.18	
GTAT14020V5L-E	L	●		1.4	2.0	0.05	9.525	3.18	
GTBT15030V5R-E	R	●		1.5	3.0	0.05	9.525	3.18	
GTBT15030V5L-E	L	●		1.5	3.0	0.05	9.525	3.18	
GTBT1503001R-E	R	●		1.5	3.0	0.1	9.525	3.18	
GTBT1503001L-E	L	●		1.5	3.0	0.1	9.525	3.18	
GTBT18030V5R-E	R	●		1.8	3.0	0.05	9.525	3.18	
GTBT18030V5L-E	L	●		1.8	3.0	0.05	9.525	3.18	
GTBT20030V5R-E	R	●		2.0	3.0	0.05	9.525	3.18	
GTBT20030V5L-E	L	●		2.0	3.0	0.05	9.525	3.18	
GTBT2003001R-E	R	●		2.0	3.0	0.1	9.525	3.18	
GTBT2003001L-E	L	●		2.0	3.0	0.1	9.525	3.18	
GTBT22530V5R-E	R	●		2.25	3.0	0.05	9.525	3.18	
GTBT22530V5L-E	L	●		2.25	3.0	0.05	9.525	3.18	
GTCT25030V5R-E	R	●		2.5	3.0	0.05	9.525	3.18	
GTCT25030V5L-E	L	●		2.5	3.0	0.05	9.525	3.18	
GTCT27530V5R-E	R	●		2.75	3.0	0.05	9.525	3.18	
GTCT27530V5L-E	L	●		2.75	3.0	0.05	9.525	3.18	
GTCT30030V5R-E	R	●		3.0	3.0	0.05	9.525	3.18	
GTCT30030V5L-E	L	●		3.0	3.0	0.05	9.525	3.18	
GTAT0330600R-VT	R		●	0.33	0.6	0	9.525	3.18	0.25
GTAT0431200R-VT	R		●	0.43	1.2	0	9.525	3.18	0.9
GTAT0532000R-VT	R		●	0.53	2.0	0	9.525	3.18	1.6
GTAT0652000R-VT	R		●	0.65	2.0	0	9.525	3.18	1.6
GTAT0752000R-VT	R		●	0.75	2.0	0	9.525	3.18	1.6
GTAT0802000R-VT	R		●	0.8	2.0	0	9.525	3.18	1.6
GTAT0852000R-VT	R		●	0.85	2.0	0	9.525	3.18	1.6
GTAT0952000R-VT	R		●	0.95	2.0	0	9.525	3.18	1.6
GTAT1002000R-VT	R		●	1.0	2.0	0	9.525	3.18	1.6
GTAT1102000R-VT	R		●	1.1	2.0	0	9.525	3.18	1.6
GTAT1202000R-VT	R		●	1.2	2.0	0	9.525	3.18	1.6
GTAT1302000R-VT	R		●	1.3	2.0	0	9.525	3.18	1.6
GTAT1402000R-VT	R		●	1.4	2.0	0	9.525	3.18	1.6
GTBT1503000R-VT	R		●	1.5	3.0	0	9.525	3.18	2.7
GTBT2003000R-VT	R		●	2.0	3.0	0	9.525	3.18	2.7

Geometry: **E** Type Breaker (Grooving)
For precision cutting



Right hand insert shown.

Geometry: **VT** Type Breaker (Grooving, Profiling)



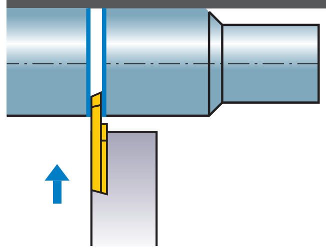
RECOMMENDED CUTTING CONDITIONS

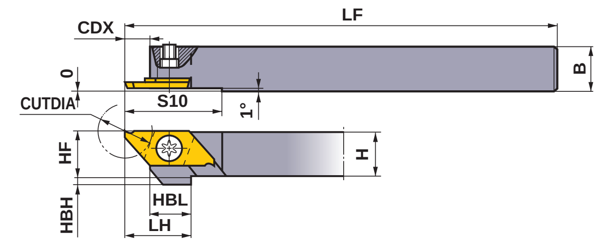
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB−280HB	VP15TF/VP15KZ	165−490	.0004−.0035
	Free Cutting Steel	−	VP15TF/VP15KZ	100−590	.0004−.0035
M	Stainless Steel	≤200HB	VP15TF/VP15KZ	165−395	.0008−.002
N	Non-Ferrous Metal	−	VP15TF/VP15KZ	230−755	.0012−.004

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

CTAH



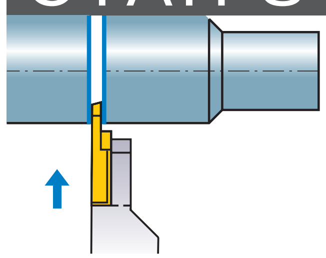


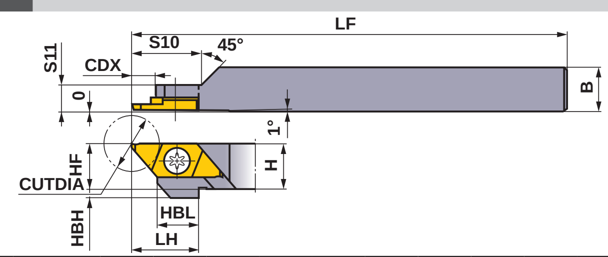
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (inch)	Clamp Screw *2	Wrench
CTAHR/L-062	●	●	CTAT	○○○○	.375	.375	.375	4.724	.591	.217	.125	.374	.866	.472 (.315)*1	NS402W	NKY15S
CTAHR/L-082	●	●	CTAT	○○○○	.500	.500	.500	4.724	.591	.217	—	.374	.866	.472 (.315)*1	NS402W	NKY15S
CTAHR/L-102	●	●	CTAT	○○○○	.625	.625	.625	4.724	.591	.217	—	.374	.866	.472 (.315)*1	NS403W	NKY15S

*1 When the width of cutting off (CW) is .028 inch.
*2 Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

CTAH-S





Right hand tool holder only.

Order Number	Stock R	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	S11	CUTDIA (inch)	Clamp Screw *2	Wrench
CTAHR-062S	●	CTAT	○○○○	.375	.375	.375	3.150	.591	.217	.125	.374	.630	.217	.472 (.315)*1	NS401	NKY25R
CTAHR-082S	●	CTAT	○○○○	.500	.500	.500	3.150	.591	.217	—	.374	.630	.217	.472 (.315)*1	NS401	NKY25R

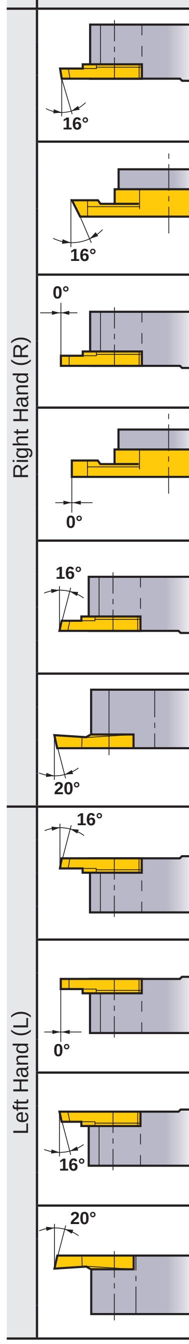
*1 When the width of cutting off (CW) is .028 inch.
*2 Clamp Torque (lbf-in) : NS401=31

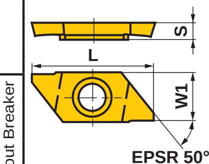
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB−280HB	MS6015 / VP15TF	165−490	.0008−.0035
P	Free Cutting Steel	−	MS6015	100−590	.0004−.0035
M	Stainless Steel	≤200HB	VP15TF	165−395	.0008−.0019
N	Non-Ferrous Metal	−	MS6015	230−755	.0012−.0043

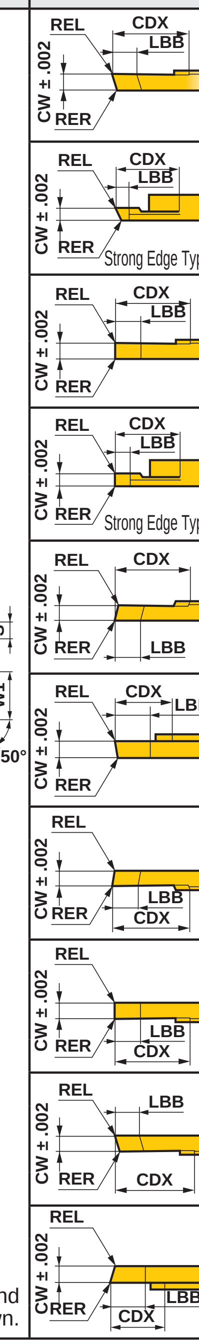
● : USA Stock
<5 inserts in one case>

INSERTS





Right hand insert shown.



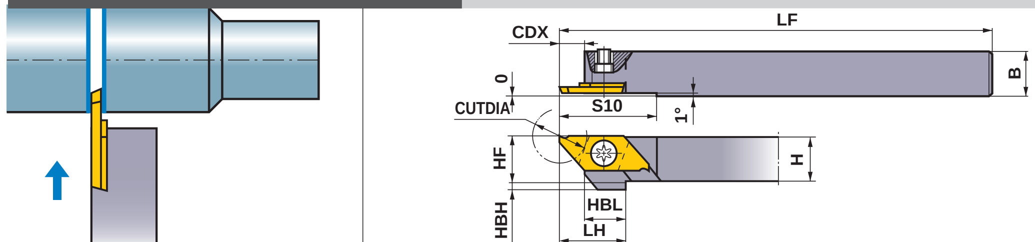
Holder	Breaker	Order Number	Hand	Coated VP15TF	Coated NEW MS6015	CW	CDX	RER/L	L	W1	S	LBB	CUTDIA (inch)
Right Hand (R)	With Breaker	CTAT07080V5RR-B	R	●		.028	.177	.002	.787	.315	.098	.059	.315
Right Hand (R)	With Breaker	CTAT10120V5RR-B	R	●	●	.039	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT15120V5RR-B	R	●	●	.059	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT20120V5RR-B	R	●	●	.079	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT15120V5RR-BX	R	●		.059	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT20120V5RR-BX	R	●		.079	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT10120V5RN-B	N	●	●	.039	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT15120V5RN-B	N	●	●	.059	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT20120V5RN-B	N	●	●	.079	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT15120V5RN-BX	N	●		.059	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT20120V5RN-BX	N	●		.079	.264	.002	.787	.315	.098	.059	.472
Right Hand (R)	With Breaker	CTAT10110V5RL-B	L	●		.039	.264	.002	.787	.315	.098	.059	.433
Right Hand (R)	With Breaker	CTAT15110V5RL-B	L	●		.059	.264	.002	.787	.315	.098	.059	.433
Right Hand (R)	With Breaker	CTAT20110V5RL-B	L	●		.079	.264	.002	.787	.315	.098	.059	.433
Right Hand (R)	Without Breaker	CTAT1012000RR	R	●	●	.039	.264	.000	.787	.315	.098	.138	.472
Right Hand (R)	Without Breaker	CTAT1512000RR	R	●	●	.059	.264	.000	.787	.315	.098	.138	.472
Right Hand (R)	Without Breaker	CTAT2012000RR	R	●	●	.079	.264	.000	.787	.315	.098	.138	.472
Left Hand (L)	With Breaker	CTAT07080V5LL-B	L	●		.028	.177	.002	.787	.315	.098	.059	.315
Left Hand (L)	With Breaker	CTAT10120V5LL-B	L	●		.039	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT15120V5LL-B	L	●		.059	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT20120V5LL-B	L	●		.079	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT10120V5LN-B	N	●	●	.039	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT15120V5LN-B	N	●	●	.059	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT20120V5LN-B	N	●	●	.079	.264	.002	.787	.315	.098	.059	.472
Left Hand (L)	With Breaker	CTAT10110V5LR-B	R	●	●	.039	.264	.002	.787	.315	.098	.059	.433
Left Hand (L)	With Breaker	CTAT15110V5LR-B	R	●	●	.059	.264	.002	.787	.315	.098	.059	.433
Left Hand (L)	With Breaker	CTAT20110V5LR-B	R	●	●	.079	.264	.002	.787	.315	.098	.059	.433
Left Hand (L)	Without Breaker	CTAT1012000LL	L	●		.039	.264	.000	.787	.315	.098	.138	.472
Left Hand (L)	Without Breaker	CTAT1512000LL	L	●		.059	.264	.000	.787	.315	.098	.138	.472
Left Hand (L)	Without Breaker	CTAT2012000LL	L	●		.079	.264	.000	.787	.315	.098	.138	.472

● = NEW

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

CTAH

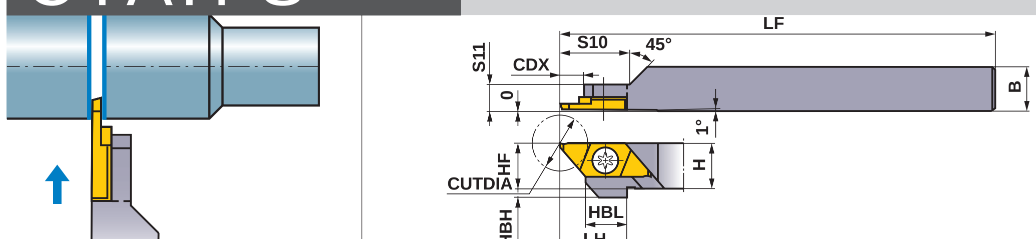


Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (mm)	Clamp Screw ⁎2	Wrench
CTAHR/L0810-120	●	●	CTAT	○○○○	8	10	8	120	15	5.5	4	9.5	22	12 (8)⁎1	NS402W	NKY15S
CTAHR/L1010-120	●	●		○○○○	10	10	10	120	15	5.5	2	9.5	22		NS402W	NKY15S
CTAHR/L1212-120	●	●		○○○○	12	12	12	120	15	5.5	—	9.5	22		NS403W	NKY15S
CTAHR/L1616-120	●	●		○○○○	16	16	16	120	15	5.5	—	9.5	22		NS403W	NKY15S

⁎1 When the width of cutting off (CW) is 0.7 mm.
⁎2 Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

CTAH-S



Right hand tool holder only.

Order Number	Stock R	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	S11	CUTDIA (mm)	Clamp Screw ⁎2	Wrench
CTAHR1010-120S	●	CTAT	○○○○	10	10	10	80	15	16	2	9.5	16	5.5	12 (8)⁎1	NS401	NKY25R

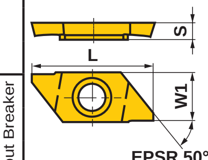
⁎1 When the width of cutting off (CW) is 0.7 mm.
⁎2 Clamp Torque (lbf-in) : NS401=31

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB—280HB	**MS6015/VP15TF**	165—490	.0008—.0035
	Free Cutting Steel	—	**MS6015**	100—590	.0004—.0035
M	Stainless Steel	≤200HB	**VP15TF**	165—395	.0008—.0019
N	Non-Ferrous Metal	—	**MS6015**	230—755	.0012—.0043

● : USA Stock
<5 inserts in one case>

INSERTS



Right hand insert shown.

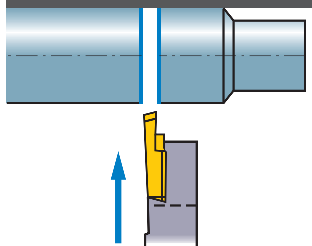
Holder	Breaker	Order Number	Hand	Coated VP15TF	Coated NEW MS6015	CW	CDX	RER/L	L	W1	S	LBB	CUTDIA (mm)
Right Hand (R)	With Breaker	CTAT07080V5RR-B	R	●		0.7	4.5	0.05	20	8	2.5	1.5	8
		CTAT10120V5RR-B	R	●	●	1.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT15120V5RR-B	R	●	●	1.5	6.7	0.05	20	8	2.5	1.5	12
		CTAT20120V5RR-B	R	●	●	2.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT15120V5RR-BX (Strong Edge Type)	R	●		1.5	6.7	0.05	20	8	2.5	1.5	12
		CTAT20120V5RR-BX (Strong Edge Type)	R	●		2.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT10120V5RN-B	N	●	●	1.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT15120V5RN-B	N	●	●	1.5	6.7	0.05	20	8	2.5	1.5	12
		CTAT20120V5RN-B	N	●	●	2.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT15120V5RN-BX (Strong Edge Type)	N	●		1.5	6.7	0.05	20	8	2.5	1.5	12
		CTAT20120V5RN-BX (Strong Edge Type)	N	●		2.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT10110V5RL-B	L	●		1.0	6.7	0.05	20	8	2.5	1.5	11
		CTAT15110V5RL-B	L	●		1.5	6.7	0.05	20	8	2.5	1.5	11
		CTAT20110V5RL-B	L	●		2.0	6.7	0.05	20	8	2.5	1.5	11
	Without Breaker	CTAT1012000RR	R	●	●	1.0	6.7	0	20	8	2.5	3.5	12
		CTAT1512000RR	R	●	●	1.5	6.7	0	20	8	2.5	3.5	12
		CTAT2012000RR	R	●	●	2.0	6.7	0	20	8	2.5	3.5	12
Left Hand (L)	With Breaker	CTAT07080V5LL-B	L	●		0.7	4.5	0.05	20	8	2.5	1.5	8
		CTAT10120V5LL-B	L	●		1.0	6.7	0	20	8	2.5	1.5	12
		CTAT15120V5LL-B	L	●		1.5	6.7	0	20	8	2.5	1.5	12
		CTAT20120V5LL-B	L	●		2.0	6.7	0	20	8	2.5	1.5	12
		CTAT10120V5LN-B	N	●	●	1.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT15120V5LN-B	N	●	●	1.5	6.7	0.05	20	8	2.5	1.5	12
		CTAT20120V5LN-B	N	●	●	2.0	6.7	0.05	20	8	2.5	1.5	12
		CTAT10110V5LR-B	R	●	●	1.0	6.7	0.05	20	8	2.5	1.5	11
		CTAT15110V5LR-B	R	●	●	1.5	6.7	0.05	20	8	2.5	1.5	11
		CTAT20110V5LR-B	R	●	●	2.0	6.7	0.05	20	8	2.5	1.5	11
	Without Breaker	CTAT1012000LL	L	●		1.0	6.7	0	20	8	2.5	3.5	12
		CTAT1512000LL	L	●		1.5	6.7	0	20	8	2.5	3.5	12
		CTAT2012000LL	L	●		2.0	6.7	0	20	8	2.5	3.5	12

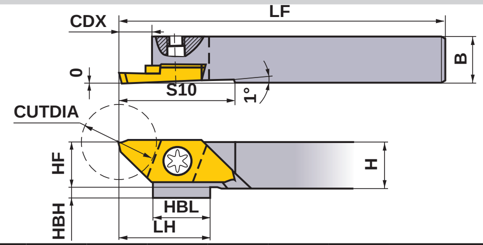
● = NEW

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

CTBH





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (inch)	Clamp Screw*	Wrench
CTBHR/L-062	●	●	CTBT	○○○○	.375	.375	.375	4.724	.768	.295	.125	.374	.984	.630	NS402W	NKY15S
CTBHR/L-082	●	●	CTBT	○○○○	.500	.500	.500	4.724	.768	.295	–	.374	.984	.630	NS403W	NKY15S
CTBHR/L-102	●	●	CTBT	○○○○	.625	.625	.625	4.724	.768	.295	–	.374	.984	.630	NS403W	NKY15S

⁎ Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

INSERTS

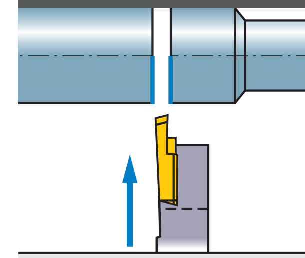
Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Coated MS6015 (NEW)	CW	CDX	RER/L	L	W1	S	CUTDIA (inch)
Right Hand (R)	16°	With Breaker	L, S, W1, EPSR 45°	REL, CDX, CW ± .002, RER	CTBT15160V5RR-B	R	●	●	.059	.362	.002	.984	.370	.138	.630
					CTBT20160V5RR-B	R	●	●	.079	.362	.002	.984	.370	.138	.630
	0°			REL, CDX, CW ± .002, RER	CTBT20160V5RN-B	N	●	●	.079	.362	.002	.984	.370	.138	.630
Left Hand (L)	16°			REL, CW ± .002, RER, CDX	CTBT20160V5LL-B	L	●		.079	.362	.002	.984	.370	.138	.630
	0°			REL, CW ± .002, RER, CDX	CTBT20160V5LN-B	N	●	●	.079	.362	.002	.984	.370	.138	.630
	16°		Right hand insert shown.	REL, CW ± .002, RER, CDX	CTBT20145V5LR-B	R	●	●	.079	.362	.002	.984	.370	.138	.571

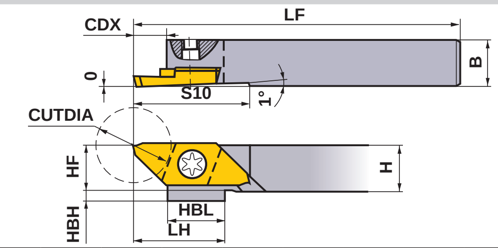
● = NEW

● : USA Stock
<5 inserts in one case>

METRIC STANDARD

CTBH





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (mm)	Clamp Screw*	Wrench
CTBHR/L1010-160	●	●	CTBT	○○○○	10	10	10	120	19.5	7.5	2	9.5	25	16	NS402W	NKY15S
CTBHR/L1212-160	●	●	CTBT	○○○○	12	12	12	120	19.5	7.5	–	9.5	25	16	NS403W	NKY15S
CTBHR/L1616-160	●	●	CTBT	○○○○	16	16	16	120	19.5	7.5	–	9.5	25	16	NS403W	NKY15S

⁎ Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Coated MS6015 (NEW)	CW	CDX	RER/L	L	W1	S	CUTDIA (mm)
Right Hand (R)	16°	With Breaker	L, S, W1, EPSR 45°	REL, CDX, CW ±0.05, RER	CTBT15160V5RR-B	R	●	●	1.5	9.2	0.05	25	9.4	3.5	16
					CTBT20160V5RR-B	R	●	●	2.0	9.2	0.05	25	9.4	3.5	16
	0°			REL, CDX, CW ±0.05, RER	CTBT20160V5RN-B	N	●	●	2.0	9.2	0.05	25	9.4	3.5	16
Left Hand (L)	16°			REL, CW ±0.05, RER, CDX	CTBT20160V5LL-B	L	●		2.0	9.2	0.05	25	9.4	3.5	16
	0°			REL, CW ±0.05, RER, CDX	CTBT20160V5LN-B	N	●	●	2.0	9.2	0.05	25	9.4	3.5	16
	16°		Right hand insert shown.	REL, CW ±0.05, RER, CDX	CTBT20145V5LR-B	R	●	●	2.0	9.2	0.05	25	9.4	3.5	14.5

● = NEW

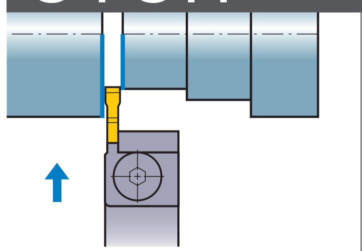
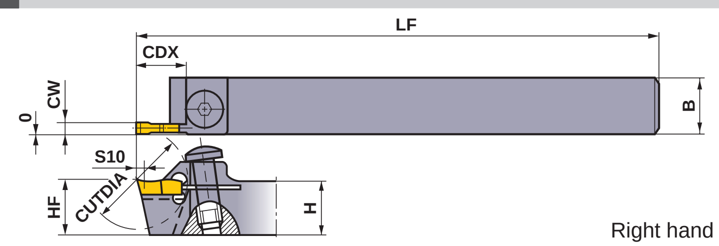
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	MS6015/VP15TF	165–490	.0008 –.0035
P	Free Cutting Steel	–	MS6015	100–590	.0004 –.0035
M	Stainless Steel	≤200HB	VP15TF	165–395	.0008 –.0019
N	Non-Ferrous Metal	–	MS6015	230–755	.0012 –.0043

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

CTCH

Right hand tool holder shown.

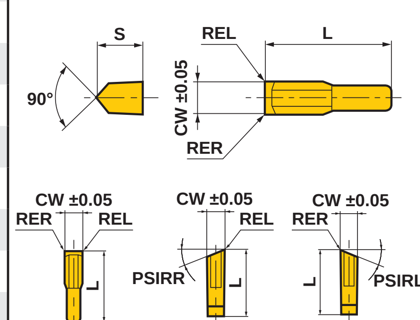
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H	B	HF	LF	CDX	S10	CUTDIA (mm)	Clamp Screw*	Wrench
CTCHR/L1010-200	●	●	CTCT	2○○○	10	10	10	120	11	0.5	20	NS501W	HKY25RS
CTCHR/L1212-200	●	●		2○○○	12	12	12	120	11	0.5	20	NS501W	HKY25RS

* Clamp Torque (lbf-in) : NS501W=19

INSERTS

Breaker	Order Number	Hand	Coated VP15TF	Dimensions (mm) CW	PSIRR/L	RER/L	L	S	CUTDIA (mm)
With Breaker	**CTCT22200V5N-B**	N	●	2.2	0°	0.05	10	4.0	20
	CTCT2220001N-B	N	●	2.2	0°	0.1	10	4.0	20
	CTCT25200V5N-B	N	●	2.5	0°	0.05	10	4.0	20
	CTCT2520001N-B	N	●	2.5	0°	0.1	10	4.0	20
	CTCT22200V5R-B	R	●	2.2	17°	0.05	10	4.0	20
	CTCT2220001R-B	R	●	2.2	17°	0.1	10	4.0	20
	CTCT25200V5R-B	R	●	2.5	17°	0.05	10	4.0	20
	CTCT2520001R-B	R	●	2.5	17°	0.1	10	4.0	20
	CTCT22200V5L-B	L	●	2.2	17°	0.05	10	4.0	20
	CTCT2220001L-B	L	●	2.2	17°	0.1	10	4.0	20
	CTCT25200V5L-B	L	●	2.5	17°	0.05	10	4.0	20
	CTCT2520001L-B	L	●	2.5	17°	0.1	10	4.0	20

Geometry

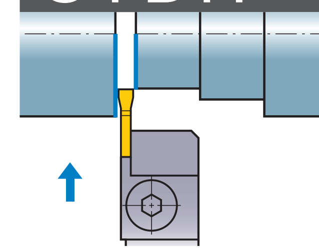
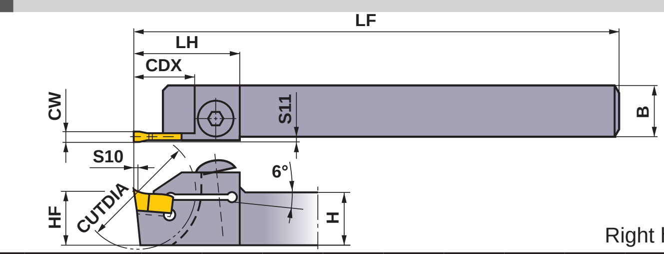


Neutral (N) Right Hand (R) Left Hand (L)

● : USA Stock
<10 inserts in one case>

METRIC STANDARD

CTDH

Right hand tool holder shown.

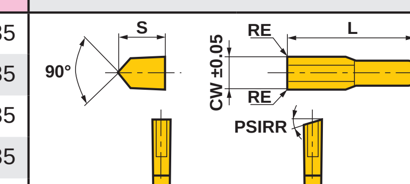
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H	B	HF	LF	LH	CDX	S10	S11	CUTDIA (mm)	Clamp Screw*	Wrench
CTDHR/L1616-230	●		CTDT	2535○○	16	16	16	125	24	12.2	0.5	0.5	23	HBH06020	HKY40R
CTDHR/L1616-280	●			2535○○	16	16	16	120	25	15	0.5	0.5	28	NS502W	HKY25R
CTDHR/L1616-350	●	●		2535○○	16	16	16	125	32	18.5	0.5	0.5	35	HBH06020	HKY40R

* Clamp Torque (lbf-in) : HBH06020=62, NS502W=19

INSERTS

Breaker	Order Number	Hand	Coated VP15TF	Dimensions (mm) CW	PSIRR	RE	L	S	CUTDIA (mm)
With Breaker	**CTDT2535002N-B**	N	●	2.5	0°	0.2	12	6.39	23–35
	CTDT25350V5R-B	R	●	2.5	8°	≤0.05	12	6.39	23–35
	CTDT25350V5R-BS	R	●	2.5	17°	≤0.05	12	6.39	23–35
	CTDT2535002R-B	R	●	2.5	8°	0.2	12	6.39	23–35

Geometry



Neutral (N) Right Hand (R)

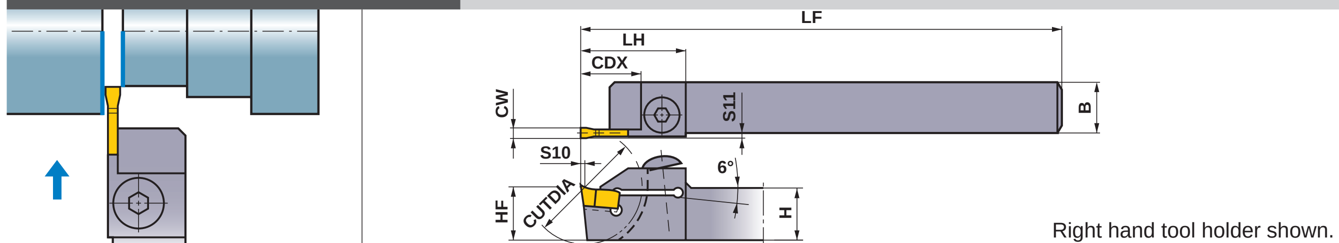
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	165–490	.0008–.0035
	Free Cutting Steel	–	**VP15TF**	100–590	.0004–.0035
M	Stainless Steel	≤200HB	**VP15TF**	165–395	.0008–.0019
N	Non-Ferrous Metal	–	**VP15TF**	230–755	.0012–.0043

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

CTEH

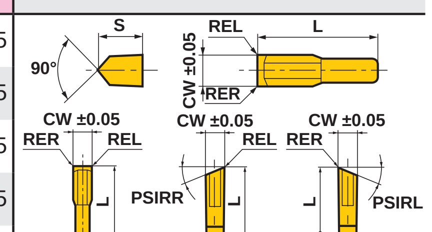


Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	CDX	S10	S11	CUTDIA (mm)	Clamp Screw *	Wrench
CTEHR/L1616-230	●		CTET	3035○○	16	16	16	125	24	12.2	0.5	0.5	23	HBH06020	HKY40R
CTEHR/L1616-280	●		CTET	3035○○	16	16	16	120	25	15	0.5	0.5	28	NS502W	HKY25R
CTEHR/L1616-350	●	●	CTET	3035○○	16	16	16	125	32	18.5	0.5	0.5	35	HBH06020	HKY40R

* Clamp Torque (lbf-in) : HBH06020=62, NS502W=19

INSERTS

Breaker	Order Number	Hand	Coated VP15TF	CW	PSIRR/L	RER/L	L	S	CUTDIA (mm)	Geometry
With Breaker	CTET30350V5R-B	R	●	3	8°	≦0.05	12	6.39	23−35	
	CTET30350V5R-BS	R	●	3	17°	≦0.05	12	6.39	23−35	
	CTET3035002N-B	N	●	3	0°	0.2	12	6.39	23−35	
	CTET3035002R-B	R	●	3	8°	0.2	12	6.39	23−35	
	CTET3035002L-B	L	●	3	8°	0.2	12	6.39	23−35	

RECOMMENDED CUTTING CONDITIONS

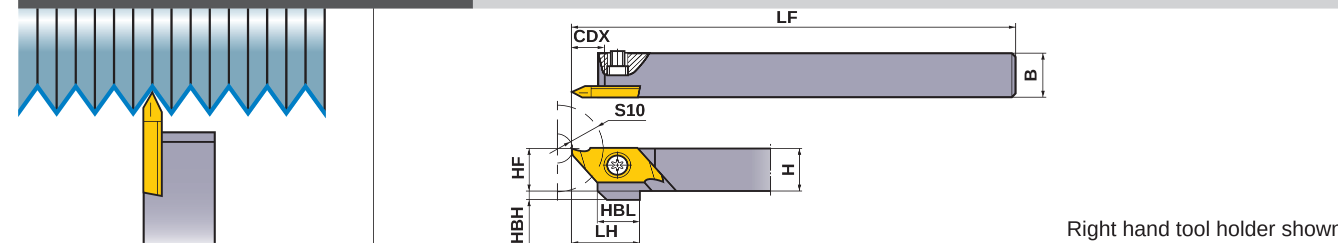
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB−280HB	VP15TF	165−490	.0008−.0035
P	Free Cutting Steel	−	VP15TF	100−590	.0004−.0035
M	Stainless Steel	≦200HB	VP15TF	165−395	.0008−.0019
N	Non-Ferrous Metal	−	VP15TF	230−755	.0012−.0043

● : USA Stock
<10 inserts in one case>

THREADING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

TTAH

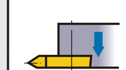
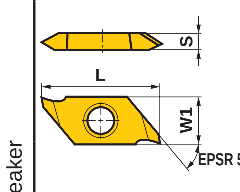
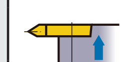
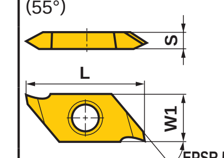
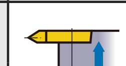


Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	HBH	HBL	CDX	S10	Clamp Screw *	Wrench
TTAHR/L-062	●	●	TTAT	○○○○	.375	.375	.375	4.724	.591	.125	.374	.276	.256	NS402W	NKY15S
TTAHR/L-082	●	●	TTAT	○○○○	.500	.500	.500	4.724	.591	−	.374	.276	.256	NS402W	NKY15S
TTAHR/L-102	●	●	TTAT	○○○○	.625	.625	.625	4.724	.591	−	.374	.276	.256	NS402W	NKY15S

* Clamp Torque (lbf-in) : NS402W=6.2

INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	PDX	RE	L	W1	S	Pitch of Thread (inch) (thread/inch)
Right Hand (R)		With Breaker	General Purpose (60°)  Right hand insert shown.		TTAT60075F5RR-B	R	●	.016	.002 Flat	.787	.315	.098	.008−.030 (80−36)
					TTAT60125V5RR-B	R	●	.031	.002	.787	.315	.098	.020−.049 (40−16)
					TTAT60075F5RL-B	L	●	.016	.002 Flat	.787	.315	.098	.008−.030 (80−36)
					TTAT60125V5RL-B	L	●	.031	.002	.787	.315	.098	.020−.049 (40−16)
					TTAT6015001RN-B	N	●	.049	.004	.787	.315	.098	.039−.059 (24−18)
Left Hand (L)					TTAT60075F5LR-B	R	●	.016	.002 Flat	.787	.315	.098	.008−.030 (80−36)
					TTAT60125V5LR-B	R	●	.031	.002	.787	.315	.098	.020−.049 (40−16)
					TTAT60075F5LL-B	L	●	.016	.002 Flat	.787	.315	.098	.008−.030 (80−36)
					TTAT60125V5LL-B	L	●	.031	.002	.787	.315	.098	.020−.049 (40−16)
					TTAT6015001LN-B	N	●	.049	.004	.787	.315	.098	.039−.059 (24−18)
Right Hand (R)			General Purpose (55°)  Right hand insert shown.		TTAT55158V5RR-B	R	●	.031	.002	.787	.315	.098	(40−16)
					TTAT55158V5RL-B	L	●	.031	.002	.787	.315	.098	(40−16)
Left Hand (L)					TTAT55158V5LR-B	R	●	.031	.002	.787	.315	.098	(40−16)
					TTAT55158V5LL-B	L	●	.031	.002	.787	.315	.098	(40−16)

Refer to page D037 for the thread diameter range.

RECOMMENDED CUTTING CONDITIONS

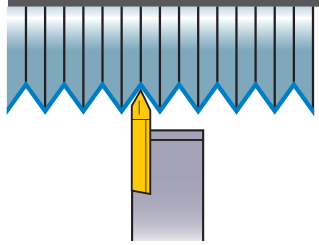
	Work Material	Hardness	Cutting Speed (SFM)
P	Carbon Steel · Alloy Steel	180HB−280HB	165−490
P	Free Cutting Steel	−	100−590
M	Stainless Steel	≦200HB	165−395
N	Non-Ferrous Metal	−	230−755

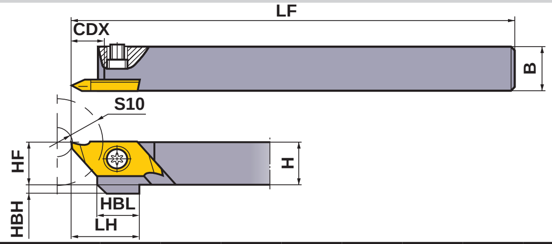
● : USA Stock
<5 inserts in one case>

THREADING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

TTAH





Right hand tool holder shown.

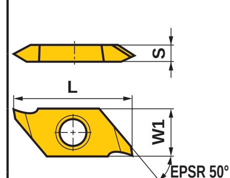
Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	LH	HBH	HBL	CDX	S10	Clamp Screw *	Wrench
TTAHR/L0810	●	●	TTAT	○○○○	8	10	8	120	15	4	9.5	7	6.5	NS402W	NKY15S
TTAHR/L1010	●	●		○○○○	10	10	10	120	15	2	9.5	7	6.5	NS402W	NKY15S
TTAHR/L1212	●	●		○○○○	12	12	12	120	15	–	9.5	7	6.5	NS403W	NKY15S
TTAHR/L1616	●	●		○○○○	16	16	16	120	15	–	9.5	7	6.5	NS403W	NKY15S

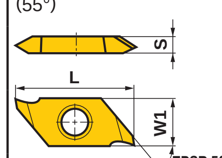
Dimensions (mm)

* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	PDX	RE	L	W1	S	Pitch of Thread (mm) (thread/inch)
Right Hand (R)		With Breaker	General Purpose (60°)	PNA 60°	TTAT60075F5RR-B	R	●	0.4	0.05 Flat	20.0	8.0	2.5	0.2–0.75 (80–36)
					TTAT60125V5RR-B	R	●	0.8	0.05	20.0	8.0	2.5	0.5–1.25 (40–16)
				PNA 60°	TTAT60075F5RL-B	L	●	0.4	0.05 Flat	20.0	8.0	2.5	0.2–0.75 (80–36)
					TTAT60125V5RL-B	L	●	0.8	0.05	20.0	8.0	2.5	0.5–1.25 (40–16)
				PNA 60°	TTAT6015001RN-B	N	●	1.25	0.1	20.0	8.0	2.5	1.0–1.5 (24–18)
Left Hand (L)				PNA 60°	TTAT60075F5LR-B	R	●	0.4	0.05 Flat	20.0	8.0	2.5	0.2–0.75 (80–36)
					TTAT60125V5LR-B	R	●	0.8	0.05	20.0	8.0	2.5	0.5–1.25 (40–16)
				PNA 60°	TTAT60075F5LL-B	L	●	0.4	0.05 Flat	20.0	8.0	2.5	0.2–0.75 (80–36)
					TTAT60125V5LL-B	L	●	0.8	0.05	20.0	8.0	2.5	0.5–1.25 (40–16)
			Right hand insert shown.	PNA 60°	TTAT6015001LN-B	N	●	1.25	0.1	20.0	8.0	2.5	1.0–1.5 (24–18)
Right Hand (R)			General Purpose (55°)	PNA 55°	TTAT55158V5RR-B	R	●	0.8	0.05	20.0	8.0	2.5	(40–16)
				PNA 55°	TTAT55158V5RL-B	L	●	0.8	0.05	20.0	8.0	2.5	(40–16)
Left Hand (L)				PNA 55°	TTAT55158V5LR-B	R	●	0.8	0.05	20.0	8.0	2.5	(40–16)
			Right hand insert shown.	PNA 55°	TTAT55158V5LL-B	L	●	0.8	0.05	20.0	8.0	2.5	(40–16)



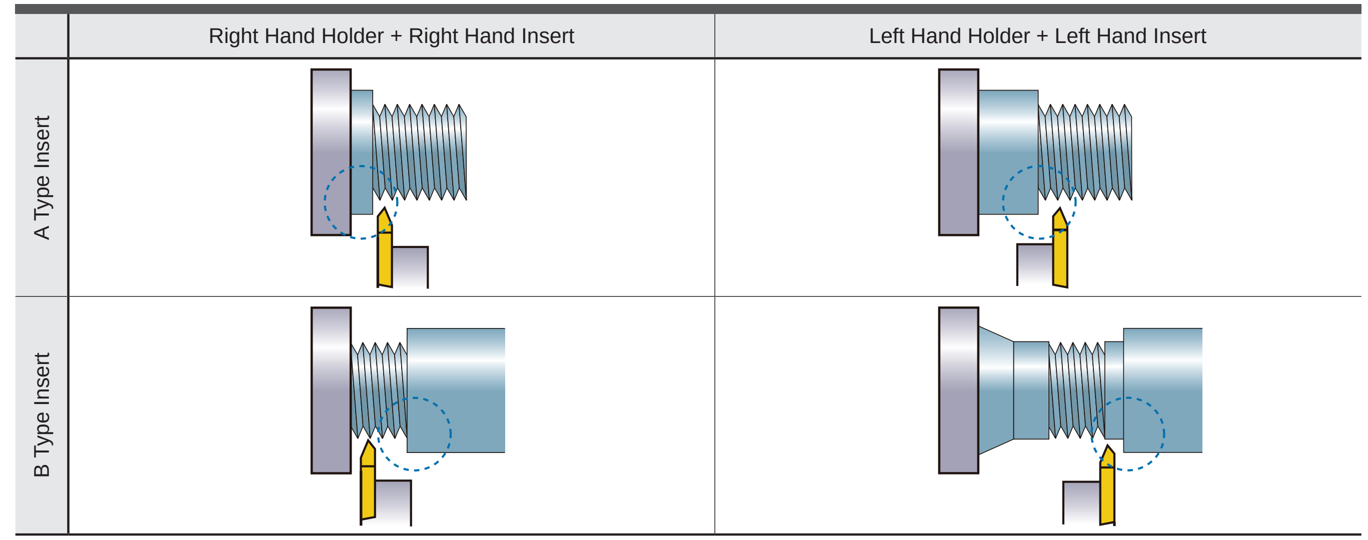


Refer to page D037 for the thread diameter range.

● : USA Stock

<5 inserts in one case>

HOLDER APPLICATION



* Above 4 combinations enable machining at the areas shown by ◌.

THREAD DIAMETER RANGE

Application Range

Pitch (mm)	≥φ1.0	≥φ1.2	≥φ1.6	≥φ2.0	≥φ2.5	≥φ3.0	≥φ4.0	≥φ5.0	≥φ6.0	≥φ7.0	Number of Passes
0.2											2–4
0.25											
0.3											3–5
0.35											
0.4											4–6
0.45											
0.5											5–7
0.6											
0.7											
0.75		Machining Impossible									
0.8											
1											
1.25											6–8
1.5											

Thread Diameter (mm)

*Metric Thread (60°)

Pitch(thread/inch)	≥φ0.060 / ≥φ1.524	≥φ0.073 / ≥φ1.854	≥φ0.086 / ≥φ2.184	≥φ0.099 / ≥φ2.515	≥φ0.112 / ≥φ2.845	≥φ0.164 / ≥φ4.166	≥φ0.190 / ≥φ4.826	≥φ0.250 / ≥φ6.350	≥φ0.313 / ≥φ7.938	Number of Passes
Thread Diameter: Inch / mm										
80										3–5
72										
64										4–6
56										
48										5–7
44										
40										
32										
28										
26		Machining Impossible								
24										
20										6–8
18										
16										

*American UN,Whitworth Thread

RECOMMENDED CUTTING CONDITIONS

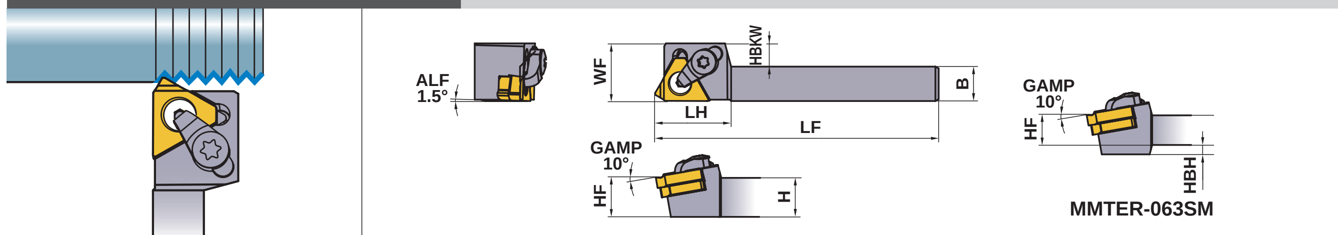
	Work Material	Hardness	Cutting Speed (SFM)
P	Carbon Steel · Alloy Steel	180HB–280HB	165–490
P	Free Cutting Steel	–	100–590
M	Stainless Steel	≤200HB	165–395
N	Non-Ferrous Metal	–	230–755

D SMALL TOOLS

THREADING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

MMTE



Order Number	Stock R	Insert Number		H	B	LF	LH	HBH	HF	HBKW	WF	*Clamp Bridge*	* Clamp Screw	Stop Ring	* Shim Screw	Shim	Wrench
				Dimensions (inch)													
MMTER-063SM	●	TTAT	MMT16ER	.375	.375	4.724	.875	.118	.375	.250	.625	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
MMTER-083SM	●	TTAT	MMT16ER	.500	.500	4.724	.875	–	.500	.125	.625	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R

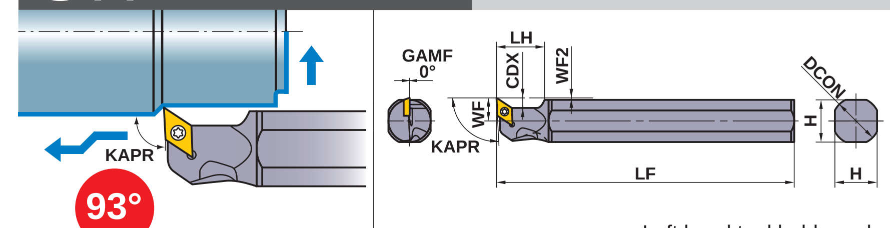
⁎ Clamp Torque (lbf-in) : SETS51=31, HFC03008=18

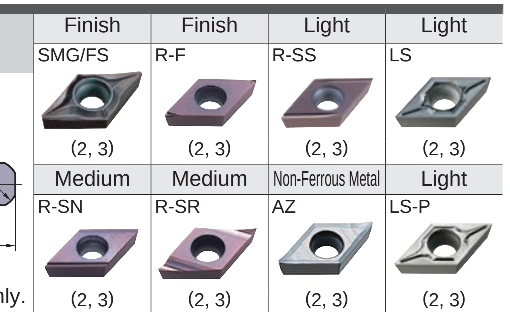
● : USA Stock

DIMPLE SLEEVE HOLDER (FOR OPPOSITE TOOL POSTS)

INCH STANDARD

SH





Order Number	Stock L	Insert Number		DCON	LF	LH	H	WF	WF2	CDX	* Clamp Screw	Wrench
				Dimensions (inch)								
SH16H-FSDUCL07	●	DCMT DCMW DCET DCGT DCGW	21.5	.625	3.937	.787	.551	.305	.030	.165	TS254	TKY08R
SH19K-FSDUCL07	●	DCMT DCMW DCET DCGT DCGW	21.5	.750	4.921	.787	.669	.364	.030	.165	TS254	TKY08R
SH25M-FSDUCL07	●	DCMT DCMW DCET DCGT DCGW	21.5	1.000	5.906	.787	.906	.482	.030	.165	TS254	TKY08R
SH16H-FSDUCL11	●	DCMT DCMW DCET DCGT DCGW	32.5	.625	3.937	.787	.551	.305	.030	.252	TS43	TKY15R
SH19K-FSDUCL11	●	DCMT DCMW DCET DCGT DCGW	32.5	.750	4.921	.787	.669	.364	.030	.252	TS43	TKY15R
SH25M-FSDUCL11	●	DCMT DCMW DCET DCGT DCGW	32.5	1.000	5.906	.787	.906	.482	.030	.252	TS43	TKY15R

⁎ Clamp Torque (lbf-in) : TS254=8.9, TS43=31

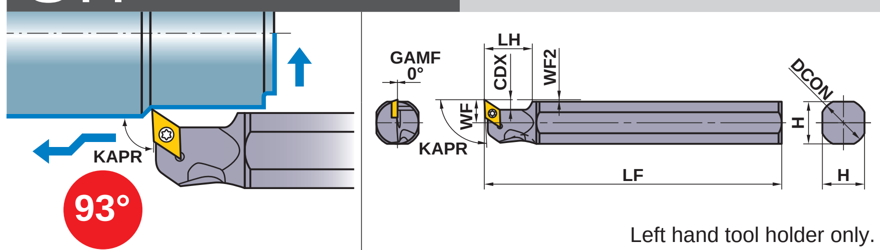
Note 1) When using insert with right and left hand chip breaker, please use right hand insert.

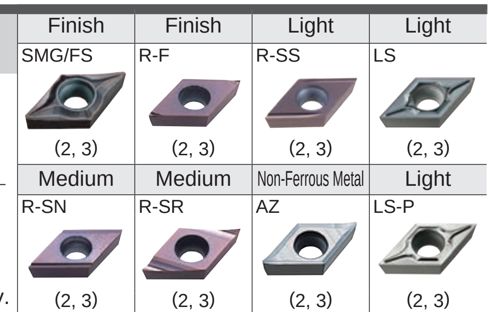
Note 2) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.

DIMPLE SLEEVE HOLDER (FOR OPPOSITE TOOL POSTS)

METRIC STANDARD

SH





Order Number	Stock L	Insert Number		DCON	LF	LH	H	WF	WF2	CDX	Clamp Screw*	Wrench
				Dimensions (mm)								
SH20K-FSDUCL07	●	DCMT DCMW DCET DCGT DCGW	21.5○○	20	125	20	18	9.75	0.75	4.2	TS254	TKY08R
SH22K-FSDUCL07	●			22	125	20	20	10.75	0.75	4.2	TS254	TKY08R
SH20K-FSDUCL11	●	DCMT DCMW DCET DCGT DCGW	32.5○○	20	125	20	18	9.75	0.75	6.4	TS43	TKY15R
SH22K-FSDUCL11	●			22	125	20	20	10.75	0.75	6.4	TS43	TKY15R

⁎ Clamp Torque (lbf-in) : TS254=8.9, TS43=31

Note 1) When using insert with right and left hand chip breaker, please use right hand insert.

Note 2) Insert photo is an example. Letters show chip breaker style, figures show inscribed circle.

RECOMMENDED CUTTING CONDITIONS

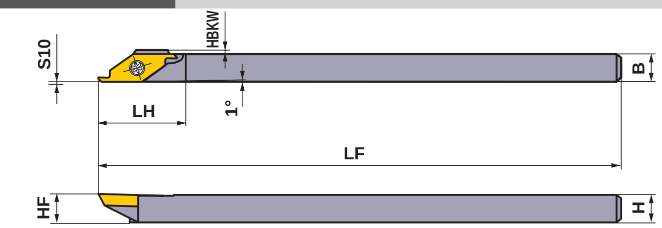
	Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	180HB–280HB	**MS6015/VP15TF**	165–490	.0004–.006
P	Free Cutting Steel	–	**MS6015**	100–590	.0004–.006
P	Free Cutting Steel	–	**NX2525**	165–820	.0004–.006
M	Stainless Steel	≤200HB	**VP15TF/MP9005/MP9015**	165–395	.0008–.004
N	Non-Ferrous Metal	–	**HTi10/MT9005**	230–755	.0012–.006
S	Titanium Alloy	–	**MT9005**	130–260	.0016–.005
S	Heat Resistant Alloy	–	**MP9015**	65–245	.0016–.005

● : USA Stock

FOR RADIAL TYPE TOOL POSTS

INCH STANDARD

CSVH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		H	B	HF	LF	HBKW	LH	S10	APMX (inch)⁎1	Clamp Screw⁎2	Wrench
					Dimensions (inch)									
CSVHR/L-062	●	●	CSVT	○○○○	.375	.375	.375	5.512	0	.787	.004	.118	NS251	NKY15S
CSVHR/L-082	●		CSVT	○○○○	.500	.500	.500	5.512	0	.787	.004	.118	NS251	NKY15S

⁎1 APMX : Max. Depth of Cut

⁎2 Clamp Torque (lbf-in) : NS251=6.2

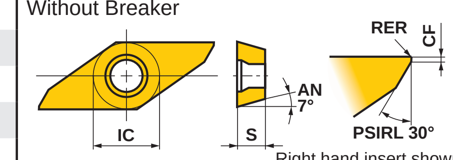
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.

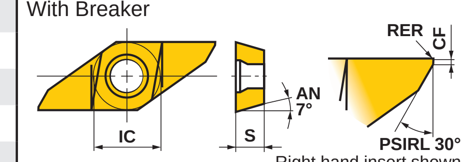
Note 2) Each insert has own depth of cut.

INSERTS

CSVTF — Front turning

Order Number	Hand	Coated VP15KZ	IC	S	RER/L	CF	APMX (inch)*	Geometry
			Dimensions (inch)					
CSVTF30AR	R	●	.250	.094	0	.012	.118	Without Breaker
CSVTF30AL	L	●	.250	.094	0	.012	.118	
CSVTF30BR	R	●	.250	.094	0	.012	.118	
CSVTF30CR	R	●	.250	.094	0	.006	.118	
CSVTF30DR	R	●	.250	.094	0	.006	.118	
CSVTF30AR-B	R	●	.250	.094	0	.012	.118	With Breaker
CSVTF30AL-B	L	●	.250	.094	0	.012	.118	
CSVTF30BR-B	R	●	.250	.094	0	.012	.118	
CSVTF30CR-B	R	●	.250	.094	0	.006	.118	
CSVTF30DR-B	R	●	.250	.094	0	.006	.118	

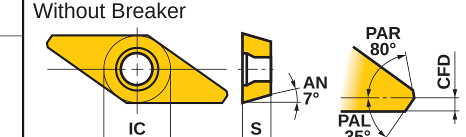




⁎ APMX : Max. Depth of Cut

CSVTFXL — Front turning, Copying

Order Number	Hand	Coated VP15KZ	IC	S	CFD	APMX (inch)*	Geometry
			Dimensions (inch)				
CSVTFXL	L	●	.250	.094	.028	.118	Without Breaker



⁎ APMX : Max. Depth of Cut

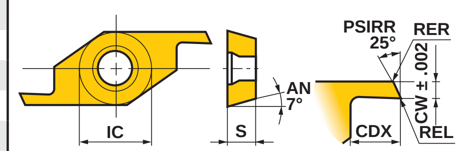
● : USA Stock
<5 inserts in one case>

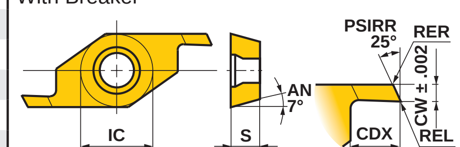
FOR RADIAL TYPE TOOL POSTS

INSERTS

CSVTC — Cutting off

Order Number	Hand	Coated VP15KZ	IC	S	RER/L	CDX	CW	APMX* (inch)	Geometry
CSVTC0640R	R	●	.250	.094	0	.079	.024	.059	Without Breaker
CSVTC0750R	R	●	.250	.094	0	.098	.028	.079	
CSVTC0750L	L	●	.250	.094	0	.098	.028	.079	
CSVTC0850R	R	●	.250	.094	0	.098	.031	.079	
CSVTC0850L	L	●	.250	.094	0	.098	.031	.079	
CSVTC0950R	R	●	.250	.094	0	.098	.035	.079	
CSVTC1060R	R	●	.250	.094	0	.118	.039	.098	
CSVTC1060L	L	●	.250	.094	0	.118	.039	.098	
CSVTC1360R	R	●	.250	.094	0	.118	.051	.098	
CSVTC1360L	L	●	.250	.094	0	.118	.051	.098	
CSVTC1560R	R	●	.250	.094	0	.118	.059	.098	
CSVTC1560L	L	●	.250	.094	0	.118	.059	.098	Right hand insert shown.
CSVTC0640R-B	R	●	.250	.094	0	.079	.024	.059	With Breaker
CSVTC0750R-B	R	●	.250	.094	0	.098	.028	.079	
CSVTC0850R-B	R	●	.250	.094	0	.098	.031	.079	
CSVTC0950R-B	R	●	.250	.094	0	.098	.035	.035	
CSVTC1060R-B	R	●	.250	.094	0	.118	.039	.098	
CSVTC1360R-B	R	●	.250	.094	0	.118	.051	.098	
CSVTC1560R-B	R	●	.250	.094	0	.118	.059	.098	Right hand insert shown.

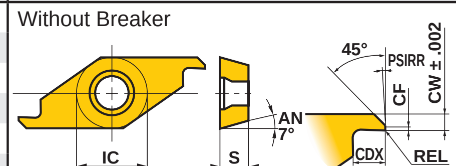


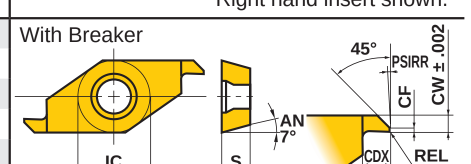


* APMX : Max. Depth of Cut

CSVTB — Back turning

Order Number	Hand	Coated VP15KZ	IC	S	REL/L	CDX	CW	CF	PSIRR/L	APMX* (inch)	Geometry
CSVTB10AR	R	●	.250	.094	0	.098	.039	.012	5°	.079	Without Breaker
CSVTB10AL	L	●	.250	.094	0	.098	.039	.012	5°	.079	
CSVTB10BR	R	●	.250	.094	0	.098	.039	.012	2°	.079	
CSVTB10CR	R	●	.250	.094	0	.098	.039	.006	2°	.079	
CSVTB10DR	R	●	.250	.094	0	.098	.039	.006	5°	.079	
CSVTB12AR	R	●	.250	.094	0	.098	.047	.012	5°	.079	
CSVTB14AR	R	●	.250	.094	0	.098	.055	.012	5°	.079	Right hand insert shown.
CSVTB10AR-B	R	●	.250	.094	0	.098	.039	.012	5°	.079	With Breaker
CSVTB10BR-B	R	●	.250	.094	0	.098	.039	.012	2°	.079	
CSVTB10CR-B	R	●	.250	.094	0	.098	.039	.006	2°	.079	
CSVTB10DR-B	R	●	.250	.094	0	.098	.039	.006	5°	.079	
CSVTB12AR-B	R	●	.250	.094	0	.098	.047	.012	5°	.079	
CSVTB14AR-B	R	●	.250	.094	0	.098	.055	.012	5°	.079	Right hand insert shown.

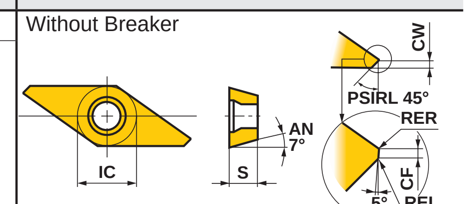




* APMX : Max. Depth of Cut

CSVTBXL — Back turning, Copying

Order Number	Hand	Coated VP15KZ	IC	S	RER/L	CW	CF	APMX* (inch)	Geometry
CSVTBXL	L	●	.250	.094	0	.028	.0014	.118	Without Breaker



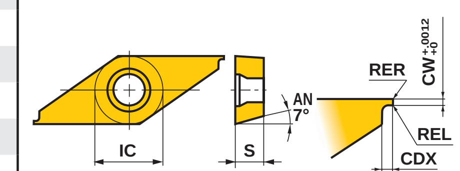
* APMX : Max. Depth of Cut

● : USA Stock <5 inserts in one case>

INSERTS

CSVTG — Grooving

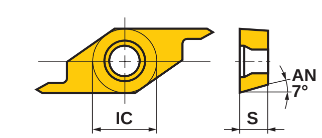
Order Number	Hand	Coated VP15KZ	IC	S	RER/L	CDX	CW	APMX* (inch)	Geometry
CSVTG02505R	R	●	.250	.094	0	.020	.010	.006	Without Breaker
CSVTG03005R	R	●	.250	.094	0	.020	.012	.006	
CSVTG03505R	R	●	.250	.094	0	.020	.014	.006	
CSVTG04005R	R	●	.250	.094	0	.020	.016	.006	
CSVTG04510R	R	●	.250	.094	0	.039	.018	.018	
CSVTG05010R	R	●	.250	.094	0	.039	.020	.018	
CSVTG05510R	R	●	.250	.094	0	.039	.022	.018	
CSVTG06010R	R	●	.250	.094	0	.039	.024	.018	
CSVTG06510R	R	●	.250	.094	0	.039	.026	.018	
CSVTG07010R	R	●	.250	.094	0	.039	.028	.018	
CSVTG07520R	R	●	.250	.094	0	.079	.030	.055	
CSVTG07520L	L	●	.250	.094	0	.079	.030	.055	
CSVTG08020R	R	●	.250	.094	0	.079	.031	.055	
CSVTG08520R	R	●	.250	.094	0	.079	.033	.055	
CSVTG09020R	R	●	.250	.094	0	.079	.035	.055	
CSVTG09520R	R	●	.250	.094	0	.079	.037	.055	
CSVTG09520L	L	●	.250	.094	0	.079	.037	.055	
CSVTG10020R	R	●	.250	.094	0	.079	.039	.055	
CSVTG11030R	R	●	.250	.094	0	.118	.043	.102	
CSVTG12030R	R	●	.250	.094	0	.118	.047	.102	
CSVTG12030L	L	●	.250	.094	0	.118	.047	.102	
CSVTG13030R	R	●	.250	.094	0	.118	.051	.102	
CSVTG14030R	R	●	.250	.094	0	.118	.055	.102	
CSVTG15030R	R	●	.250	.094	0	.118	.059	.102	Right hand insert shown.

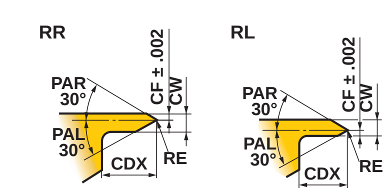


* APMX : Max. Depth of Cut

CSVTT — Threading

Order Number	Hand	Coated VP15KZ	Pitch (inch)	IC	S	RE	CDX	CW	CF	Geometry
CSVTT60050RR	R	●	.008–.020	.250	.094	.001	.118	.039	.014	Without Breaker General Purpose (60°)
CSVTT60050RL	R	●	.008–.020	.250	.094	.001	.118	.039	.014	Right hand insert shown.

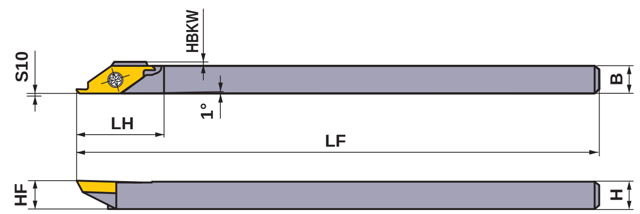




FOR RADIAL TYPE TOOL POSTS

METRIC STANDARD

CSVH



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H	B	HF	LF	HBKW	LH	S10	APMX *1 (mm)	Clamp Screw *2	Wrench
CSVHR/L0707	●	●	CSVT	○○○○	7	7	7	140	0.5	20	0.1	3.0	NS251	NKY15S
CSVHR/L0808	●	●	CSVT	○○○○	8	8	8	140	0	20	0.1	3.0	NS251	NKY15S
CSVHR/L0909	●		CSVT	○○○○	9.5	9.5	9.5	140	0	20	0.1	3.0	NS251	NKY15S
CSVHR/L1010	●	●	CSVT	○○○○	10	10	10	140	0	20	0.1	3.0	NS251	NKY15S
CSVHR/L1212	●		CSVT	○○○○	12	12	12	140	0	20	0.1	3.0	NS251	NKY15S

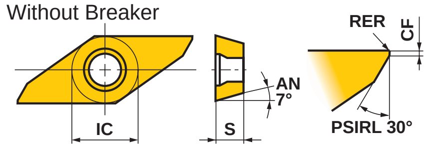
*1 APMX : Max. Depth of Cut
*2 Clamp Torque (lbf-in) : NS251=6.2
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Each insert has own depth of cut.

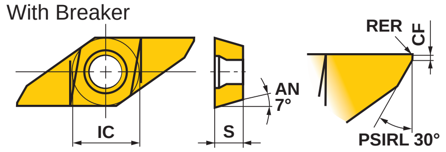
INSERTS

CSVTF

Front turning

Order Number	Hand	Coated VP15KZ	Dimensions (mm) IC	S	RER/L	CF	APMX * (mm)	Geometry
CSVTF30AR	R	●	6.35	2.38	0	0.3	3.0	Without Breaker
CSVTF30AL	L	●	6.35	2.38	0	0.3	3.0	
CSVTF30BR	R	●	6.35	2.38	0	0.3	3.0	
CSVTF30CR	R	●	6.35	2.38	0	0.15	3.0	
CSVTF30DR	R	●	6.35	2.38	0	0.15	3.0	Right hand insert shown.
CSVTF30AR-B	R	●	6.35	2.38	0	0.3	3.0	With Breaker
CSVTF30AL-B	L	●	6.35	2.38	0	0.3	3.0	
CSVTF30BR-B	R	●	6.35	2.38	0	0.3	3.0	
CSVTF30CR-B	R	●	6.35	2.38	0	0.15	3.0	
CSVTF30DR-B	R	●	6.35	2.38	0	0.15	3.0	Right hand insert shown.



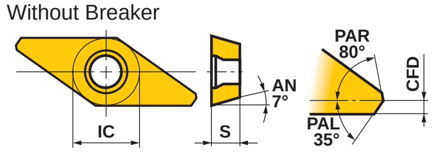


* APMX : Max. Depth of Cut

CSVTFXL

Front turning, Copying

Order Number	Hand	Coated VP15KZ	Dimensions (mm) IC	S	CFD	APMX * (mm)	Geometry
CSVTFXL	L	●	6.35	2.38	0.7	3.0	Without Breaker



* APMX : Max. Depth of Cut

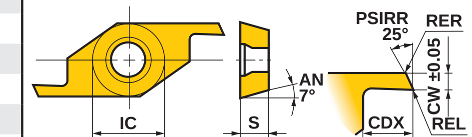
● : USA Stock
<5 inserts in one case>

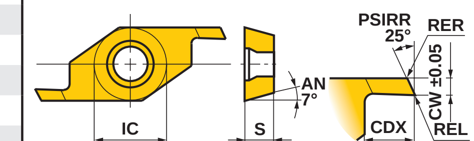
INSERTS

CSVTC

Cutting off

Order Number	Hand	Coated VP15KZ	Dimensions (mm) IC	S	RER/L	CDX	CW	APMX * (mm)	Geometry
CSVTC0640R	R	●	6.35	2.38	0	2.0	0.6	1.5	Without Breaker
CSVTC0750R	R	●	6.35	2.38	0	2.5	0.7	2.0	
CSVTC0750L	L	●	6.35	2.38	0	2.5	0.7	2.0	
CSVTC0850R	R	●	6.35	2.38	0	2.5	0.8	2.0	
CSVTC0850L	L	●	6.35	2.38	0	2.5	0.8	2.0	
CSVTC0950R	R	●	6.35	2.38	0	2.5	0.9	2.0	
CSVTC1060R	R	●	6.35	2.38	0	3.0	1.0	2.5	
CSVTC1060L	L	●	6.35	2.38	0	3.0	1.0	2.5	
CSVTC1360R	R	●	6.35	2.38	0	3.0	1.3	2.5	
CSVTC1360L	L	●	6.35	2.38	0	3.0	1.3	2.5	
CSVTC1560R	R	●	6.35	2.38	0	3.0	1.5	2.5	
CSVTC1560L	L	●	6.35	2.38	0	3.0	1.5	2.5	Right hand insert shown.
CSVTC0640R-B	R	●	6.35	2.38	0	2.0	0.6	1.5	With Breaker
CSVTC0750R-B	R	●	6.35	2.38	0	2.5	0.7	2.0	
CSVTC0850R-B	R	●	6.35	2.38	0	2.5	0.8	2.0	
CSVTC0950R-B	R	●	6.35	2.38	0	2.5	0.9	2.0	
CSVTC1060R-B	R	●	6.35	2.38	0	3.0	1.0	2.5	
CSVTC1360R-B	R	●	6.35	2.38	0	3.0	1.3	2.5	
CSVTC1560R-B	R	●	6.35	2.38	0	3.0	1.5	2.5	Right hand insert shown.



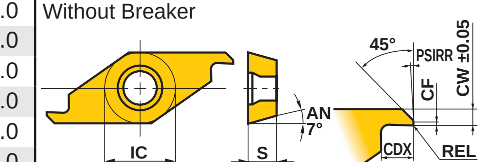


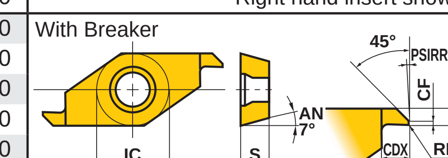
* APMX : Max. Depth of Cut

CSVTB

Back turning

Order Number	Hand	Coated VP15KZ	Dimensions (mm) IC	S	RER/L	CDX	CW	CF	PSIRR/L	APMX * (mm)	Geometry
CSVTB10AR	R	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	Without Breaker
CSVTB10AL	L	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	
CSVTB10BR	R	●	6.35	2.38	0	2.5	1	0.3	2°	2.0	
CSVTB10CR	R	●	6.35	2.38	0	2.5	1	0.15	2°	2.0	
CSVTB10DR	R	●	6.35	2.38	0	2.5	1	0.15	5°	2.0	
CSVTB12AR	R	●	6.35	2.38	0	2.5	1.2	0.3	5°	2.0	
CSVTB14AR	R	●	6.35	2.38	0	2.5	1.4	0.3	5°	2.0	Right hand insert shown.
CSVTB10AR-B	R	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	With Breaker
CSVTB10BR-B	R	●	6.35	2.38	0	2.5	1	0.3	2°	2.0	
CSVTB10CR-B	R	●	6.35	2.38	0	2.5	1	0.15	2°	2.0	
CSVTB10DR-B	R	●	6.35	2.38	0	2.5	1	0.15	5°	2.0	
CSVTB12AR-B	R	●	6.35	2.38	0	2.5	1.2	0.3	5°	2.0	
CSVTB14AR-B	R	●	6.35	2.38	0	2.5	1.4	0.3	5°	2.0	Right hand insert shown.



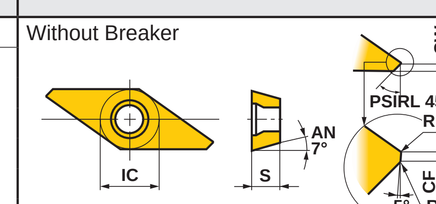


* APMX : Max. Depth of Cut

CSVTBXL

Back turning, Copying

Order Number	Hand	Coated VP15KZ	Dimensions (mm) IC	S	RER/L	CW	CF	APMX * (mm)	Geometry
CSVTBXL	L	●	6.35	2.38	0	0.7	0.035	3.0	Without Breaker



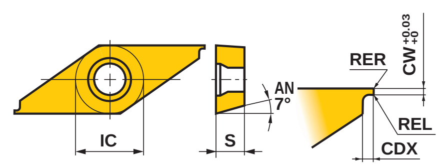
* APMX : Max. Depth of Cut

FOR RADIAL TYPE TOOL POSTS

INSERTS

CSVTG — Grooving

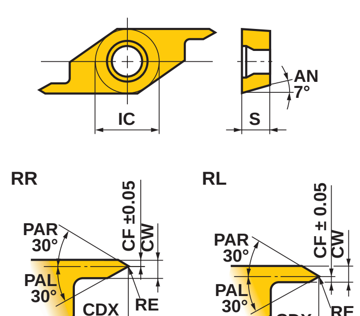
Order Number	Hand	Coated VP15KZ	IC	S	RER/L	CDX	CW	APMX* (mm)	Geometry
CSVTG02505R	R	●	6.35	2.38	0	0.5	0.25	0.15	Without Breaker
CSVTG03005R	R	●	6.35	2.38	0	0.5	0.3	0.15	
CSVTG03505R	R	●	6.35	2.38	0	0.5	0.35	0.15	
CSVTG04005R	R	●	6.35	2.38	0	0.5	0.4	0.15	
CSVTG04510R	R	●	6.35	2.38	0	1.0	0.45	0.45	
CSVTG05010R	R	●	6.35	2.38	0	1.0	0.5	0.45	
CSVTG05510R	R	●	6.35	2.38	0	1.0	0.55	0.45	
CSVTG06010R	R	●	6.35	2.38	0	1.0	0.6	0.45	
CSVTG06510R	R	●	6.35	2.38	0	1.0	0.65	0.45	
CSVTG07010R	R	●	6.35	2.38	0	1.0	0.7	0.45	
CSVTG07520R	R	●	6.35	2.38	0	2.0	0.75	1.4	
CSVTG07520L	L	●	6.35	2.38	0	2.0	0.75	1.4	
CSVTG08020R	R	●	6.35	2.38	0	2.0	0.8	1.4	
CSVTG08520R	R	●	6.35	2.38	0	2.0	0.85	1.4	
CSVTG09020R	R	●	6.35	2.38	0	2.0	0.9	1.4	
CSVTG09520R	R	●	6.35	2.38	0	2.0	0.95	1.4	
CSVTG09520L	L	●	6.35	2.38	0	2.0	0.95	1.4	
CSVTG10020R	R	●	6.35	2.38	0	2.0	1.0	1.4	
CSVTG11030R	R	●	6.35	2.38	0	3.0	1.1	2.6	
CSVTG12030R	R	●	6.35	2.38	0	3.0	1.2	2.6	
CSVTG12030L	L	●	6.35	2.38	0	3.0	1.2	2.6	
CSVTG13030R	R	●	6.35	2.38	0	3.0	1.3	2.6	
CSVTG14030R	R	●	6.35	2.38	0	3.0	1.4	2.6	
CSVTG15030R	R	●	6.35	2.38	0	3.0	1.5	2.6	Right hand insert shown.



* APMX : Max. Depth of Cut

CSVTT — Threading

Order Number	Hand	Coated VP15KZ	Pitch (mm)	IC	S	RE	CDX	CW	CF	Geometry
CSVTT60050RR	R	●	0.2−0.5	6.35	2.38	0.03	3.0	1.0	0.35	Without Breaker General Purpose (60°)
CSVTT60050RL	R	●	0.2−0.5	6.35	2.38	0.03	3.0	1.0	0.35	



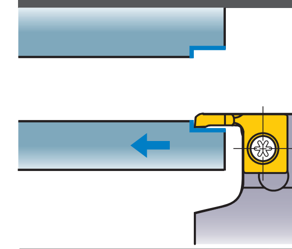
Right hand insert shown.

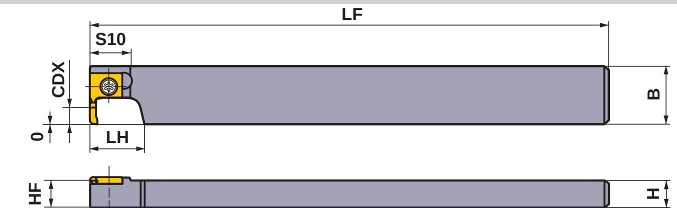
● : USA Stock
<5 inserts in one case>

BORING TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

SBAH — Without off set



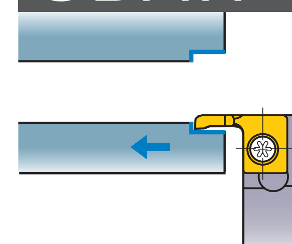


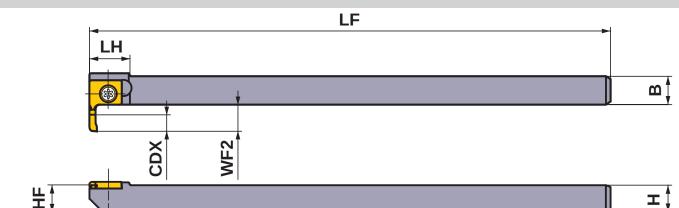
Right hand tool holder only.

Order Number	Stock R	Insert Number		H	B	LF	HF	LH	S10	CDX (mm)	DMIN*1 (mm)	Clamp Screw*2	Wrench
SBAHR1022	●	SBAT	3080○○L/L-B	10	21.5	120	10	17.5	15	8	3	NS402W	NKY15S
SBAHR1222	●		3080○○L/L-B	12	21.5	120	12	17.5	15	8	3	NS403W	NKY15S

*1 DMIN : Min. Cutting Diameter
*2 Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

SBAH — With off set





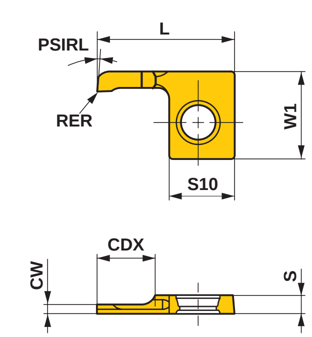
Right hand tool holder only.

Order Number	Stock R	Insert Number		H	B	LF	HF	WF2	LH	CDX (mm)	DMIN*1 (mm)	Clamp Screw*2	Wrench
SBAHR1010	●	SBAT	3080○○L/L-B	10	10	120	10	10	15	8	3	NS402W	NKY15S

*1 DMIN : Min. Cutting Diameter
*2 Clamp Torque (lbf-in) : NS402W=0.7

INSERTS

Breaker	Order Number	Coated VP15KZ	PSIRL	RER	CDX	L	W1	S	CW	S10	DMIN* (mm)	Geometry
Without Breaker	SBAT308000L	●	5°	0	8.0	18.5	12.0	2.50	1.25	9.0	3	
Without Breaker	SBAT3080V5L	●	5°	0.05	8.0	18.5	12.0	2.50	1.25	9.0	3	
With Breaker	SBAT308000L-B	●	5°	0	8.0	18.5	12.0	2.50	1.25	9.0	3	
With Breaker	SBAT3080V5L-B	●	5°	0.05	8.0	18.5	12.0	2.50	1.25	9.0	3	



* DMIN : Min. Cutting Diameter

D SMALL TOOLS

HOW TO READ THE STANDARD OF BORING BARS

●How this section page is organized

①Organized by product series.
(Refer to the index on the next page.)

TYPE OF BORING BAR
indicates the initial letters for the order number, as well as applicable insert types.

TITLE OF PRODUCT SERIES

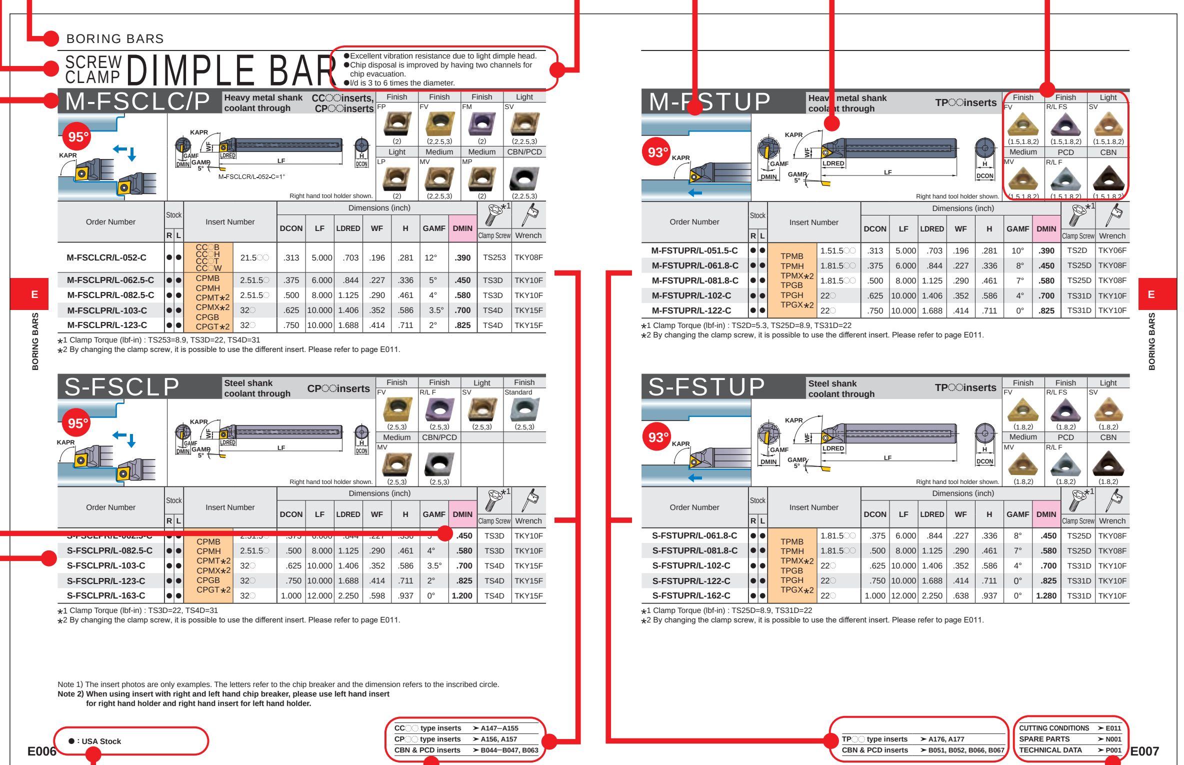
PRODUCT SECTION

PRODUCT FEATURES

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict available machining applications along with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages for details of inserts that are applicable to the title product.

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, minimum cutting diameters, standard corner radius, recommended l/d ratios, and spare parts.

MIN. CUTTING DIAMETER
is colour-coded to let you find, at a glance, the maximum / minimum cutting diameters for internal machining.

●To Order : Please specify order number and hand of tool (right/left).

TURNING

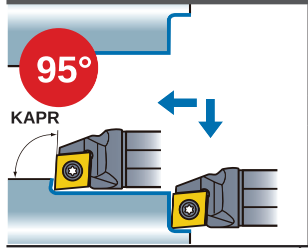
BORING BARS

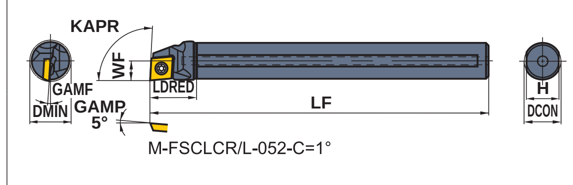
SCREW CLAMP DIMPLE BAR

- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- l/d is 3 to 6 times the diameter.

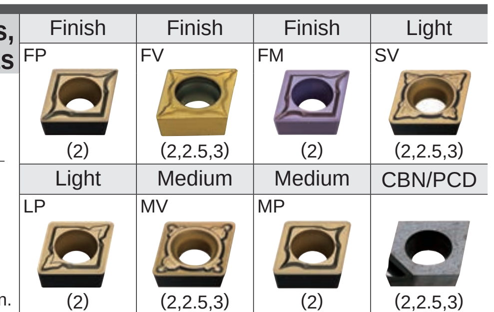
M-FSCLC/P

Heavy metal shank coolant through CC◌◌inserts, CP◌◌inserts





Right hand tool holder shown.

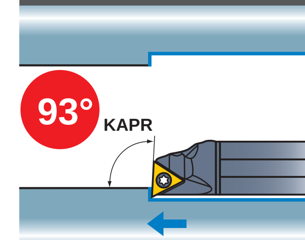


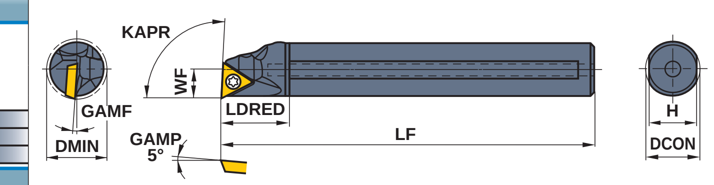
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *1	Wrench
M-FSCLCR/L-052-C	●	●	CC◌B CC◌H CC◌T CC◌W	21.5◌◌	.313	5.000	.703	.196	.281	12°	**.390**	TS253	TKY08F
M-FSCLPR/L-062.5-C	●	●	CPMB CPMH CPMT*2 CPMX*2 CPGB CPGT*2	2.51.5◌	.375	6.000	.844	.227	.336	5°	**.450**	TS3D	TKY10F
M-FSCLPR/L-082.5-C	●	●		2.51.5◌	.500	8.000	1.125	.290	.461	4°	**.580**	TS3D	TKY10F
M-FSCLPR/L-103-C	●	●		32◌	.625	10.000	1.406	.352	.586	3.5°	**.700**	TS4D	TKY15F
M-FSCLPR/L-123-C	●	●		32◌	.750	10.000	1.688	.414	.711	2°	**.825**	TS4D	TKY15F

*1 Clamp Torque (lbf-in) : TS253=8.9, TS3D=22, TS4D=31

M-FSTUP

Heavy metal shank coolant through TP◌◌inserts





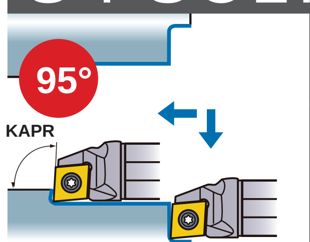
Right hand tool holder shown.

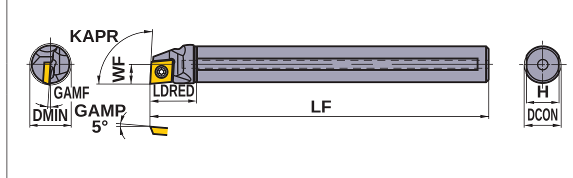
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *1	Wrench
M-FSTUPR/L-051.5-C	●	●	TPMB TPMH TPMX*2 TPGB TPGH TPGX*2	1.51.5◌◌	.313	5.000	.703	.196	.281	10°	**.390**	TS2D	TKY06F
M-FSTUPR/L-061.8-C	●	●		1.81.5◌◌	.375	6.000	.844	.227	.336	8°	**.450**	TS25D	TKY08F
M-FSTUPR/L-081.8-C	●	●		1.81.5◌◌	.500	8.000	1.125	.290	.461	7°	**.580**	TS25D	TKY08F
M-FSTUPR/L-102-C	●	●		22◌	.625	10.000	1.406	.352	.586	4°	**.700**	TS31D	TKY10F
M-FSTUPR/L-122-C	●	●		22◌	.750	10.000	1.688	.414	.711	0°	**.825**	TS31D	TKY10F

*1 Clamp Torque (lbf-in) : TS2D=5.3, TS25D=8.9, TS31D=22

S-FSCLP

Steel shank coolant through CP◌◌inserts





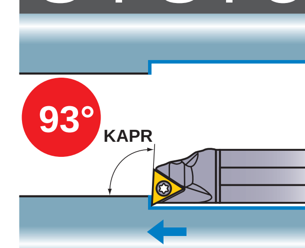
Right hand tool holder shown.

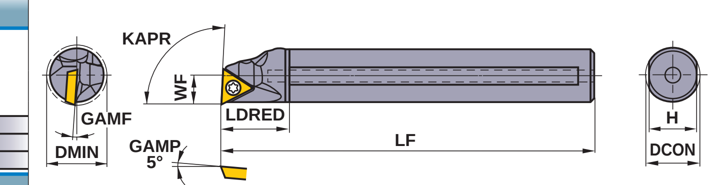
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *1	Wrench
S-FSCLPR/L-062.5-C	●	●	CPMB CPMH CPMT*2 CPMX*2 CPGB CPGT*2	2.51.5◌	.375	6.000	.844	.227	.336	5°	**.450**	TS3D	TKY10F
S-FSCLPR/L-082.5-C	●	●		2.51.5◌	.500	8.000	1.125	.290	.461	4°	**.580**	TS3D	TKY10F
S-FSCLPR/L-103-C	●	●		32◌	.625	10.000	1.406	.352	.586	3.5°	**.700**	TS4D	TKY15F
S-FSCLPR/L-123-C	●	●		32◌	.750	10.000	1.688	.414	.711	2°	**.825**	TS4D	TKY15F

*1 Clamp Torque (lbf-in) : TS3D=22, TS4D=31

S-FSTUP

Steel shank coolant through TP◌◌inserts





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *1	Wrench
S-FSTUPR/L-061.8-C	●	●	TPMB TPMH TPMX*2 TPGB TPGH TPGX*2	1.81.5◌◌	.375	6.000	.844	.227	.336	8°	**.450**	TS25D	TKY08F
S-FSTUPR/L-081.8-C	●	●		1.81.5◌◌	.500	8.000	1.125	.290	.461	7°	**.580**	TS25D	TKY08F
S-FSTUPR/L-102-C	●	●		22◌	.625	10.000	1.406	.352	.586	4°	**.700**	TS31D	TKY10F
S-FSTUPR/L-122-C	●	●		22◌	.750	10.000	1.688	.414	.711	0°	**.825**	TS31D	TKY10F

*1 Clamp Torque (lbf-in) : TS25D=8.9, TS31D=22

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

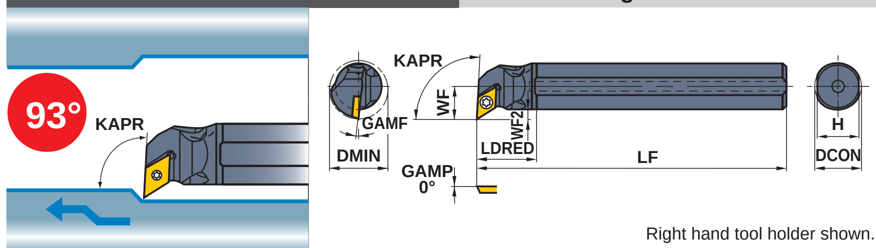
● : USA Stock

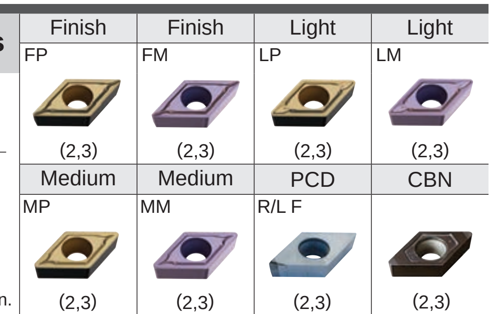
SCREW CLAMP DIMPLE BAR

- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- l/d is 3 to 6 times the diameter.

M-FSDUC

Heavy metal shank coolant through DC◌◌inserts





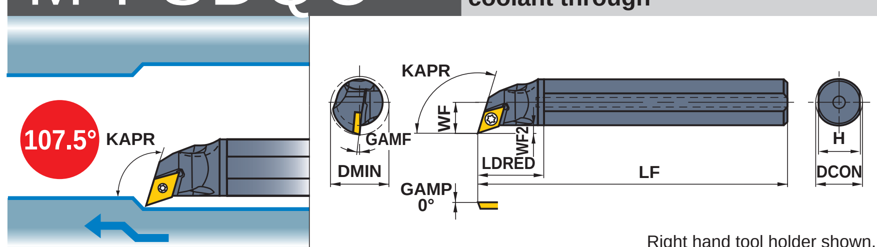
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	WF2	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSDUCR/L-062-C	●	●	DCMT DCMW DCGT DCGW	21.5◌	.375	6.000	.675	.317	.130	.336	7.5°	.525	TS25	TKY08F
M-FSDUCR/L-082-C	●	●		21.5◌	.500	8.000	.833	.380	.130	.461	6°	.667	TS25	TKY08F
M-FSDUCR/L-102-C	●	●		21.5◌	.625	10.000	.781	.442	.130	.586	5°	.781	TS25	TKY08F

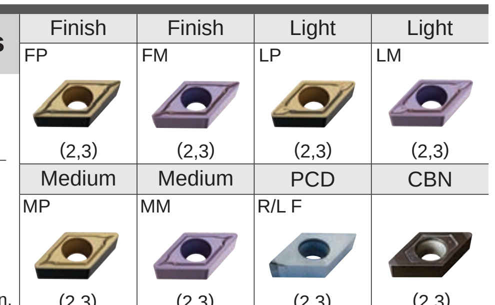
Dimensions (inch)

* Clamp Torque (lbf-in) : TS25=8.9, TS43=31

M-FSDQC

Heavy metal shank coolant through DC◌◌inserts





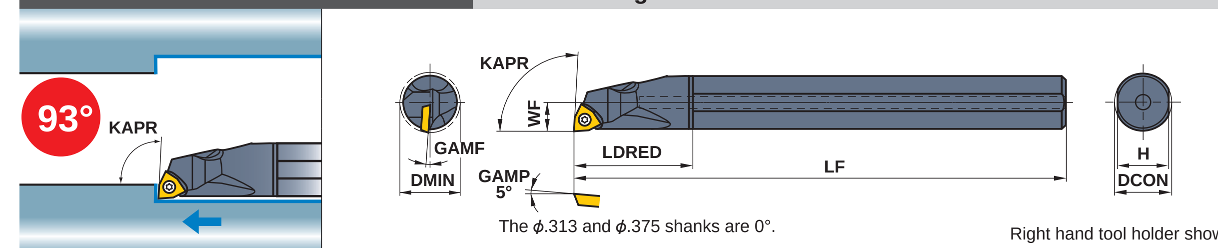
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	WF2	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSDQCR/L-062-C	●	●	DCMT DCMW DCGT DCGW	21.5◌	.375	6.000	.769	.290	.102	.336	8°	.488	TS25	TKY08F
M-FSDQCR/L-082-C	●	●		21.5◌	.500	8.000	.938	.352	.102	.461	6°	.667	TS25	TKY08F
M-FSDQCR/L-102-C	●	●		21.5◌	.625	10.000	.879	.415	.102	.586	5°	.781	TS25	TKY08F
M-FSDQCR/L-123-C	●	●		32.5◌	.750	10.000	.975	.521	.146	.711	7°	.938	TS43	TKY15F

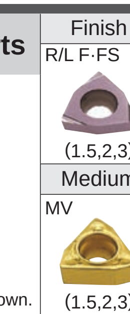
Dimensions (inch)

* Clamp Torque (lbf-in) : TS25=8.9, TS43=31

M-FSWUB/P

Heavy metal shank coolant through WB◌◌inserts, WP◌◌inserts





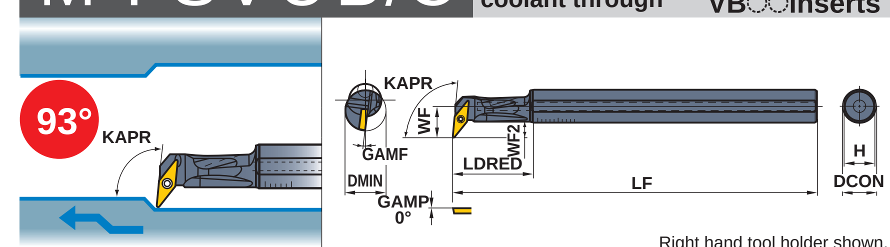
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSWUBR/L-051.5-C	●	●	WBMT WBGT	1.51.5◌	.313	5.000	.703	.196	.281	14°	.391	TS2	TKY06F
M-FSWUBR/L-061.5-C	●	●		1.51.5◌	.375	6.000	.844	.227	.336	11°	.450	TS2	TKY06F
M-FSWUPR/L-082-C	●	●	WPMT WPGT	21.5◌	.500	8.000	1.125	.289	.461	4°	.583	TS253	TKY08F
M-FSWUPR/L-102-C	●	●		21.5◌	.625	10.000	1.406	.352	.586	1°	.703	TS253	TKY08F
M-FSWUPR/L-123-C	●	●		32◌	.750	10.000	1.688	.414	.711	2°	.825	TS4	TKY15F

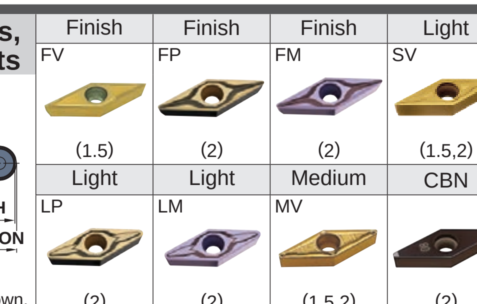
Dimensions (inch)

* Clamp Torque (lbf-in) : TS2=5.3, TS253=8.9, TS4=31

M-FSVUB/C

Heavy metal shank coolant through VC◌◌inserts, VB◌◌inserts





Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	WF2	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSVUCR/L-081.5-C	●	●	VCGT VCMT	1.51.5◌	.500	8.000	1.042	.447	.197	.461	8°	.667	TS202	TKY06F
M-FSVUBR/L-102-C	●	●	VBGT VBMT VBGW	22◌	.625	10.000	1.269	.608	.295	.586	8°	.781	TS255	TKY08F
M-FSVUBR/L-122-C	●	●		22◌	.750	10.000	1.519	.670	.295	.711	7°	.938	TS255	TKY08F

Dimensions (inch)

* Clamp Torque (lbf-in) : TS202=5.3, TS255=8.9

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

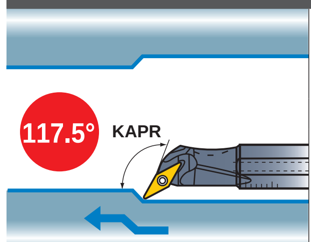
● : USA Stock

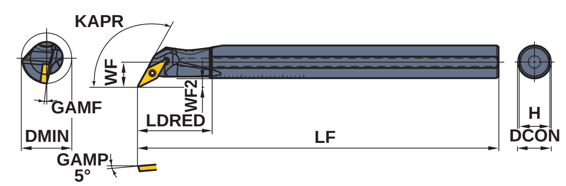
SCREW CLAMP DIMPLE BAR

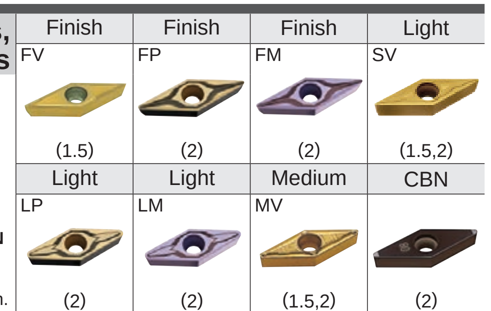
- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- l/d is 3 to 6 times the diameter.

M-FSVPB/C

Heavy metal shank coolant through
VC◌◌inserts, VB◌◌inserts







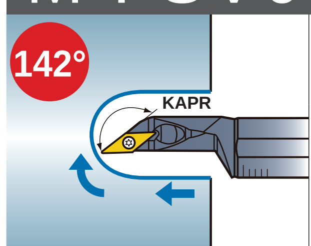
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	WF2	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSVPCR/L-061.5-C	●	●	VCGT VCMT	1.51.5◌	.375	6.000	.938	.306	.118	.336	8°	.600	TS202	TKY06F
M-FSVPBR/L-082-C	●	●	VBGT VBMT VBGW	22◌	.500	8.000	1.167	.407	.157	.461	8°	.833	TS255	TKY08F
M-FSVPBR/L-102-C	●	●		22◌	.625	10.000	1.367	.490	.177	.586	5°	.977	TS255	TKY08F

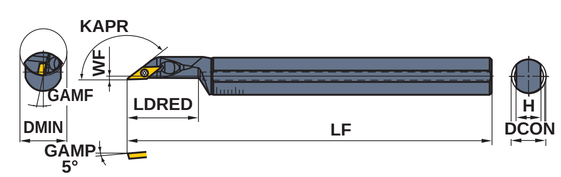
Dimensions (inch)

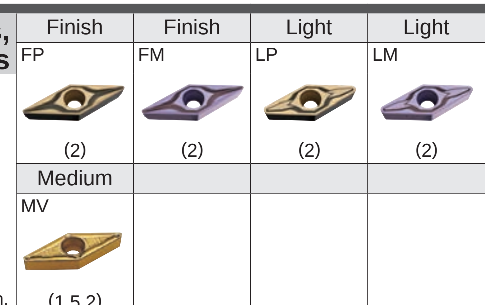
* Clamp Torque (lbf-in) : TS202=5.3, TS255=8.9

M-FSVJB/C

Heavy metal shank coolant through
VC◌◌inserts, VB◌◌inserts







Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
M-FSVJCR/L-081.5-C	●	●	VCGT VCMT	1.51.5◌	.500	8.000	1.083	.093	.461	5°	.667	TS202	TKY06F
M-FSVJCR/L-101.5-C	●	●		1.51.5◌	.625	10.000	1.406	.076	.586	5°	.781	TS202	TKY06F
M-FSVJBR/L-122-C	●	●	VBET VBGT VBMT VBGW	22◌	.750	10.000	1.406	.060	.711	5°	.938	TS255	TKY08F

Dimensions (inch)

* Clamp Torque (lbf-in) : TS202=5.3, TS255=8.9

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : USA Stock

RECOMMENDED CUTTING CONDITIONS

Steel Shank							l/d ≤ 3		3 < l/d ≤ 5	
Heavy Metal Shank							l/d ≤ 3		3 < l/d ≤ 6	
	Work Material	Cutting Mode	Breaker	Recom-mendation	Grade	Cutting Speed (SFM)	Feed (IPR)	D.O.C. (inch)	Feed (IPR)	D.O.C. (inch)
P	Mild Steel ≤180HB	Finish	FP	①	NX2525	555 (395—720)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
		Light	LP	①	MP3025	490 (330—655)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	NX2525	525 (360—690)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MP	①	MP3025	460 (295—620)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
				②	NX2525	490 (330—655)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
	Carbon Steel Alloy Steel 180—350HB	Finish	FP	①	MC6015	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	LP	①	MC6025	460 (295—620)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	MP3025	360 (195—525)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MP	①	MC6025	425 (260—590)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
				②	MP3025	330 (195—490)	.010 (.006—.014)	—.080	.008 (.006—.010)	—.060
M	Stainless Steel ≤200HB	Finish	FM	①	VP15TF	490 (360—620)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
		Light	LM	①	MC7025	410 (280—540)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
				②	VP15TF	425 (295—555)	.008 (.004—.010)	—.040	.006 (.002—.008)	—.040
		Medium	MM	①	MC7025	345 (230—440)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.040
				②	VP15TF	390 (260—525)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.040
K	Gray Cast Iron Tensile Strength ≤350MPa	Finish	F, FS	①	HTi10	425 (295—525)	.006 (.004—.008)	—.020	.006 (.004—.008)	—.020
		Medium	MK	①	MC5015	295 (195—390)	.008 (.006—.010)	—.080	.008 (.006—.010)	—.060
N	Aluminum Alloy	Finish	F, FS	①	HTi10	985 (655—1310)	.004 (.002—.006)	—.020	.004 (.002—.006)	—.020
			Flat Top	①	MD220	655 (490—820)	.004 (.002—.006)	—.080	.004 (.002—.006)	—.040
H	Hardened Steel 35–65HRC	Finish	Flat Top	①	MB8120	330 (260—655)	.004 (.002—.006)	—.006	.004 (.002—.006)	—.004

When vibrations occur, reduce cutting speed to 70% of the above.
The depth of cut needs to be less than the corner diameter when using the FSVJ type.

■CCG/MT, CPGT, CPMX, TPGD/P, TPGA/M, TPMX inserts

- **By changing the insert screw, it is possible to use the inserts listed on the left hand side.**

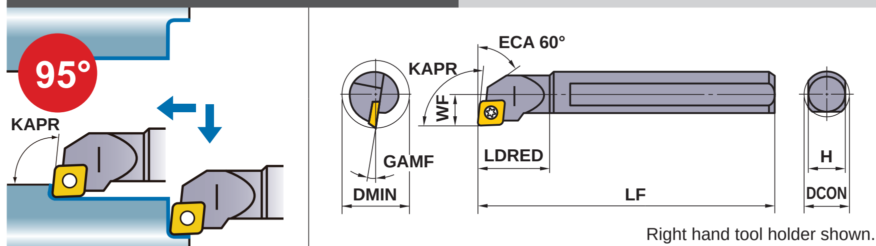
Order Number	Insert Screw	Remark
CCG/MT21.5◌	Can be used as it is.	If the screw is too long then please grind away the unnecessary material.
CPGT2.51.5◌	Change to TS3.	
CPGT32◌	Change to TS4.	
CPMX2.51.5◌	Can be used as it is.	
CPMX32◌	Can be used as it is.	
TPGD/P1.51.5◌	Change to CS200T.	
TPGD/P1.81.5◌	Change to CS250T.	
TPGA/M22◌	Change to CS300890T.	
TPMX1.51.5◌	Change to CS200T.	
TPMX1.81.5◌	Change to CS250T.	
TPMX22◌	Change to CS300890T.	

SCREW CLAMP TYPE

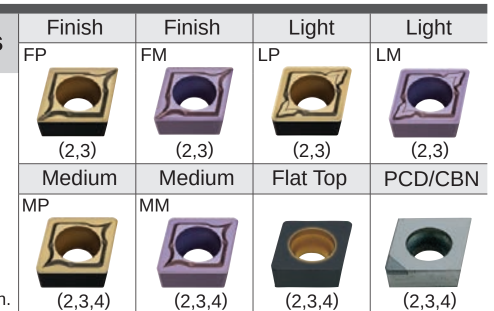
- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Steel and carbide shanks are stocked in various diameters.

S-SCLC

Steel shank — CC◌◌inserts



Right hand tool holder shown.



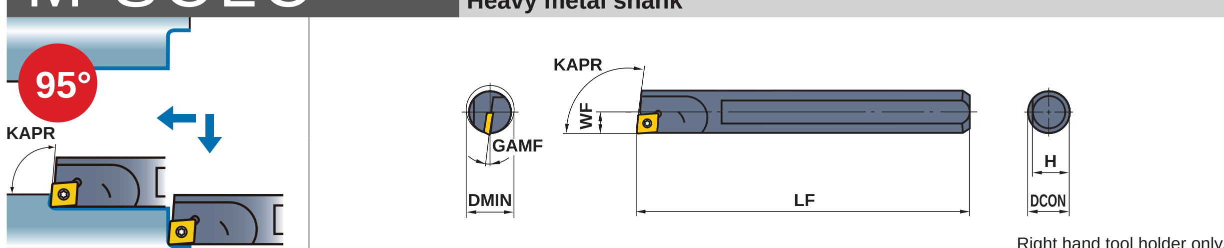
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SCLCR/L-062	●	●	CCMT CCMW CCGB CCGW CCGT CCGH CCET CCMH CCGW	21.5◌	.375	6.000	.625	.250	.340	15°	.477	TS25	TKY08F
S-SCLCR/L-082	●	●		21.5◌	.500	6.000	.750	.313	.460	13°	.602	TS25	TKY08F
S-SCLCR/L-103	●	●		32.5◌	.625	8.000	1.250	.406	.560	10°	.797	TS4	TKY15F
S-SCLCR/L-123	●	●		32.5◌	.750	10.000	1.875	.500	.700	8°	.954	TS4	TKY15F

Dimensions (inch)

* Clamp Torque (lbf-in) : TS25=8.9, TS4=31, TS5=66

M-SCLC

Heavy metal shank — CC◌◌inserts



Right hand tool holder only.

Order Number	Stock R	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
M-SCLCR-063	●	CCGT CCMW CCGW	03S1◌◌	.188	3.000	.100	.173	15°	.200	TS16	TKY06F
M-SCLCR-073	●		03S1◌◌	.219	3.500	.120	.199	14°	.240	TS16	TKY06F
M-SCLCR-064	●		04T0◌◌	.250	4.000	.140	.230	14°	.280	TS21	TKY06F

Dimensions (inch)

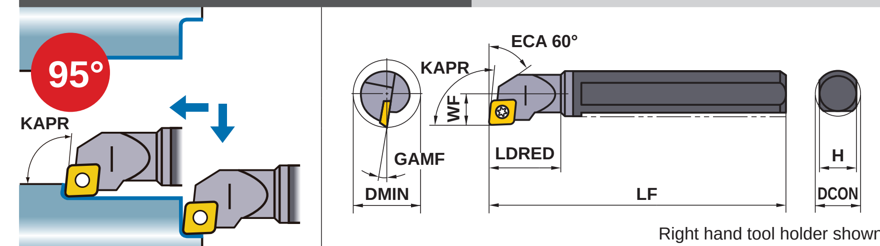
* Clamp Torque (lbf-in) : TS16=5.3, TS21=5.3

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : USA Stock

C-SCLC

Carbide shank — CC◌◌inserts



Right hand tool holder shown.

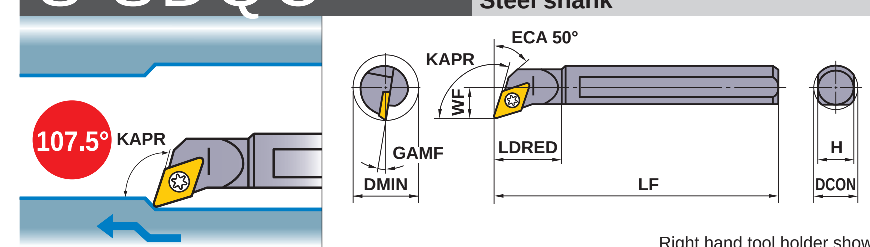
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
C-SCLCR/L-062	●	●	CCMT CCMW CCGB CCGW CCGT CCGH CCET CCMH	21.5◌	.375	6.000	.625	.250	.360	15°	.477	TS25	TKY08F
C-SCLCR/L-082	●	●		21.5◌	.500	6.000	.750	.313	.485	13°	.602	TS25	TKY08F
C-SCLCR/L-103	●	●		32.5◌	.625	8.000	1.250	.406	.600	10°	.797	TS4	TKY15F

Dimensions (inch)

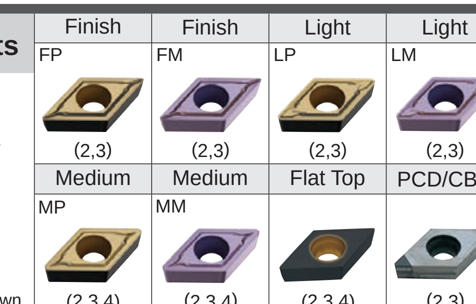
* Clamp Torque (lbf-in) : TS25=8.9, TS4=31

S-SDQC

Steel shank — DC◌◌inserts



Right hand tool holder shown.



Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SDQCR/L-082	●	●	DCMT DCMW DCGW DCGT DCET	21.5◌	.500	6.000	.875	.375	.460	10°	.665	TS25	TKY08F
S-SDQCR/L-102	●	●		21.5◌	.625	8.000	1.000	.406	.560	7°	.797	TS25	TKY08F
S-SDQCR/L-123	●	●		32.5◌	.750	10.000	1.250	.500	.700	7°	.954	TS4	TKY15F

Dimensions (inch)

* Clamp Torque (lbf-in) : TS25=8.9, TS4=31, TS5=66

RECOMMENDED CUTTING CONDITIONS

Steel Shank				l/d ≤ 3			3 < l/d ≤ 4 (Shank Diameter ≥ 1.000 inch)		
Heavy Metal Shank				l/d ≤ 3			3 < l/d ≤ 6		
Carbide Shank				l/d ≤ 5			5 < l/d ≤ 7		
	Work Material	Hardness	Cutting Mode	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P	Carbon Steel Alloy Steel	180−280HB	Light Cutting	295−525	.002−.006	.008	260−490	.002−.006	.008
			Medium Cutting	195−395	.006−.014	−.118	165−360	.004−.008	.059
M	Stainless Steel	≤200HB	Light Cutting	330−590	.002−.006	.008	330−590	.002−.006	.008
			Medium Cutting	165−295	.006−.010	−.079	130−260	.004−.008	.039
N	Aluminum Alloy	−	Light Cutting	655−1310	.002−.006	.008	655−1310	.002−.006	.008
			Medium Cutting	490−820	.002−.006	−.079	490−820	.002−.006	.059

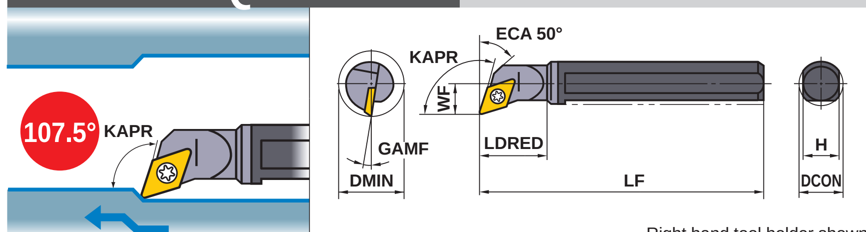
E
BORING BARS

SCREW CLAMP TYPE

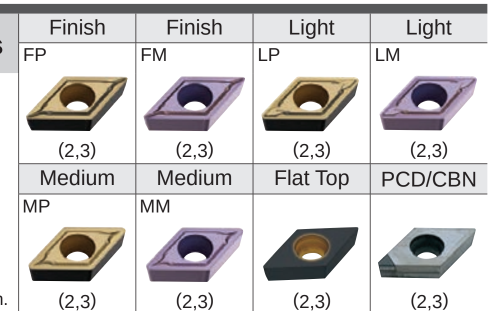
- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Steel and carbide shanks are stocked in various diameters.

C-SDQC

Carbide shank DC◌◌inserts



Right hand tool holder shown.



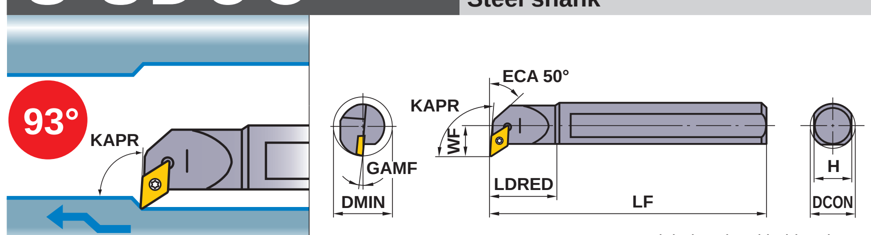
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
C-SDQCR/L-082	●	●	DCMT DCMW DCGW DCGT DCET	21.5◌	.500	6.000	.875	.375	.485	10°	.665	TS25	TKY08F
C-SDQCR/L-102	●	●		21.5◌	.625	8.000	1.000	.406	.600	7°	.797	TS25	TKY08F
C-SDQCR/L-123	●	●		32.5◌	.750	10.000	1.250	.500	.725	7°	.954	TS4	TKY15F

Dimensions (inch)

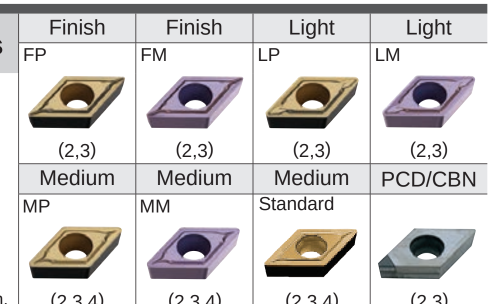
⋆ Clamp Torque (lbf-in) : TS25=8.9, TS4=31

S-SDUC

Steel shank DC◌◌inserts



Right hand tool holder shown.



Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SDUCR/L-062	●	●	DCMT DCMW DCGW DCGT DCET	21.5◌	.375	6.000	.625	.437	.340	7°	.664	TS25	TKY08F
S-SDUCR/L-082	●	●		21.5◌	.500	6.000	.750	.500	.460	7°	.789	TS25	TKY08F
S-SDUCR/L-102	●	●		21.5◌	.625	8.000	1.250	.563	.560	7°	.954	TS25	TKY08F

Dimensions (inch)

⋆ Clamp Torque (lbf-in) : TS25=8.9, TS4=31, TS5=66

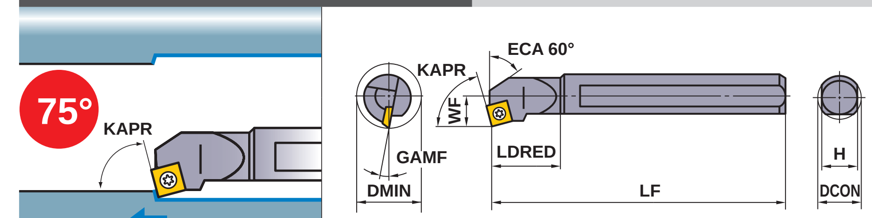
Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : USA Stock

S-SSKC

Steel shank SC◌◌inserts



Right hand tool holder shown.

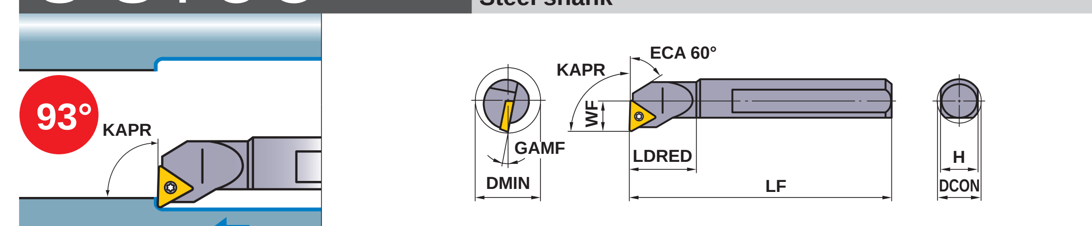
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SSKCR/L-103	●	●	SCMT SCMW	32.5◌	.625	8.000	1.250	.406	.560	10°	.797	TS4	TKY15F
S-SSKCR/L-123	●	●		32.5◌	.750	10.000	1.875	.500	.700	8°	.954	TS4	TKY15F

Dimensions (inch)

⋆ Clamp Torque (lbf-in) : TS4=31, TS5=66

S-STUC

Steel shank TC◌◌inserts



Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-STUCR/L-062	●	●	TCMT TCMW TCGT TCGW	21.5◌	.375	6.000	.625	.250	.360	15°	.477	TS25	TKY08F
S-STUCR/L-082	●	●		21.5◌	.500	6.000	.750	.313	.485	13°	.602	TS25	TKY08F
S-STUCR/L-102	●	●		21.5◌	.625	8.000	1.250	.406	.600	10°	.797	TS25	TKY08F
S-STUCR/L-123	●	●		32.5◌	.750	10.000	1.875	.500	.725	8°	.954	TS4	TKY15F

Dimensions (inch)

⋆ Clamp Torque (lbf-in) : TS25=8.9, TS4=31

RECOMMENDED CUTTING CONDITIONS

	Steel Shank			l/d ≤ 3			3 < l/d ≤ 4 (Shank Diameter ≥ 1.000 inch)		
	Heavy Metal Shank			l/d ≤ 3			3 < l/d ≤ 6		
	Carbide Shank			l/d ≤ 5			5 < l/d ≤ 7		
	Work Material	Hardness	Cutting Mode	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P	Carbon Steel Alloy Steel	180−280HB	Light Cutting	295−525	.002−.006	.008	260−490	.002−.006	.008
			Medium Cutting	195−395	.006−.014	−.118	165−360	.004−.008	.059
M	Stainless Steel	≤200HB	Light Cutting	330−590	.002−.006	.008	330−590	.002−.006	.008
			Medium Cutting	165−295	.006−.010	−.079	130−260	.004−.008	.039
N	Aluminum Alloy	−	Light Cutting	655−1310	.002−.006	.008	655−1310	.002−.006	.008
			Medium Cutting	490−820	.002−.006	−.079	490−820	.002−.006	.059

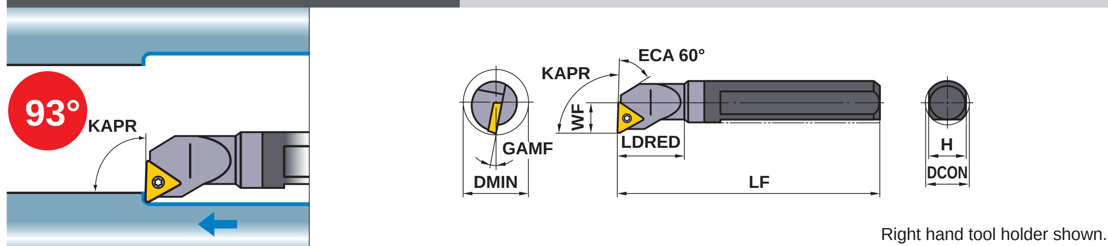
E BORING BARS

SCREW CLAMP TYPE

- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Steel and carbide shanks are stocked in various diameters.

C-STUC

Carbide shank TC◌◌inserts



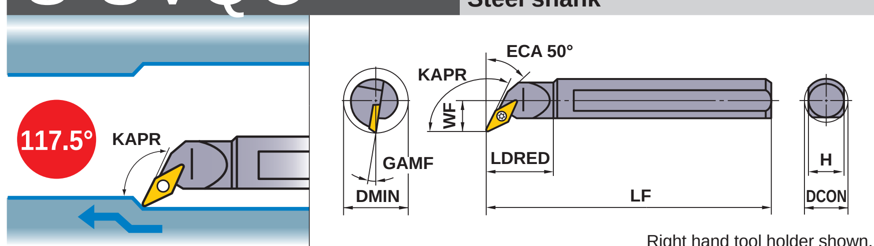
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
C-STUCR/L-062	●	●	TCMT	21.5◌	.375	6.000	.625	.250	.340	15°	**.477**	TS25	TKY08F
C-STUCR/L-082	●	●	TCMW TCGT	21.5◌	.500	6.000	.750	.313	.460	13°	**.602**	TS25	TKY08F
C-STUCR/L-102	●	●	TCGW	21.5◌	.625	8.000	1.250	.406	.560	10°	**.797**	TS25	TKY08F

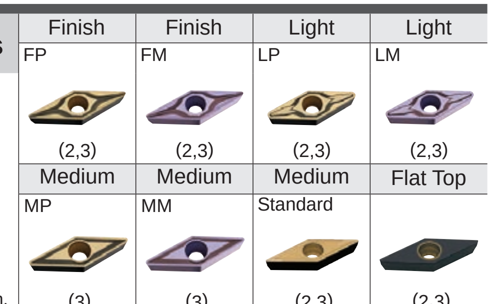
Dimensions (inch)

⁎ Clamp Torque (lbf-in) : TS25=8.9

S-SVQC

Steel shank VC◌◌inserts





Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SVQCR/L-102	●	●	VCMT VCMW	22◌	.625	8.000	1.000	.406	.560	8°	**.797**	TS25	TKY08F
S-SVQCR/L-122	●	●	VCGT VCGW	22◌	.750	10.000	1.250	.500	.700	7°	**.954**	TS25	TKY08F

Dimensions (inch)

⁎ Clamp Torque (lbf-in) : TS25=8.9, TS4=31

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

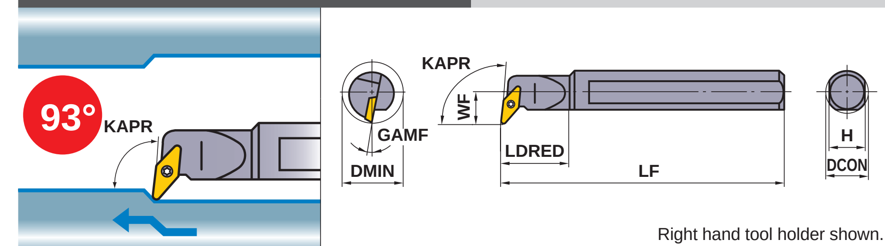
● **: USA Stock**

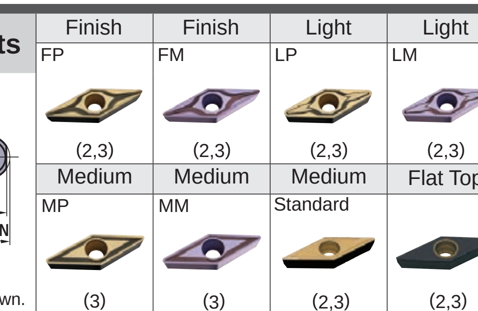
E

BORING BARS

S-SVUC

Steel shank VC◌◌inserts





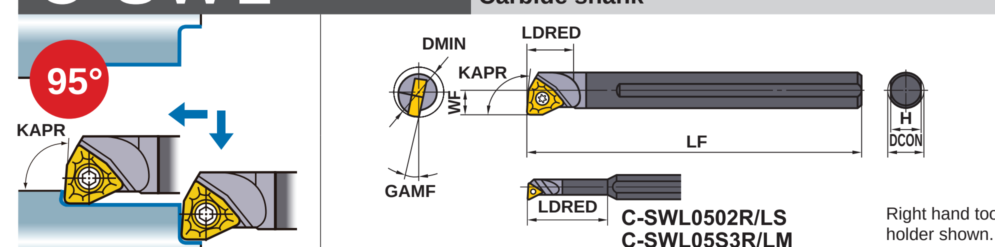
Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
S-SVUCR/L-122	●	●	VCMT VCMW VCGT VCGW	22◌	.750	10.000	1.250	.500	.700	7°	**1.000**	TS25	TKY08F

Dimensions (inch)

⁎ Clamp Torque (lbf-in) : TS25=8.9, TS4=31

C-SWL

Carbide shank WC◌◌inserts



Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
C-SWL0502R/LS	●	●	WCMT	1.21◌	.313	5.000	1.000	.114	.282	17°	**.228**	TS21	TKY06F
C-SWL05S3R/LM	●	●	WCGT WCMW	1.51.5◌	.313	5.000	1.370	.156	.282	15°	**.312**	TS2	TKY06F
C-SWL0504R/L	●	●	WCGW	21.5◌	.313	5.000	.598	.203	.282	15°	**.406**	TS25	TKY08F

Dimensions (inch)

⁎ Clamp Torque (lbf-in) : TS21=5.3, TS2=5.3, TS25=8.9

RECOMMENDED CUTTING CONDITIONS

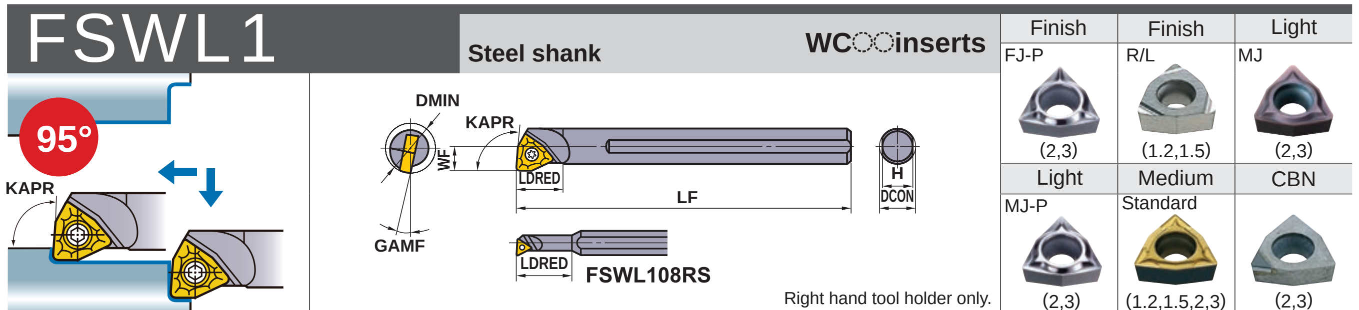
	Work Material	Hardness	Cutting Mode	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
	Steel Shank			l/d ≤ 3			3 < l/d ≤ 4 (Shank Diameter ≥ 1.000 inch)		
	Heavy Metal Shank			l/d ≤ 3			3 < l/d ≤ 6		
	Carbide Shank			l/d ≤ 5			5 < l/d ≤ 7		
P	Carbon Steel Alloy Steel	180−280HB	Light Cutting	295−525	.002−.006	.008	260−490	.002−.006	.008
			Medium Cutting	195−395	.006−.014	−.118	165−360	.004−.008	.059
M	Stainless Steel	≤200HB	Light Cutting	330−590	.002−.006	.008	330−590	.002−.006	.008
			Medium Cutting	165−295	.006−.010	−.079	130−260	.004−.008	.039
N	Aluminum Alloy	−	Light Cutting	655−1310	.002−.006	.008	655−1310	.002−.006	.008
			Medium Cutting	490−820	.002−.006	−.079	490−820	.002−.006	.059

SCREW CLAMP TYPE

- Two wall pocket.
- 7º positive insert, low cutting force.
- Screw-on type.
- Steel and carbide shanks are stocked in various diameters.

FSWL1

Steel shank WC◌◌inserts

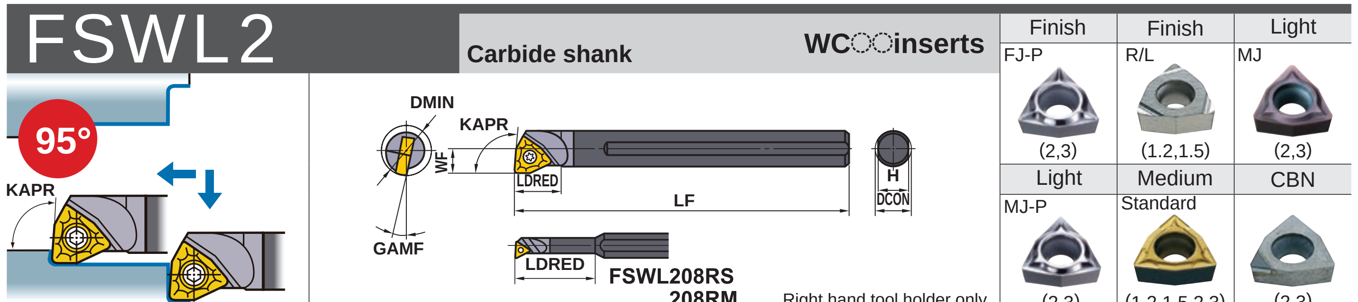


Order Number	Stock R	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *	Wrench
				Dimensions (mm)								
FSWL108RS	★	WCMT WCGT	1.21◌	8	100	19	2.9	7	17°	**5.8**	TS21	TKY06F
FSWL108RM	★	WCMT WCGT WCMW	1.51.5◌	8	100	25	4	7	15°	**8**	TS2	TKY06F
FSWL108R	★	WCMT WCGW	21.5◌	8	125	10	5	7	15°	**10**	TS25	TKY08F
FSWL110R	★		21.5◌	10	150	12	6	9	13°	**12**	TS25	TKY08F
FSWL112R	★		32.5◌	12	180	15	8	11	13°	**16**	TS4	TKY15F

⁎ Clamp Torque (lbf-in) : TS21=5.3, TS25=8.9, TS4=31

FSWL2

Carbide shank WC◌◌inserts



Order Number	Stock R	Stock L	Insert Number		DCON	LF	LDRED	WF	H	GAMF	DMIN	Clamp Screw *	Wrench
					Dimensions (mm)								
FSWL208RS	★		WCMT WCGT	1.21◌	8	122	25	2.9	7	17°	**5.8**	TS21	TKY06F
FSWL208R/LM	★	★		1.51.5◌	8	125	33	4	7	15°	**8**	TS2	TKY06F
FSWL208R	★			21.5◌	8	125	10	5	7	15°	**10**	TS25	TKY08F
FSWL210R/L	★	★	WCMT	21.5◌	10	150	12	6	9	13°	**12**	TS25	TKY08F
FSWL212R/L	★	★	WCGW	32.5◌	12	180	15	8	11	13°	**16**	TS4	TKY15F
FSWL216R/L	★	★	WCMT	32.5◌	16	200	20	11	14	7°	**22**	TS4	TKY15F

⁎ Clamp Torque (lbf-in) : TS21=5.3, TS2=5.3, TS25=8.9, TS4=31

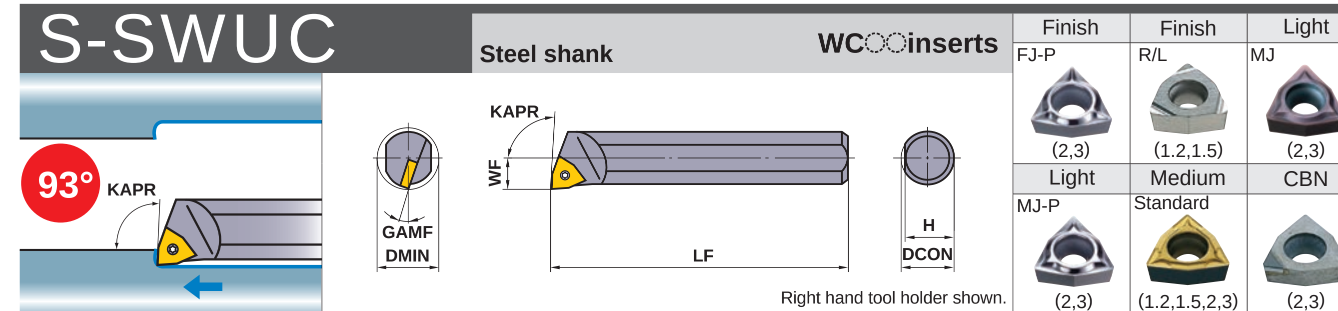
Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

S-SWUC

Steel shank WC◌◌inserts

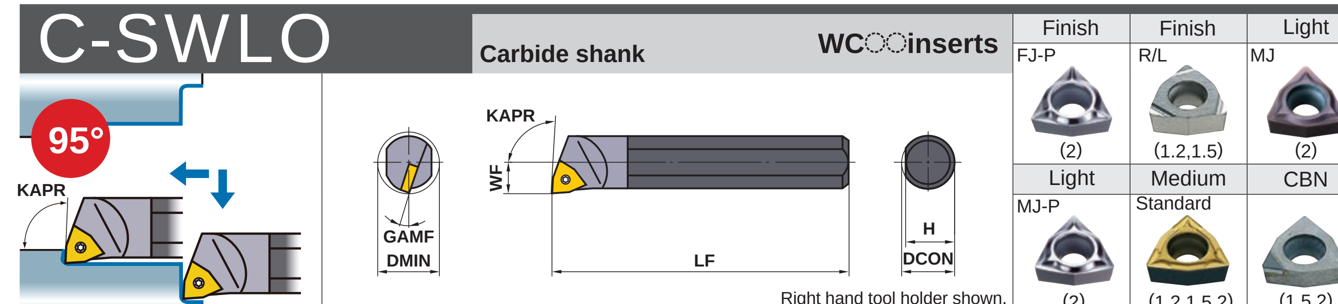


Order Number	Stock R	Stock L	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw *	Wrench
					Dimensions (inch)							
S-SWUCR/L-055	●	●	WCMT WCMW WCGT WCGW	1.21◌	.188	4.000	.114	.172	17°	**.228**	TS21	TKY06F
S-SWUCR/L-065	●	●		1.21◌	.250	4.000	.156	.235	17°	**.312**	TS2	TKY06F
S-SWUCR/L-066	●	●		1.51.5◌	.313	6.000	.188	.295	15°	**.375**	TS2	TKY06F
S-SWUCR/L-062	●	●		21.5◌	.375	6.000	.250	.358	15°	**.500**	TS25	TKY08F
S-SWUCR/L-082	●	●		21.5◌	.500	6.000	.312	.480	13°	**.625**	TS25	TKY08F
S-SWUCR/L-103	●	●		32.5◌	.625	8.000	.375	.593	10°	**.750**	TS4	TKY15F
S-SWUCR/L-123	●	●		32.5◌	.750	10.000	.500	.725	8°	**1.000**	TS4	TKY15F

⁎ Clamp Torque (lbf-in) : TS21=5.3, TS2=5.3, TS25=8.9, TS4=31

C-SWLO

Carbide shank WC◌◌inserts



Order Number	Stock R	Stock L	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw *	Wrench
					Dimensions (inch)							
C-SWLOR/L-055	●	□	WCMT WCMW WCGT WCGW	1.21◌	.188	4.000	.114	.172	17°	**.228**	TS21	TKY06F
C-SWLOR/L-065	●	□		1.21◌	.250	4.000	.156	.235	17°	**.313**	TS2	TKY06F
C-SWLOR/L-066	●	□		1.51.5◌	.313	6.000	.188	.295	15°	**.375**	TS2	TKY06F
C-SWLOR/L-070	●	□		21.5◌	.375	6.000	.218	.358	15°	**.438**	TS25	TKY08F
C-SWLOR/L-062	●	□		21.5◌	.375	6.000	.250	.358	15°	**.500**	TS25	TKY08F

⁎ Clamp Torque (lbf-in) : TS21=5.3, TS2=5.3, TS25=8.9

RECOMMENDED CUTTING CONDITIONS

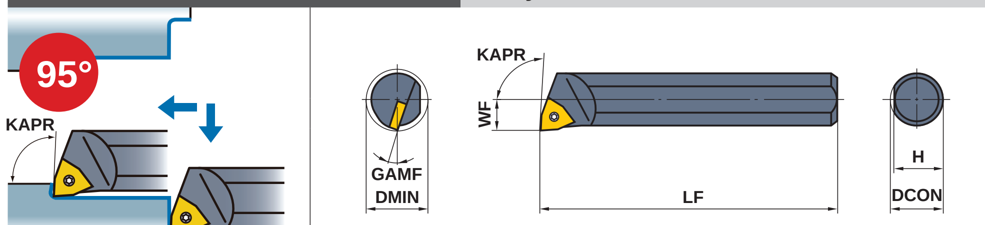
Steel Shank				l/d ≤ 3			3 < l/d ≤ 4 (Shank Diameter ≥ 1.000 inch)		
Heavy Metal Shank				l/d ≤ 3			3 < l/d ≤ 6		
Carbide Shank				l/d ≤ 5			5 < l/d ≤ 7		
Work Material		Hardness	Cutting Mode	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)
P	Carbon Steel Alloy Steel	180–280HB	Light Cutting	295–525	.002–.006	.008	260–490	.002–.006	.008
			Medium Cutting	195–395	.006–.014	–.118	165–360	.004–.008	.059
M	Stainless Steel	≤200HB	Light Cutting	330–590	.002–.006	.008	330–590	.002–.006	.008
			Medium Cutting	165–295	.006–.010	–.079	130–260	.004–.008	.039
N	Aluminum Alloy	–	Light Cutting	655–1310	.002–.006	.008	655–1310	.002–.006	.008
			Medium Cutting	490–820	.002–.006	–.079	490–820	.002–.006	.059

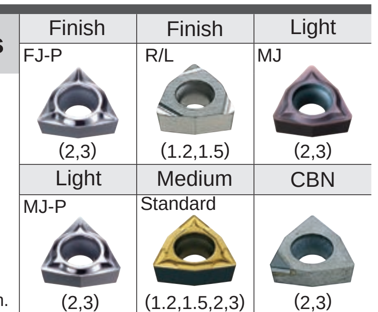
SCREW CLAMP TYPE

- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Steel and carbide shanks are stocked in various diameters.

M-SWLO

Heavy metal shank — WC◌◌inserts



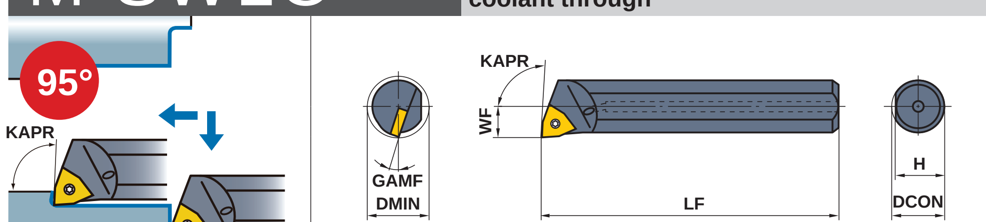


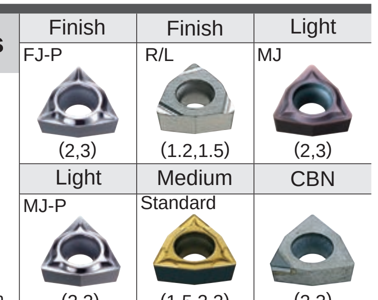
Order Number	Stock R	Stock L	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
					Dimensions (inch)							
M-SWLOR/L-055	●	●	WCMT WCGT WCMW WCGW	1.21◌	.188	4.000	.114	.172	17°	.228	TS21	TKY06F
M-SWLOR/L-065	●	●		1.21◌	.250	4.000	.156	.235	17°	.313	TS2	TKY06F
M-SWLOR/L-066	●	●		1.51.5◌	.313	6.000	.188	.295	15°	.375	TS2	TKY06F
M-SWLOR/L-070	●	●		21.5◌	.375	6.000	.218	.358	15°	.438	TS25	TKY08F
M-SWLOR/L-062	●	●		21.5◌	.375	6.000	.250	.358	15°	.500	TS25	TKY08F
M-SWLOR/L-082	●	●		21.5◌	.500	6.000	.312	.480	13°	.625	TS25	TKY08F
M-SWLOR/L-103	●	●		32.5◌	.625	8.000	.375	.600	10°	.750	TS4	TKY15F
M-SWLOR/L-123	●	●		32.5◌	.750	10.000	.500	.725	8°	1.000	TS4	TKY15F

⋆ Clamp Torque (lbf-in) : TS21=5.3, TS2=5.3, TS25=8.9, TS4=31

M-SWLO

Heavy metal shank coolant through — WC◌◌inserts





Order Number	Stock R	Stock L	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
					Dimensions (inch)							
M-SWLOR/L-066-C	●	●	WCMT WCGT WCMW WCGW	1.51.5◌	.313	6.000	.188	.295	15°	.375	TS2	TKY06F
M-SWLOR/L-070-C	●	●		21.5◌	.375	6.000	.218	.358	15°	.438	TS25	TKY08F
M-SWLOR/L-062-C	●	●		21.5◌	.375	6.000	.250	.358	15°	.500	TS25	TKY08F
M-SWLOR/L-082-C	●	●		21.5◌	.500	6.000	.312	.480	13°	.625	TS25	TKY08F
M-SWLOR/L-103-C	●	●		32.5◌	.625	8.000	.375	.600	10°	.750	TS4	TKY15F
M-SWLOR/L-123-C	●	●		32.5◌	.750	10.000	.500	.725	8°	1.000	TS4	TKY15F

⋆ Clamp Torque (lbf-in) : TS2=5.3, TS25=8.9, TS4=31

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

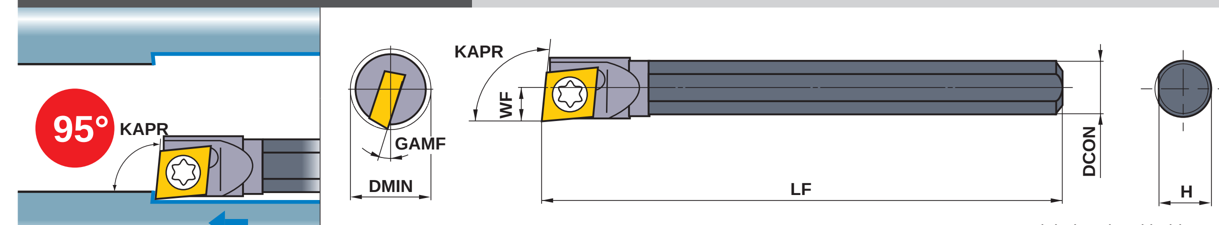
● : USA Stock

MICRO-DEX

- The minimum cutting diameter is ϕ5 mm (.197 inch).
- 7°positive insert.
- Carbide shank type.
- Easy-to-use tool geometries.
- Suitable for small workpiece.
- l/d is 5 times the diameter.

SCLC

Carbide shank — CC◌◌inserts



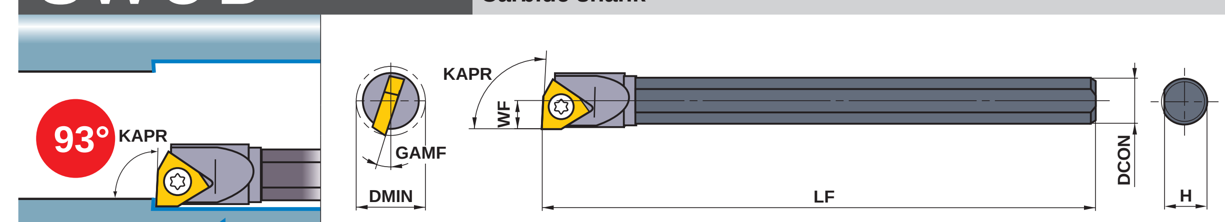
Order Number	Stock R	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
				Dimensions (mm)							
C04GSCLCR03	●	⋆1 CCGT CCGW CCMW	03S1◌◌	4	90	2.5	3.7	15°	5	TS16	TKY06F
C05HSCLCR03	●		03S1◌◌	5	100	3.0	4.7	13°	6	TS16	TKY06F
C06JSCLCR04	●		04T0◌◌	6	110	3.5	5.7	13°	7	TS21	TKY06F
C07KSCLCR04	●		04T0◌◌	7	125	4.0	6.7	11°	8	TS21	TKY06F

⋆ Clamp Torque (lbf-in) : TS16=5.3, TS21=5.3

Note 1) Diameter of inscribed circle is non-ISO standard. (For SCLC type)

SWUB

Carbide shank — WB◌◌ inserts



Order Number	Stock R	Insert Number		DCON	LF	WF	H	GAMF	DMIN	Clamp Screw*	Wrench
				Dimensions (mm)							
C05HSWUBR02	●	WBGT WBMT	1.21◌◌LF	5	100	3.0	4.7	15°	6	TS21	TKY06F
C06JSWUBR02	●		1.21◌◌LF	6	110	3.5	5.7	13°	7	TS2C	TKY06F
C07KSWUBRL3	●		1.51.5◌◌LF	7	125	4.0	6.7	15°	8	TS2	TKY06F

⋆ Clamp Torque (lbf-in) : TS21=5.3, TS2C=5.3, TS2=5.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	l/d
P	General Steel	NX2525	130−395	.0004−.002	.004−.012	3−5
M	Stainless Steel	VP15TF	130−395	.0004−.002	.004−.012	3−5
K	Cast Iron	VP15TF	130−395	.0004−.002	.004−.012	3−5
N	Non-Ferrous Material	VP15TF	260−525	.0004−.002	.004−.024	3−5
		MD220	260−525	.0004−.002	.004−.024	3−5
H	Hardened Steel 35−65HRC	MB8110	130−395	.0004−.002	.001−.008	3−5

E

BORING BARS

E

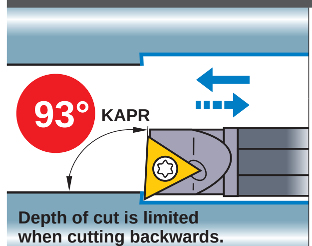
BORING BARS

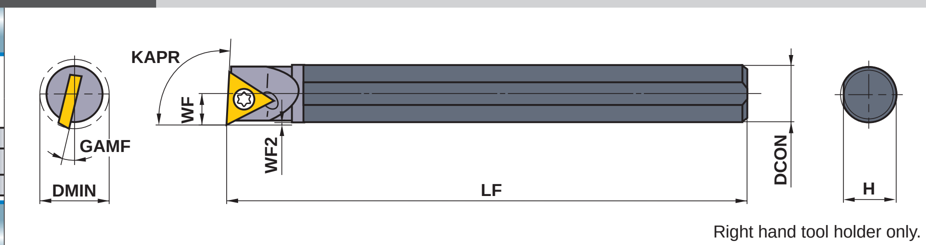
MICRO-DEX

- The minimum cutting diameter is ϕ8 mm (.315 inch).
- 7°positive insert.
- Carbide shank type.
- Easy-to-use tool geometries.
- Suitable for small workpiece.
- l/d is 5 times the diameter.

STUC

Carbide shank | TCGT inserts | Finish R/L-F





Order Number	Stock R	Insert Number		Dimensions (mm) DCON	LF	WF	WF2	H	GAMF	DMIN	Clamp Screw *	Wrench
C07KSTUCR06	●	TCGT	1.21○○LF	7	125	4.0	0.35	6.7	12°	8	TS2C	TKY06F

* Clamp Torque (lbf-in) : TS2C=5.3

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Grade	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	l/d
P	General Steel	NX2525	130−395	.0004−.002	.004−.012	3−5
M	Stainless Steel	VP15TF	130−395	.0004−.002	.004−.012	3−5
K	Cast Iron	VP15TF	130−395	.0004−.002	.004−.012	3−5
N	Non-Ferrous Material	VP15TF	260−525	.0004−.003	.004−.024	3−5
		MD220	260−525	.0004−.003	.004−.024	3−5
H	Hardened Steel 35−65HRC	MB8110	130−395	.0004−.002	.001−.008	3−5

● : USA Stock
<1 MICRO-MINI in one case>

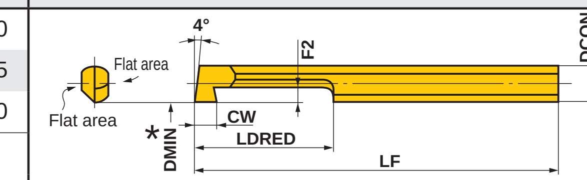
MICRO-MINI

- Solid carbide type (Single cutting edges).
- l/d is 5 times the diameter.
- Cutting edge can be shaped according to the application. Thus, it covers a wide cutting range (threading, grooving, copying, etc.).

STANDARD MICRO-MINI BORING BARS (Solid carbide boring bar)

Order Number	Stock TF15	Dimensions(mm) CW	DCON	LF	LDRED	DMIN*	F2
C03FR-BLS	●	2.0	3	80	15	3.2	1.0
C04FR-BLS	●	2.5	4	80	20	4.2	1.5
C05HR-BLS	●	3.0	5	100	25	5.2	2.0

Geometry



* DMIN : Min. Cutting Diameter

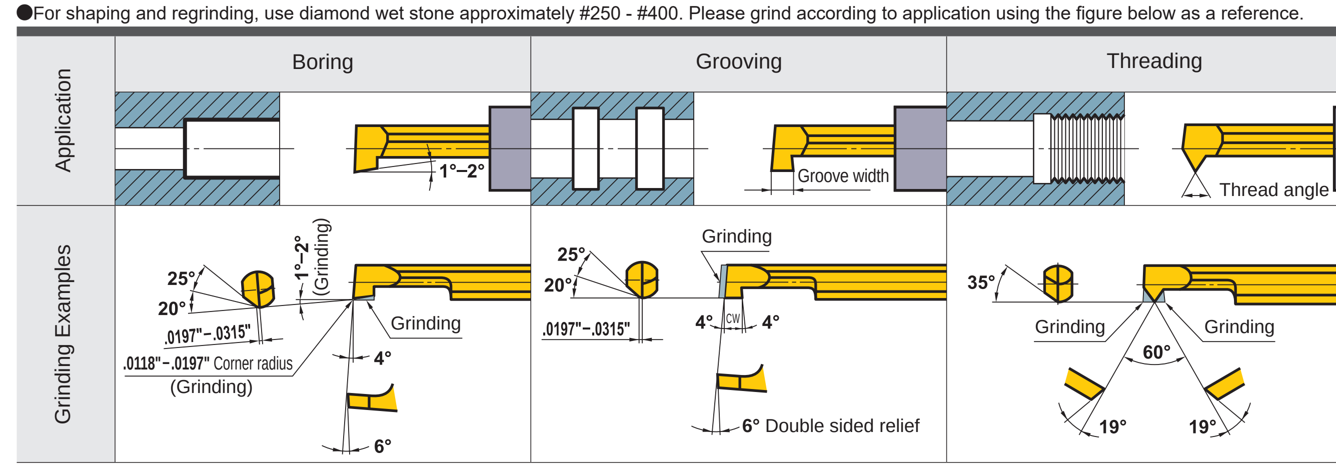
RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	l/d	Cutting Edge Preparation: * Corner Radius or BCH	Cutting Edge Preparation: * Honing
P	Carbon Steel, Alloy Steel 180−350HB	100−165	−.004	.004−.012	5	.004−.020	.0004−.002
M	Stainless Steel ≦200HB	100−165	−.004	.004−.012	5	≦.016	≦.001 (Honing not required)
K	Gray Cast Iron ≦350MPa	100−165	−.002	.004−.012	5	.004−.020	.0004−.002
N	Non-Ferrous Meterial	200−330	−.004	.004−.020	5	.004−.020	≦.001 (Honing not required)

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

GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

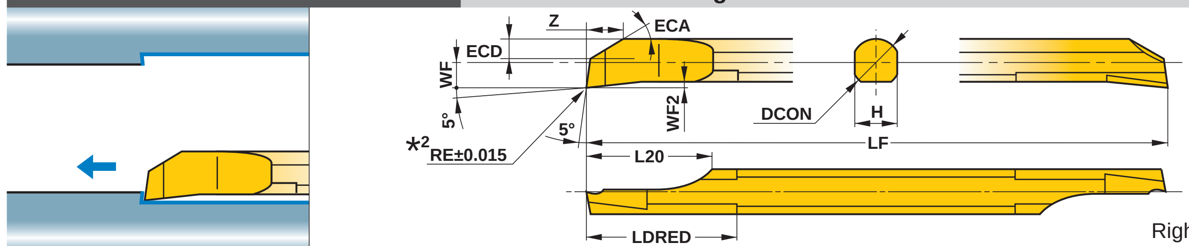
- MICRO-MINI boring bar can be applied to boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use diamond wet stone approximately #250 - #400. Please grind according to application using the figure below as a reference.



MICRO-MINI TWIN

CB

For internal machining



Right hand tool only.

Order Number	Stock		Breaker	Dimensions(mm)										
	Micro Grain	Coated		DMIN*1		RE	DCON	LF	L20	LDRED	WF	WF2	H	Z
	TF15	VP15TF		l/d ≤ 3	l/d > 3									
CB02RS	●	●	without	**2.2**	**3.6**	0.05	2	50	5	6	1	0.25	1.8	1.4
CB02RS-B	●	●	with	**2.2**	**3.9**	0.05	2	50	5	6	1	0.25	1.8	1.4
CB02RS-01	●	●	without	**2.2**	**3.6**	0.1	2	50	5	6	1	0.25	1.8	1.4
CB02RS-01B	●	●	with	**2.2**	**4.2**	0.1	2	50	5	6	1	0.25	1.8	1.4
CB02RS-02	●	●	without	**2.2**	**3.6**	0.2	2	50	5	6	1	0.25	1.8	1.4
CB02RS-02B	●	●	with	**2.2**	**4.9**	0.2	2	50	5	6	1	0.25	1.8	1.4
CB03RS	●	●	without	**3.2**	**4.2**	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3
CB03RS-B	●	●	with	**3.2**	**4.4**	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3
CB03RS-01	●	●	without	**3.2**	**4.2**	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3
CB03RS-01B	●	●	with	**3.2**	**4.5**	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3
CB03RS-02	●	●	without	**3.2**	**4.2**	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3
CB03RS-02B	●	●	with	**3.2**	**4.8**	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3
CB04RS	●	●	without	**4.2**	**5.1**	0.05	4	60	10	12	2	0.45	3.6	3.1
CB04RS-B	●	●	with	**4.2**	**5.2**	0.05	4	60	10	12	2	0.45	3.6	3.1
CB04RS-01	●	●	without	**4.2**	**5.1**	0.1	4	60	10	12	2	0.45	3.6	3.1
CB04RS-01B	●	●	with	**4.2**	**5.3**	0.1	4	60	10	12	2	0.45	3.6	3.1
CB04RS-02	●	●	without	**4.2**	**5.1**	0.2	4	60	10	12	2	0.45	3.6	3.1
CB04RS-02B	●	●	with	**4.2**	**5.5**	0.2	4	60	10	12	2	0.45	3.6	3.1
CB05RS	●	●	without	**5.2**	**6.0**	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9
CB05RS-B	●	●	with	**5.2**	**6.1**	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9
CB05RS-02	●	●	without	**5.2**	**6.0**	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9
CB05RS-02B	●	●	with	**5.2**	**6.4**	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9
CB06RS	●	●	without	**6.2**	**7.2**	0.05	6	75	12.5	18	3	0.65	5.4	4.7
CB06RS-B	●	●	with	**6.2**	**7.3**	0.05	6	75	12.5	18	3	0.65	5.4	4.7
CB06RS-02	●	●	without	**6.2**	**7.2**	0.2	6	75	12.5	18	3	0.65	5.4	4.7
CB06RS-02B	●	●	with	**6.2**	**7.8**	0.2	6	75	12.5	18	3	0.65	5.4	4.7
CB07RS	●	●	without	**7.2**	**8.6**	0.05	7	85	12.5	21	3.5	0.75	6.3	5.5
CB07RS-B	●	●	with	**7.2**	**8.8**	0.05	7	85	12.5	21	3.5	0.75	6.3	5.5
CB07RS-02	●	●	without	**7.2**	**8.6**	0.2	7	85	12.5	21	3.5	0.75	6.3	5.5
CB07RS-02B	●	●	with	**7.2**	**9.2**	0.2	7	85	12.5	21	3.5	0.75	6.3	5.5
CB08RS	★	★	without	**8.2**	**9.5**	0.05	8	95	15	24	4	0.85	7.2	6.3
CB08RS-B	★	★	with	**8.2**	**9.6**	0.05	8	95	15	24	4	0.85	7.2	6.3
CB08RS-02	★	★	without	**8.2**	**9.5**	0.2	8	95	15	24	4	0.85	7.2	6.3
CB08RS-02B	★	★	with	**8.2**	**9.8**	0.2	8	95	15	24	4	0.85	7.2	6.3

*1 DMIN : Min. Cutting Diameter
*2 The Re dimension represents the size before grinding a chip breaker.

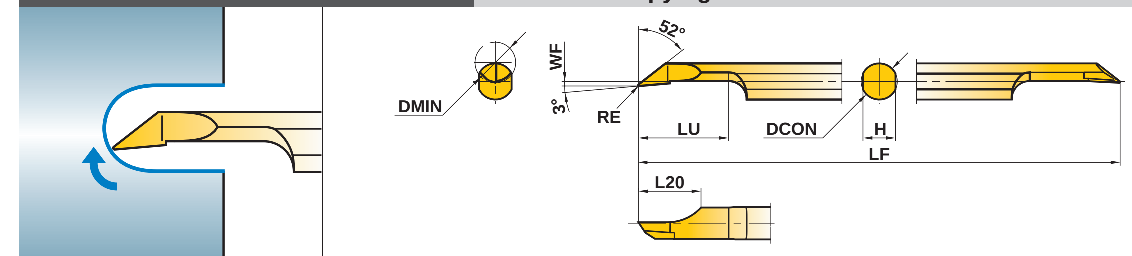
● : USA Stock ★ : Stocked in Japan
<1 MICRO-MINI TWIN in one case>

E

BORING BARS

CR

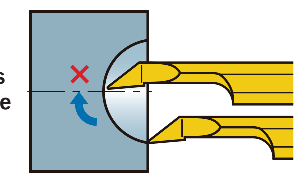
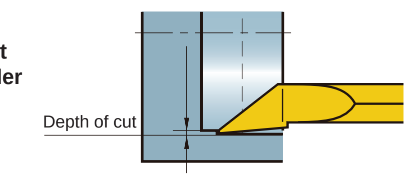
For internal copying



Right hand tool only.

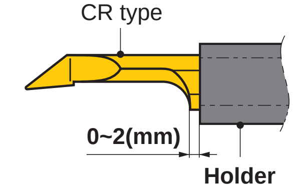
Order Number	Stock		Breaker	Dimensions(mm)							
	Micro Grain	Coated		DMIN	RE	DCON	LF	LU	L20	WF	H
	TF15	VP15TF									
CR03RS-01	●	●	without	**3.5**	0.1	3	50	8	6	0.15	2.7
CR03RS-01B	●	●	with	**3.5**	0.1	3	50	8	6	0.15	2.7
CR04RS-01	●	●	without	**4.5**	0.1	4	60	10	7	0.15	3.6
CR04RS-01B	●	●	with	**4.5**	0.1	4	60	10	7	0.15	3.6
CR05RS-01	●	●	without	**5.5**	0.1	5	70	12	8	0.15	4.5
CR05RS-01B	●	●	with	**5.5**	0.1	5	70	12	8	0.15	4.5

■NOTES

Profile turning, Inner end facing	Copying
The cutting edge should not be cross the center line of the workpiece. 	**The depth of cut should be smaller than the corner radius value.** 
If the cutting edge crosses the center line of a workpiece, the cutting edge can fracture.	With depths of cut larger than the corner radius value, burrs will be formed.

■RECOMMENDED TOOL OVERHANG

MICRO-MINI TWIN
CR type



RECOMMENDED CUTTING CONDITIONS

	Work Material	CB Type				CR Type		
		Cutting Speed (SFM)	Feed (IPR)	Depth of Cut (inch)	Overhang (l/d)	Cutting Speed (SFM)	Feed (IPR)	
							03RS/04RS	05RS
P	Carbon Steel Alloy Steel 180–350HB	130–395	.0004–.002	.004–.012	3–5	130–395	.0004–.001	.0004–.002
M	Stainless Steel ≦200HB	130–395	.0004–.002	.004–.012	3–5	130–395	.0004–.001	.0004–.002
K	Gray Cast Iron ≦350MPa	130–395	.0004–.002	.004–.012	3–5	130–395	.0004–.002	.0004–.002
N	Non-Ferrous Meterial	260–525	.0004–.003	.004–.020	3–5	260–525	.0004–.002	.0004–.003

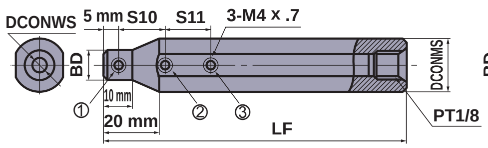
Note 1) Recommend wet machining.
Note 2) The recommended tool overhang of CR type is LU+2 mm.

E

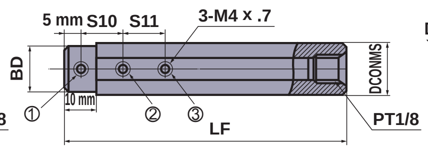
BORING BARS

HOLDER (INCH SHANK STANDARD)

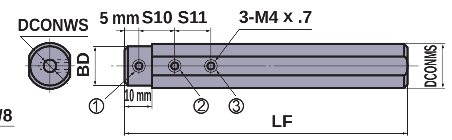
RBH Round type holder



RBH16○○○A
(Coolant thru)



RBH10○○○A, RBH12○○○A
(Coolant thru)



RBH190○○N

■ID (DCONWS) : INCH TYPE

Order Number	Stock	Dimensions						Clamp Screw *			Wrench	Torque (lbf-in)
		DCONMS (inch)	DCONWS (inch)	BD (mm)	LF (mm)	S10 (mm)	S11 (mm)	①	②	③		
RBH10300A	●	.625	.187	15	100	15	15	A	A	A	HKY20F	18 (2.0 N·m)
RBH10350A	●	.625	.219	15	100	15	15	A	A	A	HKY20F	18 (2.0 N·m)
RBH10400A	●	.625	.250	15	100	20	20	A	A	A	HKY20F	18 (2.0 N·m)
RBH10500A	●	.625	.313	15	100	20	20	D	D	D	HKY20F	18 (2.0 N·m)
RBH12300A	●	.750	.187	18	125	15	15	B	B	B	HKY20F	18 (2.0 N·m)
RBH12350A	●	.750	.219	18	125	15	15	B	B	B	HKY20F	18 (2.0 N·m)
RBH12400A	●	.750	.250	18	125	20	20	B	B	B	HKY20F	18 (2.0 N·m)
RBH12500A	●	.750	.313	18	125	20	20	A	A	A	HKY20F	18 (2.0 N·m)
RBH16300A	●	1.000	.187	14	150	15	15	A	C	C	HKY20F	18 (2.0 N·m)
RBH16350A	●	1.000	.219	15	150	15	15	A	C	C	HKY20F	18 (2.0 N·m)
RBH16400A	●	1.000	.250	16	150	20	20	A	C	C	HKY20F	18 (2.0 N·m)
RBH16500A	●	1.000	.313	17	150	20	20	A	C	C	HKY20F	18 (2.0 N·m)

■ID (DCONWS) : METRIC TYPE

Order Number	Stock	Dimensions						Clamp Screw *			Wrench	Torque (lbf-in)
		DCONMS (inch)	DCONWS (mm)	BD (mm)	LF (mm)	S10 (mm)	S11 (mm)	①	②	③		
RBH10126A	●	.625	2	15	100	10	–	B	B	–	HKY20F	18 (2.0 N·m)
RBH10189A	●	.625	3	15	100	10	10	A	A	A	HKY20F	18 (2.0 N·m)
RBH10252A	●	.625	4	15	100	15	15	A	A	A	HKY20F	18 (2.0 N·m)
RBH10315A	●	.625	5	15	100	15	15	A	A	A	HKY20F	18 (2.0 N·m)
RBH10378A	●	.625	6	15	100	20	20	A	A	A	HKY20F	18 (2.0 N·m)
RBH10441A	●	.625	7	15	100	20	20	A	A	A	HKY20F	18 (2.0 N·m)
RBH19020N	●	.750	2	18	125	10	–	C	C	–	HKY20F	18 (2.0 N·m)
RBH19030N	●	.750	3	18	125	10	10	B	B	B	HKY20F	18 (2.0 N·m)
RBH19040N	●	.750	4	18	125	15	15	B	B	B	HKY20F	18 (2.0 N·m)
RBH19050N	●	.750	5	18	125	15	15	B	B	B	HKY20F	18 (2.0 N·m)
RBH19060N	●	.750	6	18	125	15	15	B	B	B	HKY20F	18 (2.0 N·m)
RBH19070N	●	.750	7	18	125	20	20	B	B	B	HKY20F	18 (2.0 N·m)
RBH19080N	★	.750	8	18	125	20	20	A	A	A	HKY20F	18 (2.0 N·m)
RBH16126A	●	1.000	2	11	150	10	–	A	B	–	HKY20F	18 (2.0 N·m)
RBH16189A	●	1.000	3	12	150	10	10	A	B	C	HKY20F	18 (2.0 N·m)
RBH16252A	●	1.000	4	13	150	15	15	A	C	C	HKY20F	18 (2.0 N·m)
RBH16315A	●	1.000	5	14	150	15	15	A	C	C	HKY20F	18 (2.0 N·m)
RBH16378A	●	1.000	6	15	150	20	20	A	C	C	HKY20F	18 (2.0 N·m)
RBH16441A	●	1.000	7	16	150	20	20	A	C	C	HKY20F	18 (2.0 N·m)

* Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008, D=HSS04003

● : USA Stock ★ : Stocked in Japan

E

BORING BARS

HOLDER CROSS REFERENCE LIST OF INCH SHANK STANDARD

Holder			MICRO-MINI TWIN		MICRO-DEX	MICRO-MINI	Machine Makers
Type		Order Number	CB	CR		C	
Round Type Holder ϕ.625 inch	ID : Metric Type	RBH10126A	02RS(-B) 02RS-0○(B)	–	–	–	Citizen Precision Machinery Co., Ltd. NC lathes
		RBH10189A	03RS(-B) 03RS-0○(B)	03RS-01 03RS-01B	–	03FR-BLS	
		RBH10252A	04RS(-B) 04RS-0○(B)	04RS-01 04RS-01B	C04GS○○○R○○	04FR-BLS	
		RBH10315A	05RS(-B) 05RS-0○(B)	05RS-01 05RS-01B	C05GS○○○R○○	05FR-BLS	
		RBH10378A	06RS(-B) 06RS-0○(B)	–	C06GS○○○R○○	–	
		RBH10441A	07RS(-B) 07RS-0○(B)	–	C07GS○○○R○○	–	
	ID : Inch Type	RBH10300A	For DIMPLE BAR and SCREW CLAMP TYPE				
		RBH10350A					
		RBH10400A					
		RBH10500A					
Round Type Holder ϕ.750 inch	ID : Metric Type	RBH19020N	02RS(-B) 02RS-0○(B)	–	–	–	Citizen Precision Machinery Co., Ltd.
		RBH19030N	03RS(-B) 03RS-0○(B)	03RS-01 03RS-01B	–	03FR-BLS	
		RBH19040N	04RS(-B) 04RS-0○(B)	04RS-01 04RS-01B	C04GS○○○R○○	04FR-BLS	
		RBH19050N	05RS(-B) 05RS-0○(B)	05RS-01 05RS-01B	C05GS○○○R○○	05FR-BLS	
		RBH19060N	06RS(-B) 06RS-0○(B)	–	C06GS○○○R○○	–	
		RBH19070N	07RS(-B) 07RS-0○(B)	–	C07GS○○○R○○	–	
		RBH19080N	08RS(-B) 08RS-0○(B)	–	–	–	
	ID : Inch Type	RBH12300A	For DIMPLE BAR and SCREW CLAMP TYPE				
		RBH12350A					
		RBH12400A					
		RBH12500A					
Round Type Holder ϕ1.000 inch	ID : Metric Type	RBH16126A	02RS(-B) 02RS-0○(B)	–	–	–	Citizen Precision Machinery Co., Ltd. NC lathes
		RBH16189A	03RS(-B) 03RS-0○(B)	03RS-01 03RS-01B	–	03FR-BLS	
		RBH16252A	04RS(-B) 04RS-0○(B)	04RS-01 04RS-01B	C04GS○○○R○○	04FR-BLS	
		RBH16315A	05RS(-B) 05RS-0○(B)	05RS-01 05RS-01B	C05GS○○○R○○	05FR-BLS	
		RBH16378A	06RS(-B) 06RS-0○(B)	–	C06GS○○○R○○	–	
		RBH16441A	07RS(-B) 07RS-0○(B)	–	C07GS○○○R○○	–	
	ID : Inch Type	RBH16300A	For DIMPLE BAR and SCREW CLAMP TYPE				
		RBH16350A					
		RBH16400A					
		RBH16500A					

* Mitsubishi Materials obtained the makers' approval before entering their names in the list.

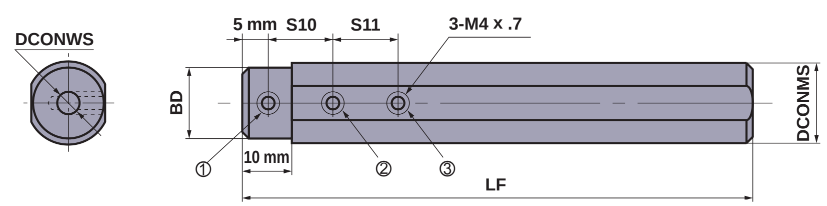
E

BORING BARS

HOLDER (METRIC SHANK STANDARD)

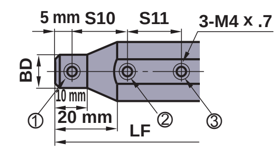
RBH

Round type holder

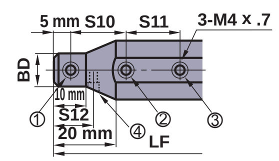


RBH16◯◯N

RBH20◯◯N
RBH25◯◯N



RBH22◯◯N



Order Number	Stock	Dimensions (mm)							Clamp Screw *				Wrench	Torque (lbf-in)
		DCONMS	DCONWS	BD	LF	S10	S11	S12	①	②	③	④		
RBH1620N	●	16	2	15	100	10	–	–	B	B	–	–	HKY20F	18 (2.0 N·m)
RBH1630N	●	16	3	15	100	10	10	–	A	A	A	–	HKY20F	18 (2.0 N·m)
RBH1640N	●	16	4	15	100	15	15	–	A	A	A	–	HKY20F	18 (2.0 N·m)
RBH1650N	●	16	5	15	100	15	15	–	A	A	A	–	HKY20F	18 (2.0 N·m)
RBH1660N	●	16	6	15	100	15	15	–	A	A	A	–	HKY20F	18 (2.0 N·m)
RBH1670N	●	16	7	15	100	20	20	–	A	A	A	–	HKY20F	18 (2.0 N·m)
RBH2020N	●	20	2	11	125	10	–	–	A	A	–	–	HKY20F	18 (2.0 N·m)
RBH2030N	●	20	3	12	125	10	10	–	A	A	B	–	HKY20F	18 (2.0 N·m)
RBH2040N	●	20	4	13	125	15	15	–	A	B	B	–	HKY20F	18 (2.0 N·m)
RBH2050N	●	20	5	14	125	15	15	–	A	B	B	–	HKY20F	18 (2.0 N·m)
RBH2060N	●	20	6	15	125	15	15	–	A	B	B	–	HKY20F	18 (2.0 N·m)
RBH2070N	●	20	7	16	125	20	20	–	A	B	B	–	HKY20F	18 (2.0 N·m)
RBH2220N	●	22	2	11	125	10	–	10	A	B	–	A	HKY20F	18 (2.0 N·m)
RBH2230N	●	22	3	12	125	10	10	10	A	B	C	A	HKY20F	18 (2.0 N·m)
RBH2240N	●	22	4	13	125	15	15	12.5	A	B	B	A	HKY20F	18 (2.0 N·m)
RBH2250N	●	22	5	14	125	15	15	12.5	A	B	B	A	HKY20F	18 (2.0 N·m)
RBH2260N	●	22	6	15	125	15	15	15	A	B	B	A	HKY20F	18 (2.0 N·m)
RBH2270N	●	22	7	16	125	20	20	15	A	B	B	A	HKY20F	18 (2.0 N·m)
RBH2520N	●	25	2	11	150	10	–	–	A	B	–	–	HKY20F	18 (2.0 N·m)
RBH2530N	●	25	3	12	150	10	10	–	A	B	C	–	HKY20F	18 (2.0 N·m)
RBH2540N	●	25	4	13	150	15	15	–	A	C	C	–	HKY20F	18 (2.0 N·m)
RBH2550N	●	25	5	14	150	15	15	–	A	C	C	–	HKY20F	18 (2.0 N·m)
RBH2560N	●	25	6	15	150	15	15	–	A	C	C	–	HKY20F	18 (2.0 N·m)
RBH2570N	●	25	7	16	150	20	20	–	A	C	C	–	HKY20F	18 (2.0 N·m)

* Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008

● : USA Stock ★ : Stocked in Japan

Memo

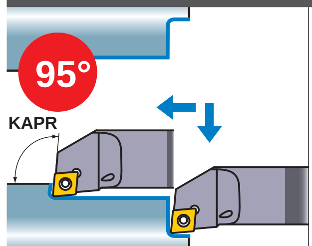
COOLANT THROUGH CARBIDE

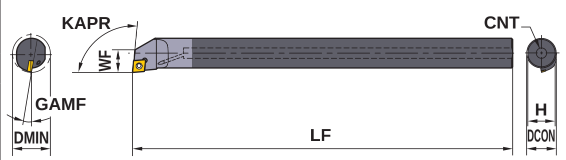
- Two wall pocket.
- 7° and 11° positive insert, low cutting force.
- Screw-on type.
- Carbide shanks are stocked in various diameters.

(inch)

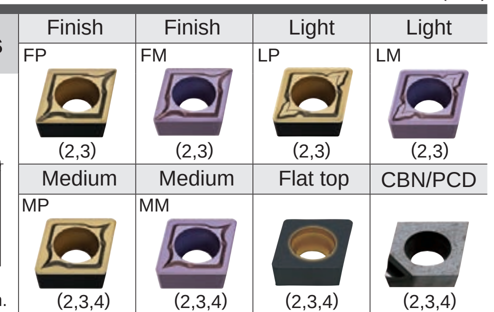
E-SCLC

Carbide Shank Coolant Through **CC◌◌inserts**





Right hand tool holder shown.



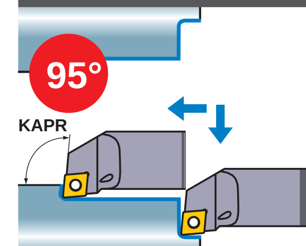
Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw *	Wrench
E05K-SCLCL2	●	CCMT CCGB CCGT CCMH CCGH CCET CCMW CCGW	21.5◌	.313	5.00	.385	.219	.295	15°	.094	.21	TS253	TKY08F
E05K-SCLCR2	●		21.5◌	.313	5.00	.385	.219	.295	15°	.094	.21	TS253	TKY08F
E06M-SCLCL2	●		21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E06M-SCLCR2	●		21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E08M-SCLCL2	●		21.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS25	TKY08F
E08M-SCLCR2	●		21.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS25	TKY08F
E10R-SCLCL2	●		21.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS25	TKY08F
E10R-SCLCR2	●		21.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS25	TKY08F
E12S-SCLCL2	●		21.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS25	TKY08F
E12S-SCLCR2	●		21.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS25	TKY08F
E08M-SCLCL3	●		32.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS4	TKY15F
E08M-SCLCR3	●		32.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS4	TKY15F
E10R-SCLCL3	●		32.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS4	TKY15F
E10R-SCLCR3	●		32.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS4	TKY15F
E12S-SCLCL3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F
E12S-SCLCR3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F

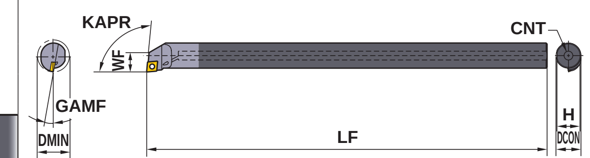
⁎ Clamp Torque (lbf-in) : TS25 = 8.9, TS253 = 8.9, TS4 = 31, TS5 = 66

(inch)

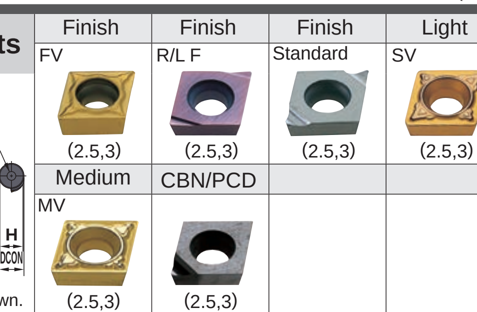
E-SCLP

Carbide Shank Coolant Through **CP◌◌inserts**





Right hand tool holder shown.



Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw *	Wrench
E06M-SCLPL2	●	CPMT CPGB CPGT CPMH	21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E06M-SCLPR2	●		21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E08R-SCLPL2	●		21.5◌	.500	8.00	.602	.313	.485	6°	.188	.71	TS25	TKY08F
E08R-SCLPR2	●		21.5◌	.500	8.00	.602	.313	.485	6°	.188	.71	TS25	TKY08F
E10S-SCLPL2	●		21.5◌	.625	10.00	.797	.406	.600	10°	.219	1.3	TS25	TKY08F
E10S-SCLPR2	●		21.5◌	.625	10.00	.797	.406	.600	10°	.219	1.3	TS25	TKY08F
E12S-SCLPL2	●		21.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS25	TKY08F
E12S-SCLPR2	●		21.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS25	TKY08F
E08R-SCLPL2.5	●		2.51.5◌	.500	8.00	.602	.313	.485	6°	.188	.71	TS3D	TKY10F
E08R-SCLPR2.5	●		2.51.5◌	.500	8.00	.602	.313	.485	6°	.188	.71	TS3D	TKY10F
E08R-SCLPL3	●		32.5◌	.500	8.00	.602	.313	.485	8°	.188	.71	TS4S	TKY15F
E08R-SCLPR3	●		32.5◌	.500	8.00	.602	.313	.485	8°	.188	.71	TS4S	TKY15F
E10S-SCLPL3	●		32.5◌	.625	10.00	.797	.406	.600	10°	.219	1.3	TS4	TKY15F
E10S-SCLPR3	●		32.5◌	.625	10.00	.797	.406	.600	10°	.219	1.3	TS4	TKY15F
E12S-SCLPL3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F
E12S-SCLPR3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F

⁎ Clamp Torque (lbf-in) : TS25 = 8.9, TS3D = 22, TS4S = 31, TS4 = 31

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● **: USA Stock**

COOLANT THROUGH CARBIDE

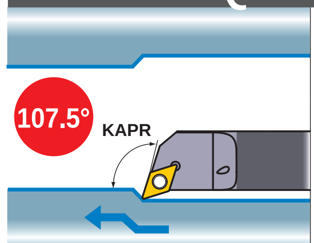
- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Carbide shanks are stocked in various diameters.

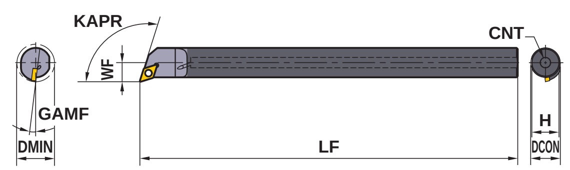
(inch)

E-SDQC

Carbide Shank Coolant Through **DC◌◌inserts**

Finish	Finish	Light	Light
FP (2,3)	FM (2,3)	LP (2,3)	LM (2,3)
Medium	**Medium**	**PCD**	**CBN**
MP (2,3)	MM (2,3)	R/L F (2,3)	(2,3)





Right hand tool holder shown.

Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw*	Wrench
E06M-SDQCL2	●	DCET DCGT DCGW DCMT DCMW	21.5◌	.375	6.00	.488	.290	.360	8°	.109	.31	TS25	TKY08F
E06M-SDQCR2	●		21.5◌	.375	6.00	.488	.290	.360	8°	.109	.31	TS25	TKY08F
E08M-SDQCL2	●		21.5◌	.500	6.00	.665	.375	.485	10°	.188	.51	TS25	TKY08F
E08M-SDQCR2	●		21.5◌	.500	6.00	.665	.375	.485	10°	.188	.51	TS25	TKY08F
E10R-SDQCL2	●		21.5◌	.625	8.00	.797	.406	.600	7°	.219	1.2	TS25	TKY08F
E10R-SDQCR2	●		21.5◌	.625	8.00	.797	.406	.600	7°	.219	1.2	TS25	TKY08F
E12S-SDQCL3	●		32.5◌	.750	10.00	.954	.500	.725	7°	.281	2.2	TS4	TKY15F
E12S-SDQCR3	●		32.5◌	.750	10.00	.954	.500	.725	7°	.281	2.2	TS4	TKY15F

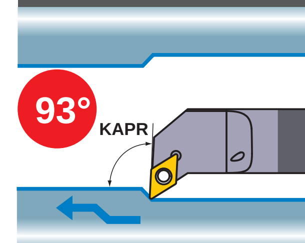
* Clamp Torque (lbf-in) : TS25 = 8.9, TS4 = 31

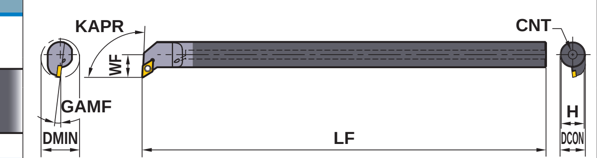
(inch)

E-SDUC

Carbide Shank Coolant Through **DC◌◌inserts**

Finish	Finish	Light	Light
FP (2,3)	FM (2,3)	LP (2,3)	LM (2,3)
Medium	**Medium**	**PCD**	**CBN**
MP (2,3,4)	MM (2,3,4)	R/L F (2,3)	(2,3)





Right hand tool holder shown.

Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw*	Wrench
E06M-SDUCL2	●	DCET DCGT DCGW DCMT DCMW	21.5◌	.375	6.00	.664	.437	.360	7°	.109	.31	TS25	TKY08F
E06M-SDUCR2	●		21.5◌	.375	6.00	.664	.437	.360	7°	.109	.31	TS25	TKY08F
E08R-SDUCL2	●		21.5◌	.500	8.00	.789	.500	.485	7°	.188	.71	TS25	TKY08F
E08R-SDUCR2	●		21.5◌	.500	8.00	.789	.500	.485	7°	.188	.71	TS25	TKY08F
E10S-SDUCL2	●		21.5◌	.625	10.00	.954	.563	.600	7°	.219	1.6	TS25	TKY08F
E10S-SDUCR2	●		21.5◌	.625	10.00	.954	.563	.600	7°	.219	1.6	TS25	TKY08F

* Clamp Torque (lbf-in) : TS25 = 8.9, TS4 = 31, TS5 = 66

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● **: USA Stock**

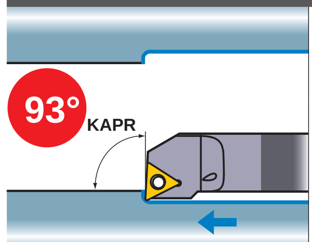
COOLANT THROUGH CARBIDE

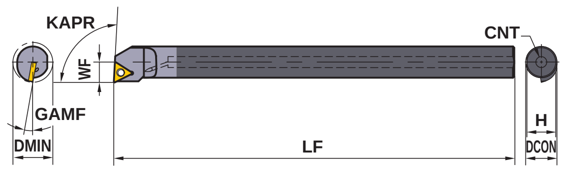
- Two wall pocket.
- 7° and 11° positive insert, low cutting force.
- Screw-on type.
- Carbide shanks are stocked in various diameters.

(inch)

E-STUC

Carbide Shank Coolant Through **TC◌◌inserts**





Right hand tool holder shown.

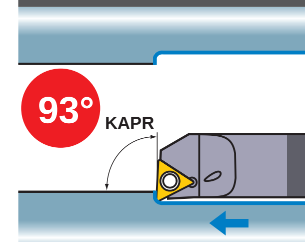
Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw *	Wrench
E06M-STUCL2	●	TCGT TCGW TCMT TCMW	21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E06M-STUCR2	●		21.5◌	.375	6.00	.477	.250	.360	15°	.109	.31	TS25	TKY08F
E08M-STUCL2	●		21.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS25	TKY08F
E08M-STUCR2	●		21.5◌	.500	6.00	.602	.313	.485	13°	.188	.51	TS25	TKY08F
E10R-STUCL2	●		21.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS25	TKY08F
E10R-STUCR2	●		21.5◌	.625	8.00	.797	.406	.600	10°	.219	1.2	TS25	TKY08F
E12S-STUCL3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F
E12S-STUCR3	●		32.5◌	.750	10.00	.954	.500	.725	8°	.281	2.2	TS4	TKY15F

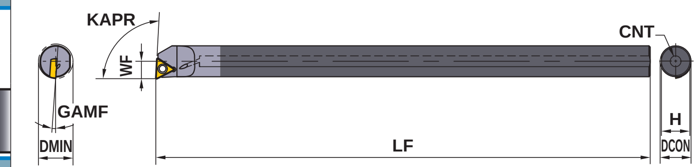
⋆ Clamp Torque (lbf-in) : TS25 = 8.9, TS4 = 31

(inch)

E-STUP

Carbide Shank Coolant Through **TP◌◌inserts**





Right hand tool holder shown.

Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw *	Wrench
E05K-STUPL1.5	●	TPMH TPMX TPGB TPGH TPGX	1.51.5◌	.313	5.00	.402	.196	.295	10°	.094	.21	TS2D	TKY06F
E05K-STUPR1.5	●		1.51.5◌	.313	5.00	.402	.196	.295	10°	.094	.21	TS2D	TKY06F
E06M-STUPL1.8	●		1.81.5◌	.375	6.00	.450	.227	.360	8°	.109	.31	TS25D	TKY08F
E06M-STUPR1.8	●		1.81.5◌	.375	6.00	.450	.227	.360	8°	.109	.31	TS25D	TKY08F
E08R-STUPL1.8	●		1.81.5◌	.500	8.00	.580	.290	.485	7°	.188	.71	TS25D	TKY08F
E08R-STUPR1.8	●		1.81.5◌	.500	8.00	.580	.290	.485	7°	.188	.71	TS25D	TKY08F
E10S-STUPL2	●		22◌	.625	10.00	.700	.352	.600	4°	.219	1.6	TS31D	TKY10F
E10S-STUPR2	●		22◌	.625	10.00	.700	.352	.600	4°	.219	1.6	TS31D	TKY10F
E12S-STUPL2	●		22◌	.750	10.00	.825	.414	.725	0°	.281	2.2	TS31D	TKY10F
E12S-STUPR2	●		22◌	.750	10.00	.825	.414	.725	0°	.281	2.2	TS31D	TKY10F

⋆ Clamp Torque (lbf-in) : TS2D = 5.3, TS25D = 8.9, TS31D = 22

Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : USA Stock

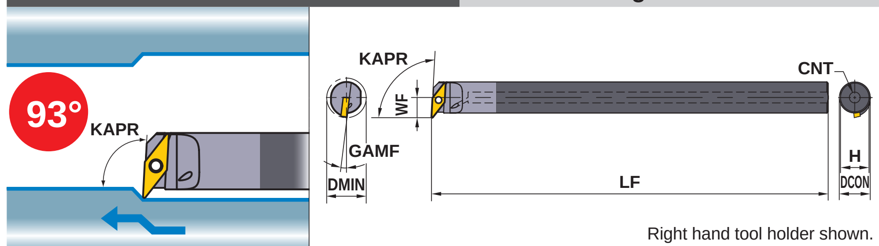
COOLANT THROUGH CARBIDE

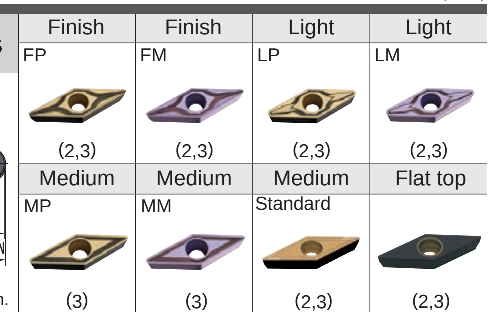
- Two wall pocket.
- 7° positive insert, low cutting force.
- Screw-on type.
- Carbide shanks are stocked in various diameters.

(inch)

E-SVUC

Carbide Shank Coolant Through **VC◌◌inserts**





Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw*	Wrench
E10R-SVUCL2	●	VCMT VCGT VCGW VCMW	22◌	.625	8.00	.831	.508	.600	7°	.219	1.2	TS25	TKY08F
E10R-SVUCR2	●		22◌	.625	8.00	.831	.508	.600	7°	.219	1.2	TS25	TKY08F
E12S-SVUCL2	●		22◌	.750	10.00	.985	.600	.725	7°	.281	2.2	TS25	TKY08F
E12S-SVUCR2	●		22◌	.750	10.00	.985	.600	.725	7°	.281	2.2	TS25	TKY08F

* Clamp Torque (lbf-in) : TS25 = 8.9, TS4 = 31

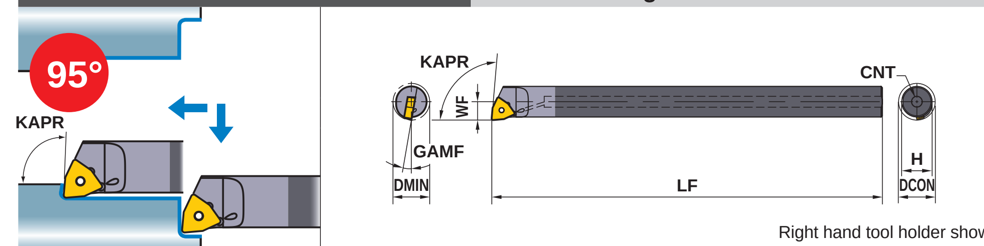
Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

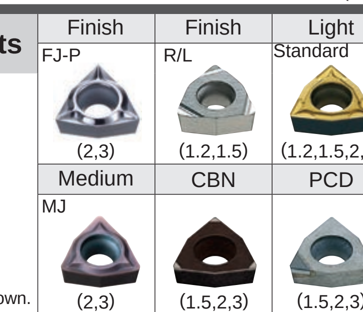
● : USA Stock

(inch)

E-SWLO

Carbide Shank Coolant Through **WC◌◌inserts**





Order Number	Stock	Insert Number		DCON	LF	DMIN	WF	H	GAMF	CNT	WT (lbs)	Clamp Screw*	Wrench
E04H-SWLOL1.2	●	WCMT WCMW WCGT WCGW	1.21◌	.250	4.00	.313	.156	.235	17°	.078	.11	TS2	TKY06F
E04H-SWLOR1.2	●		1.21◌	.250	4.00	.313	.156	.235	17°	.078	.11	TS2	TKY06F
E05M-SWLOL1.2	●		1.21◌	.313	6.00	.375	.188	.295	15°	.094	.26	TS21	TKY06F
E05M-SWLOR1.2	●		1.21◌	.313	6.00	.375	.188	.295	15°	.094	.26	TS21	TKY06F
E05M-SWLOL1.5	●		1.51.5◌	.313	6.00	.375	.188	.295	15°	.094	.26	TS2	TKY06F
E05M-SWLOR1.5	●		1.51.5◌	.313	6.00	.375	.188	.295	15°	.094	.26	TS2	TKY06F
E05K-SWLOL2	●		21.5◌	.313	5.00	.406	.203	.295	15°	.094	.21	TS25	TKT08F
E05K-SWLOR2	●		21.5◌	.313	5.00	.406	.203	.295	15°	.094	.21	TS25	TKT08F
E06M-SWLOL2	●		21.5◌	.375	6.00	.438	.218	.358	15°	.109	.31	TS25	TKT08F
E06M-SWLOR2	●		21.5◌	.375	6.00	.438	.218	.358	15°	.109	.31	TS25	TKT08F
E08M-SWLOL2	●		21.5◌	.500	6.00	.625	.312	.480	13°	.188	.51	TS25	TKT08F
E08M-SWLOR2	●		21.5◌	.500	6.00	.625	.312	.480	13°	.188	.51	TS25	TKT08F
E10R-SWLOL3	●		32.5◌	.625	8.00	.750	.375	.600	10°	.219	1.0	TS4	TKY15F
E10R-SWLOR3	●		32.5◌	.625	8.00	.750	.375	.600	10°	.219	1.0	TS4	TKY15F
E12S-SWLOL3	●		32.5◌	.750	10.00	1.000	.500	.725	8°	.281	1.7	TS4	TKY15F
E12S-SWLOR3	●		32.5◌	.750	10.00	1.000	.500	.725	8°	.281	1.7	TS4	TKY15F

* Clamp Torque (lbf-in) : TS2 = 5.3, TS21 = 5.3, TS25 = 8.9, TS4 = 31

RECOMMENDED CUTTING CONDITIONS

(inch)

				Case 1			Case 2		
Heavy Metal Shank				L/D ≤ 3			3 < L/D ≤ 4		
Steel Shank				L/D ≤ 3			3 < L/D ≤ 4		
Carbide Shank				L/D ≤ 5			5 < L/D ≤ 8		
Work Material		Hardness	Cutting Mode	**vc** (SFM)	**f** (IPR)	**ap**	**vc** (SFM)	**f** (IPR)	**ap**
P	Carbon Steel Alloy Steel	180 – 280 HB	Light Cutting	295 – 525	.002 – .006	.008	260 – 490	.002 – .006	.008
			Medium Cutting	195 – 395	.006 – .014	.118	165 – 360	.004 – .008	.059
M	Stainless Steel	≤ 200 HB	Light Cutting	330 – 590	.002 – .006	.008	330 – 590	.002 – .006	.008
			Medium Cutting	165 – 295	.006 – .010	.079	130 – 260	.004 – .008	.039
K	Cast Iron	Tensile Strength ≤ 350 MPa	Light Cutting	295 – 525	.002 – .006	.020	330 – 590	.004 – .006	.020
			Medium Cutting	195 – 390	.006 – .010	.079	130 – 260	.006 – .010	.060
N	Aluminum Alloy	–	Light Cutting	655 – 1310	.002 – .006	.008	665 – 1310	.002 – .006	.008
			Medium Cutting	490 – 820	.002 – .006	.079	490 – 820	.002 – .006	.059

Memo

HOW TO READ THE STANDARD OF GROOVING AND CUTTING OFF

●How this section page is organized

①Classified according to external or internal applications.
②Sub-classified according to product series.
(Refer to the index on the next page.)

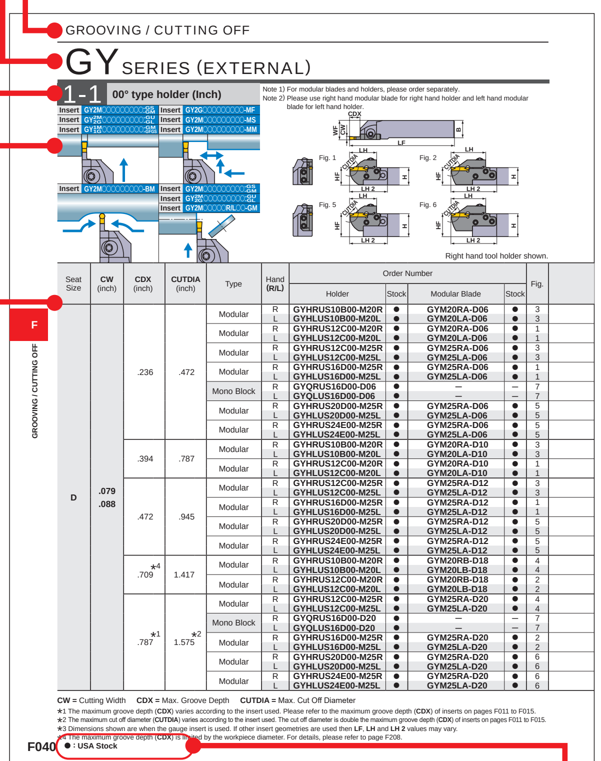
[For External Grooving / Cutting Off]

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict available machining applications such as cutting off, grooving, and copying.

INDICATION OF HOLDER TYPE ACCORDING TO APPLICATION
indicates the holder types, such as the standard type or the L type, according to machining application.

TITLE OF PRODUCT

PRODUCT SECTION



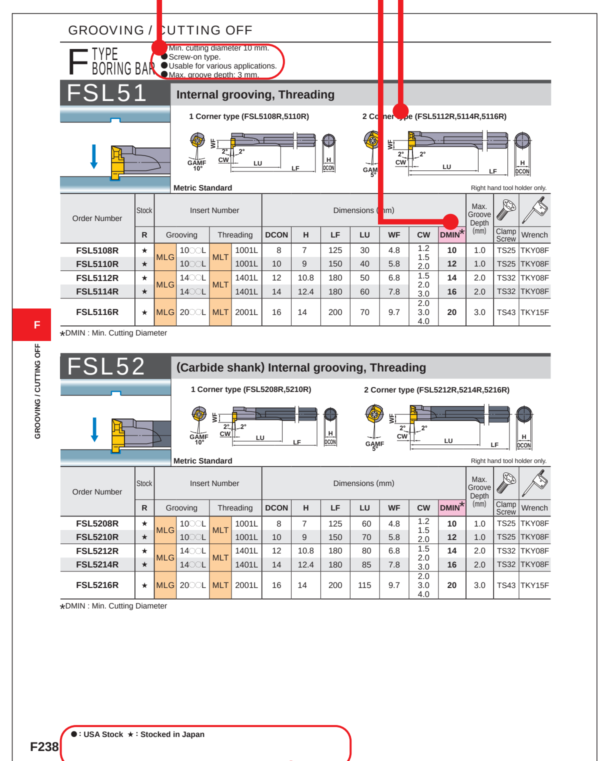
PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), holders, Modular Blade, cutting widths, maximum groove depths, maximum cut-off diameters, dimensions, applicable inserts, and cutting edge shapes.

[For Internal Grooving]

PRODUCT FEATURES

MIN. CUTTING DIAMETER
is colour-coded to let you find, at a glance, the minimum cutting diameters for internal machining.

GEOMETRY



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

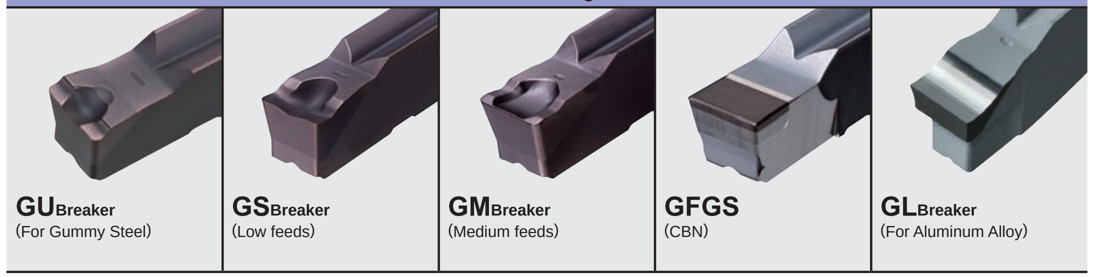
●To Order : For holder, please specify order number and hand of tool (right/left).
For insert, please specify insert number and grade.

TURNING TOOLS

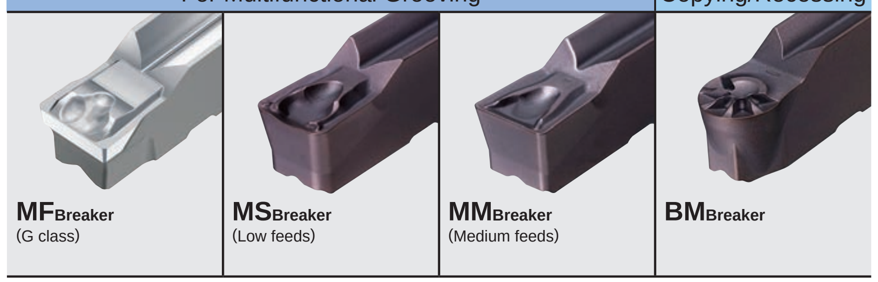
GROOVING AND CUTTING OFF

INSERT BREAKER SYSTEM

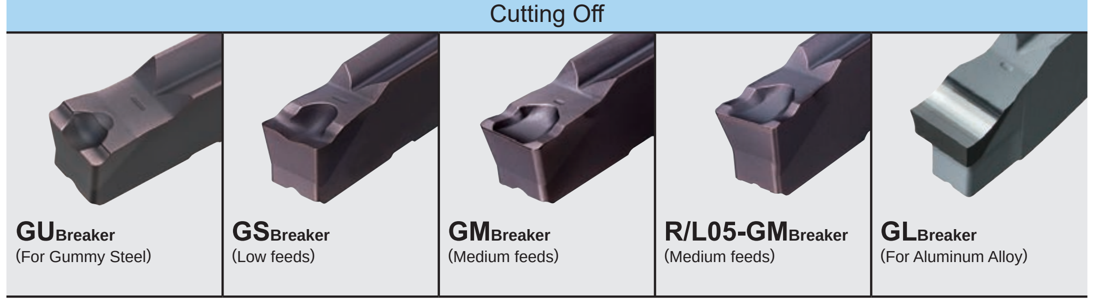
Grooving



For Multifunctional Grooving | Copying/Recessing



Cutting Off

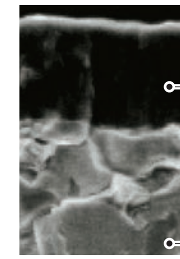


INSERT GRADE

Machining Condition \ Work Material	P Steel	M Stainless Steel	K Cast Iron	N Aluminum Alloy	S Heat resistant Alloy / Titanium Alloy	H Hardened Steel
Stable	NX2525					BC8110 / MB8025
	MY5015		MY5015	RT9010	VP10RT / RT9010	
Machining Condition	VP10RT	VP10RT	VP10RT			
Unstable	VP20RT	VP20RT	VP20RT		VP20RT	

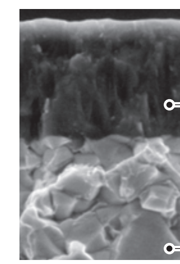
Note1) VP20RT is the first recommended grade for materials other than hardened steels.
Note2) For RT9010, VP10RT, VP20RT and MY5015, wet cutting is recommended.

VP20RT (1st Recommendation)



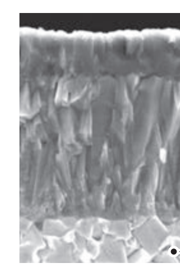
● PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

VP10RT (2nd Recommendation)



● PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult to cut materials and for extending tool life.

MY5015



● MY5015 is a CVD coated grade with excellent wear resistance even at high temperatures. It provides longer tool life when machining cast and ductile cast irons. Also suitable for high speed continuous cutting of steels.

RT9010

● First recommended grade for titanium and aluminum alloys.

NX2525

● NX2525, a cermet grade for finish machining of steels and for good surface finishes at lower cutting speeds.

BC8110

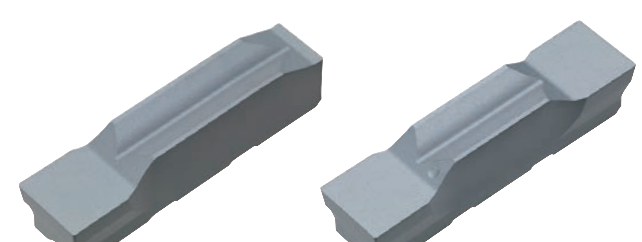
● A CBN coated grade for continuous cutting, which provides longer life when machining hardened steel.

MB8025

● MB8025 is a sintered CBN grade for hardened steel.

BLANK INSERTS

● Blank inserts for custom grinding



*1 Insert blank is not suitable for machining without grinding.

RT9010/RT9020 for blank insert

● First recommendation for blanks inserts is RT9020 due to the tougher carbide substrate that is suitable for a wider range of applications.
RT9010 has a harder substrate than RT9020 and is ideal for longer tool life on stable cutting applications.
Both grades are recommended to have a coating applied that is suitable for the required application.

IDENTIFICATION OF GY SERIES

■INSERT

①	②	③	④	⑤	⑥	⑦	⑧		⑨	⑩
GY	2	M	0300	F	030	N	05	–	M	F

①Series Description

②Number of Teeth	
1	1 Edge Type
2	2 Edge Type

③Peripheral	
G	Ground
M	Sintered
B	Blank

④Groove Width	Inch	Metric
0150	.059"	1.50 mm
0200	.079"	2.00 mm
⋮	⋮	⋮
0800	.315"	8.00 mm

⑤Seat Size *1	Inch	Metric
C	.059"	1.50 mm
D	.079" .088"	2.00 mm 2.24 mm
E	.094" .098" .108"	2.39 mm 2.50 mm 2.74 mm
F	.118" .125" .128"	3.00 mm 3.18 mm 3.24 mm
G	.157" .167"	4.00 mm 4.24 mm
H	.187" .197" .206"	4.75 mm 5.00 mm 5.24 mm
J	.236" .248" .250"	6.00 mm 6.31 mm 6.35 mm
K	.315"	8.00 mm

⑥Corner Radius	Inch	Metric
010	.004"	0.10 mm
015	.006"	0.15 mm
⋮	⋮	⋮
400	.157"	4.00 mm

⑦Hand	
N	Neutral
R	Right
L	Left

⑧Lead angle (R/L type insert)	
05	5°

⑨Application 1	
G	Grooving/Cutting off
M	Multifunctional
B	Copying (Ball nose)

⑩Application 2	
U	For Gummy Steel
F	Finishing
S	Low feeds
M	Medium feeds

■CBN INSERT

①	②	③	④	⑤	⑥	⑦		⑨	⑪	⑫
GY	1	G	0300	F	020	N	–	G	F	GS

⑪Application 3	
F	Flat Top

⑫Honing Type	
GS	General Purpose

*1 Select a seat size with the same symbol as that of the modular blade and mono block holder.

■MODULAR BLADE

●EXTERNAL/INTERNAL/RECESSING

①	②	③	④		⑤	⑥
GY	M25	R	A	–	F	12 *3

①Series Description

②Modular Blade Size
M20
M25

③Hand	
R	Right
L	Left

④Modular Blade Type	
A	Standard Type
B	Reinforced Type
C	External Recessing
D	Face Grooving

⑤Seat Size *1	Inch	Metric
D	.079" .088"	2.00 mm 2.24 mm
E	.094" .098" .108"	2.39 mm 2.50 mm 2.74 mm
F	.118" .125" .128"	3.00 mm 3.18 mm 3.24 mm
G	.157" .167"	4.00 mm 4.24 mm
H	.187" .197" .206"	4.75 mm 5.00 mm 5.24 mm
J	.236" .248" .250"	6.00 mm 6.31 mm 6.35 mm

⑥Max. Groove Depth *2	Inch	Metric
005	.197"	0.5 mm
06	.236"	6 mm
⋮	⋮	⋮
25	.984"	25.0 mm

●FACE GROOVING

①	②	③	④		⑤	⑥		⑦
GY	M25	R	D	–	F	12	–	050

⑦Min. Groove Diameter	Inch	Metric
035	1.378"	35 mm
040	1.575"	40 mm
⋮	⋮	⋮
250	9.843"	250 mm

*1 Select a seat size with the same symbol as that of the insert.
*2 The maximum groove depth is a value when used for external grooving and changes according to the insert used.
*3 GYM20R/LA-◌10, GYM20R/LA-◌12, GYM25R/LA-◌12 and GYM25R/LA-◌14 can be used for both external and internal grooving.

F
GROOVING / CUTTING OFF

■EXTERNAL/FACE GROOVING/RECESSING

●MONO BLOCK HOLDER

	①	②	③	④	⑤	⑥		⑦	⑧
(Inch)	GY	P	R	US16	D	00	–	K	25
(Metric)				2525	M				

①Series Description

②Holder Type	
S	Mono Block Holder for Swiss Style Lathe
P	Offset Mono Block Holder
Q	Zero Offset Mono Block Holder
H	Modular Type Holder

③Hand of Holder	
R	Right
L	Left

④Holder Size	Inch		Metric
US06	.375"x.375"	1010	10 mmx10 mm
US08	.500"x.500"	1212	12 mmx12 mm
US10	.625"x.625"	1616	16 mmx16 mm
US12	.750"x.750"	2012	20 mmx12 mm
US16	1.000"x1.000"	2020	20 mmx20 mm
US20	1.250"x1.250"	2525	25 mmx25 mm
US24	1.500"x1.500"	3225	32 mmx25 mm
		3232	32 mmx32 mm

⑤Holder Length	Inch		Metric
B	4.5"	J	110 mm
C	5.0"	JX	120 mm
D	6.0"	K	125 mm
E	7.0"	M	150 mm
		P	170 mm

⑥Angle (degree)	
00	0°
50	50°
90	90°

⑦Seat Size *1	Inch	Metric
C	.059"	1.50 mm
D	.079" .088"	2.00 mm 2.24 mm
E	.094" .098" .108"	2.39 mm 2.50 mm 2.74 mm
F	.118" .125" .128"	3.00 mm 3.18 mm 3.24 mm
G	.157" .167"	4.00 mm 4.24 mm
H	.187" .197" .206"	4.75 mm 5.00 mm 5.24 mm
J	.236" .248" .250"	6.00 mm 6.31 mm 6.35 mm
K	.315"	8.00 mm

⑧Max. Grooving Depth	Inch	Metric
06	.236"	6 mm
08	.315"	8 mm
⋮	⋮	⋮
25	.984"	25 mm

●MODULAR TYPE HOLDER

	①	②	③	④	⑤	⑥		⑨	⑩
(Inch)	GY	H	R	US16	M	00	–	M25	R
(Metric)				2525					

⑨Modular Blade Size
M20
M25

⑩Hand of Modular Blade	
R	Right
L	Left

*1 Select a seat size with the same symbol as that of the insert.

■INTERNAL

●MONO BLOCK HOLDER

	①	②	③	④	⑤	⑥	⑦		⑧	⑨
(Inch)	GY	A	R	US16	K	90	A	–	F	06
(Metric)				20						

①Series Description

②Holder Type	
A	Mono Block
D	Modular Type Holder

③Hand of Holder	
R	Right
L	Left

④Shank Size	Inch		Metric
US12	.750"	20	20 mm
US16	1.000"	25	25 mm
US20	1.250"	32	32 mm
US24	1.500"	40	40 mm
US32	2.000"	50	50 mm

⑤Holder Length	Inch	Metric
K	5.0"	125 mm
L	5.5"	140 mm
M	6.0"	150 mm
P	6.75"	170 mm
Q	7.0"	180 mm
R	8.0"	200 mm
S	10.0"	250 mm
T	12.0"	300 mm

⑥Angle (degree)	
90	90°

⑦Neck Length	Inch	Metric
A	1.250"	30 mm
B	1.500"	40 mm
C	2.000"	50 mm
D	2.500"	60 mm
F	3.250"	80 mm

⑧Seat Size *1	Inch	Metric
D	.079" .088"	2.00 mm 2.24 mm
E	.094" .098" .108"	2.39 mm 2.50 mm 2.74 mm
F	.118" .125" .128"	3.00 mm 3.18 mm 3.24 mm
G	.157" .167"	4.00 mm 4.24 mm
H	.187" .197" .206"	4.75 mm 5.00 mm 5.24 mm
J	.236" .248" .250"	6.00 mm 6.31 mm 6.35 mm

⑨Max. Grooving Depth	Inch	Metric
06	.236"	6 mm
07	.276"	7 mm

●MODULAR TYPE HOLDER

	①	②	③	④	⑤	⑥	⑦		⑩	⑪
(Inch)	GY	D	R	US20	M	90	D	–	M25	L
(Metric)				40						

⑩Modular Blade Size
M20
M25

⑪Hand of Modular Blade	
R	Right
L	Left

*1 Select a seat size with the same symbol as that of the insert.

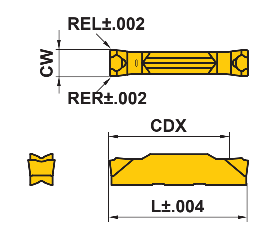
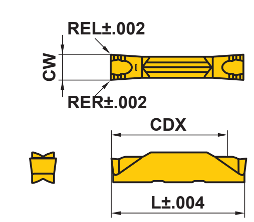
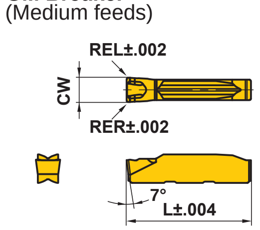
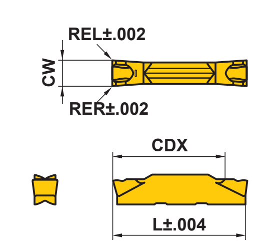
F
GROOVING / CUTTING OFF

Memo

GY SERIES INSERTS

INSERTS

(inch)

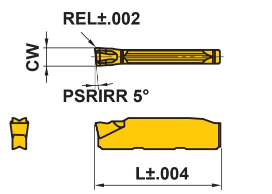
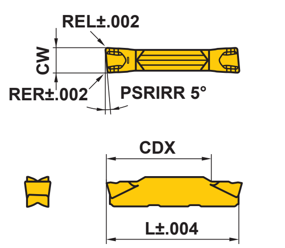
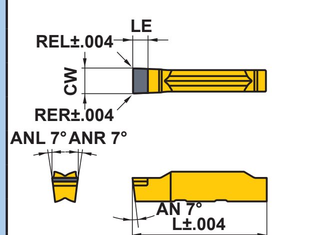
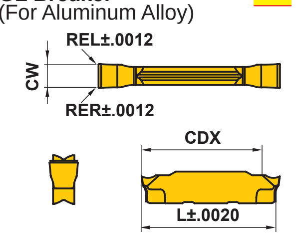
Applications	Geometry	Order Number	Stock: Coated VP10RT	Coated VP20RT	Coated MY5015	Cermet NX2525	Cermet	Carbide RT9010	Carbide RT9020	CBN BC8110	CBN MB8025	Seat Size	CW Grooving Width	CW Tolerance	RER/L	CDX	L *2
For Grooving / Cutting off	**GU Breaker** (For Gummy Steel) 	GY2M0200D020N-GU	●	●		●						D	.079	±.0012	.008	.776	.815
		GY2M0239E020N-GU	●	●		●						E	.094	±.0012	.008	.780	.815
		GY2M0250E020N-GU	●	●		●						E	.098	±.0012	.008	.768	.815
		GY2M0300F030N-GU	●	●		●						F	.118	±.0012	.012	.760	.815
		GY2M0318F030N-GU	●	●		●						F	.125	±.0012	.012	.760	.815
	GS Breaker (Low feeds) 	GY2M0150C010N-GS	●	●		●						C	.059	±.0012	.004	.528	.579
		GY2M0200D020N-GS	●	●		●						D	.079	±.0012	.008	.736	.815
		GY2M0239E020N-GS	●	●		●						E	.094	±.0012	.008	.728	.815
		GY2M0250E020N-GS	●	●		●						E	.098	±.0012	.008	.728	.815
		GY2M0300F020N-GS	●	●		●						F	.118	±.0012	.008	.728	.815
		GY2M0318F020N-GS	●	●		●						F	.125	±.0012	.008	.728	.815
	GM Breaker (Medium feeds) 	GY1M0200D020N-GM	●	●	●							D	.079	±.0012	.008	–	.815
		GY1M0250E020N-GM	●	●	●							E	.098	±.0012	.008	–	.815
		GY1M0300F030N-GM	●	●	●							F	.118	±.0012	.012	–	.815
	GM Breaker (Medium feeds) 	GY2M0150C020N-GM	●	●		●						C	.059	±.0012	.008	.547	.579
		GY2M0200D020N-GM	●	●	●	●						D	.079	±.0012	.008	.764	.815
		GY2M0239E020N-GM	●	●	●	●						E	.094	±.0012	.008	.764	.815
		GY2M0250E020N-GM	●	●	●	●						E	.098	±.0012	.008	.764	.815
		GY2M0300F030N-GM	●	●	●	●						F	.118	±.0012	.012	.764	.815
		GY2M0318F030N-GM	●	●	●	●						F	.125	±.0012	.012	.764	.815

●: USA Stock
<10 inserts in one case>

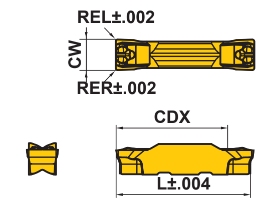
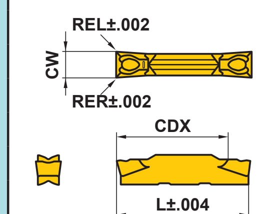
GY SERIES INSERTS

INSERTS

(inch)

Applications	Geometry	Order Number	Stock									Seat Size	CW		RER/L	CDX	*2	
			Coated			Cermet		Carbide		CBN								
			VP10RT	VP20RT	MY5015	NX2525		RT9010	RT9020	BC8110	MB8025		Grooving Width	Tolerance			L	LE
For Cutting off	**R/L05-GM Breaker**  Right hand insert shown.	GY1M0200D020R05-GM	●	●								D	.079	±.0012	.008	–	.819	–
		GY1M0200D020L05-GM	●	●								D	.079	±.0012	.008	–	.819	–
		GY1M0300F030R05-GM	●	●								F	.118	±.0012	.012	–	.821	–
		GY1M0300F030L05-GM	●	●								F	.118	±.0012	.012	–	.821	–
	R/L05-GM Breaker  Right hand insert shown.	GY2M0200D020R05-GM	●	●								D	.079	±.0012	.008	.768	.819	–
		GY2M0200D020L05-GM	●	●								D	.079	±.0012	.008	.768	.819	–
		GY2M0250E020R05-GM	●	●								E	.098	±.0012	.008	.768	.820	–
		GY2M0250E020L05-GM	●	●								E	.098	±.0012	.008	.768	.820	–
		GY2M0300F030R05-GM	●	●								F	.118	±.0012	.012	.768	.821	–
		GY2M0300F030L05-GM	●	●								F	.118	±.0012	.012	.768	.821	–
For Grooving	**Flat Top** (For Hardened Steel) 	GY1G0200D020N-GFGS								●	●	D	.079	±.0012	.008	–	.815	.106
		GY1G0239E020N-GFGS								●	●	E	.094	±.0012	.008	–	.815	.106
		GY1G0250E020N-GFGS								●	●	E	.098	±.0012	.008	–	.815	.106
		GY1G0300F020N-GFGS								●	●	F	.118	±.0012	.008	–	.815	.106
		GY1G0318F020N-GFGS								●	●	F	.125	±.0012	.008	–	.815	.106
For Grooving / Cutting Off	**GL Breaker** NEW (For Aluminum Alloy) 	GY2G0200D005N-GL						●				D	.079	±.0008	.002	.768	.829	–
		GY2G0250E005N-GL						●				E	.098	±.0008	.002	.752	.829	–
		GY2G0300F005N-GL						●				F	.118	±.0008	.002	.744	.829	–

(inch)

Applications	Geometry	Order Number	Stock									Seat Size	CW		RER/L	CDX	*2
			Coated			Cermet		Carbide		CBN							
			VP10RT	VP20RT	MY5015	NX2525		RT9010	RT9020	BC8110	MB8025		Grooving Width	Tolerance			L
For Multifunctional Grooving	**MF Breaker** (Finishing) 	GY2G0200D020N-MF	●	●		●		●				D	.079	±.0008	.008	.768	.829
		*1GY2G0224D015N-MF	●	●		●		●				D	.088	±.0008	.006	.780	.829
		GY2G0239E020N-MF	●	●		●		●				E	.094	±.0008	.008	.756	.829
		GY2G0250E020N-MF	●	●		●		●				E	.098	±.0008	.008	.764	.829
		*1GY2G0274E020N-MF	●	●		●		●				E	.108	±.0008	.008	.776	.829
		GY2G0300F020N-MF	●	●		●		●				F	.118	±.0008	.008	.768	.829
		GY2G0300F040N-MF	●	●		●		●				F	.118	±.0008	.016	.760	.829
		GY2G0318F020N-MF	●	●		●		●				F	.125	±.0008	.008	.768	.829
		GY2G0318F040N-MF	●	●		●		●				F	.125	±.0008	.016	.760	.829
		*1GY2G0324F020N-MF	●	●		●		●				F	.128	±.0008	.008	.768	.829
	MS Breaker (Low feeds) 	GY2M0200D020N-MS	●	●	●	●						D	.079	±.0012	.008	.752	.815
		GY2M0250E020N-MS	●	●	●	●						E	.098	±.0012	.008	.752	.815
		GY2M0300F020N-MS	●	●	●	●						F	.118	±.0012	.008	.756	.815
		GY2M0300F040N-MS	●	●	●	●						F	.118	±.0012	.016	.744	.815

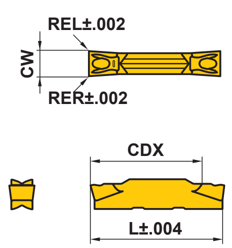
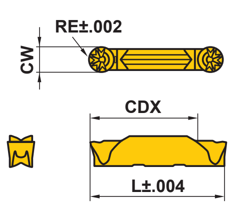
*1 Groove width corresponding to the circlip.

● : USA Stock
<10 inserts in one case> <CBN inserts are available in 1 piece in one case.>

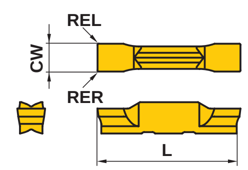
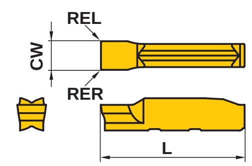
GY SERIES INSERTS

INSERTS

(inch)

Applications	Geometry	Order Number	VP10RT	VP20RT	MY5015	NX2525		RT9010	RT9020	BC8110	MB8025	Seat Size	CW Grooving Width	CW Tolerance	RE RER/L	CDX	L ★2
			Stock: Coated	Coated	Coated	Cermet	Cermet	Carbide	Carbide	CBN	CBN						
For Multifunctional Grooving	MM Breaker (Medium feeds) 	GY2M0200D020N-MM	●	●	●	●						D	.079	±.0012	.008	.752	.815
		GY2M0250E020N-MM	●	●	●	●						E	.098	±.0012	.008	.752	.815
		GY2M0300F020N-MM	●	●	●	●						F	.118	±.0012	.008	.752	.815
		GY2M0300F040N-MM	●	●	●	●						F	.118	±.0012	.016	.744	.815
		GY2M0300F080N-MM	●	●	●	●						F	.118	±.0012	.031	.728	.815
For Copying / Recessing	BM Breaker 	GY2M0200D100N-BM	●	●	●	●						D	.079	±.0012	.039	.768	.815
		GY2M0250E125N-BM	●	●	●	●						E	.098	±.0012	.049	.760	.815
		GY2M0300F150N-BM	●	●	●	●						F	.118	±.0012	.059	.748	.823
		GY2M0318F159N-BM	●	●	●	●						F	.125	±.0012	.063	.744	.823

(inch)

Applications	Geometry	Order Number	NX2525		RT9010	RT9020	Seat Size	CW Grooving Width	CW Tolerance	RER/L	L
			Stock: Cermet	Cermet	Carbide	Carbide					
Blank ★1	2 Edge Type 	GY2B0220D020N	★		★	★	D	.087	± .0039	.008	.829
		NEW GY2B0250D020N	★		★	★	D	.100	± .0039	.008	.838
		GY2B0270E020N	★		★	★	E	.106	± .0039	.008	.829
		NEW GY2B0300E020N	★		★	★	E	.120	± .0039	.008	.838
		GY2B0340F020N	★		★	★	F	.134	± .0039	.008	.829
		NEW GY2B0360F020N	★		★	★	F	.144	± .0039	.008	.838
	1 Edge Type 	GY1B0220D020N	★		★	★	D	.087	± .0039	.008	.830
		GY1B0270E020N	★		★	★	E	.106	± .0039	.008	.831
		GY1B0340F020N	★		★	★	F	.134	± .0039	.008	.827

★1 Insert blank is not suitable for machining without grinding.

REFERENCE DATA

L dimension tolerance conversion table

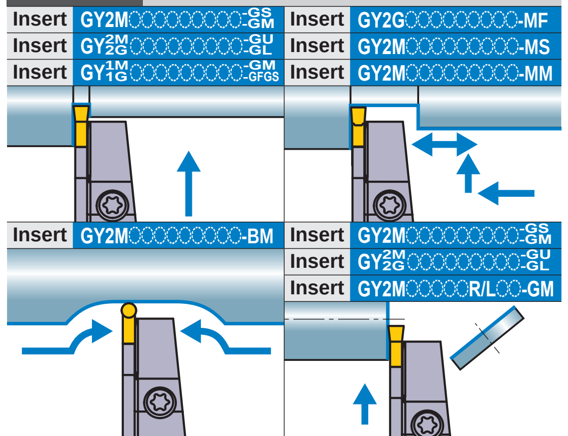
Grooving Width CW	Dimensions ★1 L (inch)	GU	GS/GM	MS/MM	R/L-GM	Flat Top	MF	BM	GL
		Dimensional tolerance (inch) versus standard dimension (L) of each breaker ★2							
.059", 1.50 mm	.579		0						
.079", 2.00 mm	.815	0	0	0	.004	-.012	.014	.008	.014
.088", 2.24 mm	★3 (.815)						.014		
.094", 2.39 mm	.815	0	0			-.012	.014		
.098", 2.50 mm	.815	0	0	0	.005	-.012	.014	.008	.014
.108", 2.74 mm	★3 (.815)						.014		
.118", 3.00 mm	.815	0	0	0	.006	-.012	.014	.008	.014
.125", 3.18 mm	.815	0	0			-.012	.014	.008	
.128", 3.24 mm	★3 (.815)						.014		
.157", 4.00 mm	1.010	0	0	0	.008	-.014	.012	.006	
.167", 4.24 mm	★3 (1.010)						.012		
.187", 4.75 mm	1.010	0	0			-.014	.012	.006	
.197", 5.00 mm	1.010	0	0	0	.012	-.014	.012	.006	
.206", 5.24 mm	★3 (1.010)						.012		
.236", 6.00 mm	1.010	0	0	0			.012	.010	
.248", 6.31 mm	★3 (1.010)						.012		
.250", 6.35 mm	1.010	0	0				.012	.010	
.315", 8.00 mm	1.201		0	0				.012	

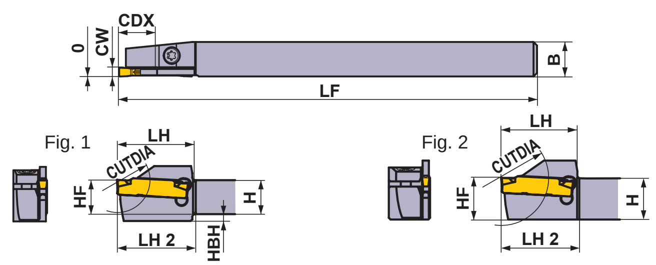
★1 This value is used at the described holder dimension.
★2 ▢ when there is no applicable breaker.
★3 The dimension is the value for approximate cutting width.

● : USA Stock ★ : Stocked in Japan
<10 inserts in one case> <CBN inserts are available in 1 piece in one case.>

GY SERIES (EXTERNAL GROOVING for Swiss style lathes)

1-1 00° type holder (Inch)





Right hand tool holder shown.

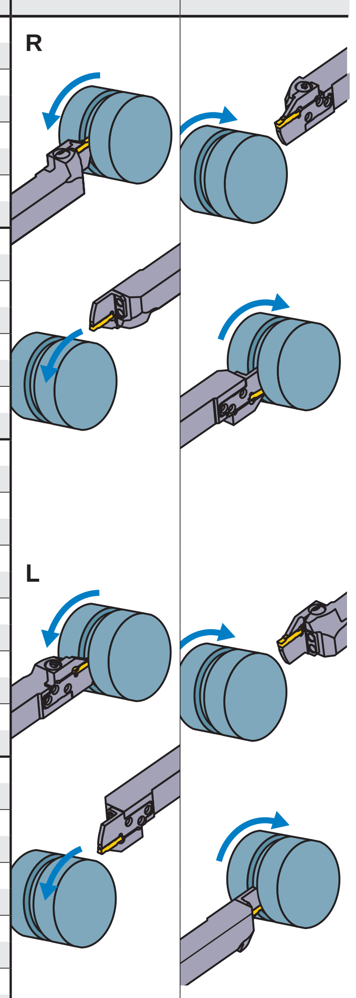
SPARE PARTS

Holder Number	Clamp Screw	Wrench
GYSR/LUS06B00-○11	CS350990T (Clamp Torque : 22 lbf-in)	TKY10R
GYSR/LUS08B00-○13		
GYSR/LUS10B00-○18	TS4SBL (Clamp Torque : 31 lbf-in)	TKY15R
GYSR/LUS12B00-○17		

Seat Size	CW (inch)	CDX (inch) ⋆4	CUTDIA (inch)	Type	Hand (R/L)	Order Number Holder	Stock	Fig.	H	B	LF	LH	LH 2	HF	HBH
C	.059	.433	.866	Mono Block	R	GYSRUS06B00-C11	●	1	.375	.375	4.500	.866	.620	.375	.125
					L	GYSLUS06B00-C11	●	1	.375	.375	4.500	.866	.620	.375	.125
		.512	1.024	Mono Block	R	GYSRUS08B00-C13	●	2	.500	.500	4.500	.866	.620	.500	–
					L	GYSLUS08B00-C13	●	2	.500	.500	4.500	.866	.620	.500	–
		.669 ⋆1	1.338 ⋆2	Mono Block	R	GYSRUS10B00-C17	●	2	.625	.625	4.500	1.063	.638	.625	–
					L	GYSLUS10B00-C17	●	2	.625	.625	4.500	1.063	.638	.625	–
				Mono Block	R	GYSRUS12B00-C17	●	2	.750	.750	4.500	1.102	.638	.750	–
					L	GYSLUS12B00-C17	●	2	.750	.750	4.500	1.102	.638	.750	–
D	.079 .088	.433	.866	Mono Block	R	GYSRUS06B00-D11	●	1	.375	.375	4.500	.866	.899	.375	.125
					L	GYSLUS06B00-D11	●	1	.375	.375	4.500	.866	.899	.375	.125
		.512	1.024	Mono Block	R	GYSRUS08B00-D13	●	2	.500	.500	4.500	.866	.899	.500	–
					L	GYSLUS08B00-D13	●	2	.500	.500	4.500	.866	.899	.500	–
		.669 ⋆1	1.338 ⋆2	Mono Block	R	GYSRUS10B00-D17	●	2	.625	.625	4.500	1.063	.918	.625	–
					L	GYSLUS10B00-D17	●	2	.625	.625	4.500	1.063	.918	.625	–
				Mono Block	R	GYSRUS12B00-D17	●	2	.750	.750	4.500	1.102	.878	.750	–
					L	GYSLUS12B00-D17	●	2	.750	.750	4.500	1.102	.878	.750	–
E	.094 .098 .108	.433	.866	Mono Block	R	GYSRUS06B00-E11	●	1	.375	.375	4.500	.866	.901	.375	.125
					L	GYSLUS06B00-E11	●	1	.375	.375	4.500	.866	.901	.375	.125
		.512	1.024	Mono Block	R	GYSRUS08B00-E13	●	2	.500	.500	4.500	.866	.901	.500	–
					L	GYSLUS08B00-E13	●	2	.500	.500	4.500	.866	.901	.500	–
		.669 ⋆1	1.338 ⋆2	Mono Block	R	GYSRUS10B00-E17	●	2	.625	.625	4.500	1.063	.920	.625	–
					L	GYSLUS10B00-E17	●	2	.625	.625	4.500	1.063	.920	.625	–
				Mono Block	R	GYSRUS12B00-E17	●	2	.750	.750	4.500	1.102	.880	.750	–
					L	GYSLUS12B00-E17	●	2	.750	.750	4.500	1.102	.880	.750	–
		.787 ⋆1	1.574 ⋆2	Mono Block	R	GYSRUS10B00-E20	●	2	.625	.625	4.500	1.220	.920	.625	–
					L	GYSLUS10B00-E20	●	2	.625	.625	4.500	1.220	.920	.625	–
				Mono Block	R	GYSRUS12B00-E20	●	2	.750	.750	4.500	1.220	.880	.750	–
					L	GYSLUS12B00-E20	●	2	.750	.750	4.500	1.220	.880	.750	–
F	.118 .125 .128	.512	1.024	Mono Block	R	GYSRUS08B00-F13	●	2	.500	.500	4.500	.866	.903	.500	–
					L	GYSLUS08B00-F13	●	2	.500	.500	4.500	.866	.903	.500	–
		.669 ⋆1	1.338 ⋆2	Mono Block	R	GYSRUS10B00-F17	●	2	.625	.625	4.500	1.063	.925	.625	–
					L	GYSLUS10B00-F17	●	2	.625	.625	4.500	1.063	.925	.625	–
				Mono Block	R	GYSRUS12B00-F17	●	2	.750	.750	4.500	1.102	.885	.750	–
					L	GYSLUS12B00-F17	●	2	.750	.750	4.500	1.102	.885	.750	–
		.787 ⋆1	1.574 ⋆2	Mono Block	R	GYSRUS10B00-F20	●	2	.625	.625	4.500	1.220	.925	.625	–
					L	GYSLUS10B00-F20	●	2	.625	.625	4.500	1.220	.925	.625	–
				Mono Block	R	GYSRUS12B00-F20	●	2	.750	.750	4.500	1.220	.885	.750	–
					L	GYSLUS12B00-F20	●	2	.750	.750	4.500	1.220	.885	.750	–

Dimensions (inch) ⋆3

Cutting Mode: Clockwise / Counterclockwise



CW = Cutting Width CDX = Max. Groove Depth CUTDIA = Max. Cut Off Diameter

⋆1 The maximum groove depth (**CDX**) varies according to the insert used.
⋆2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.
⋆3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then **LF**, **LH** and **LH 2** values may vary.
⋆4 The maximum groove depth (**CDX**) is limited by the workpiece diameter.

● : USA Stock

Select an Insert

Seat Size	Insert Number
C	GY○○0150C○○○○–Breaker
D	GY○○0200/0224D○○○○–Breaker
E	GY○○0239/0250/0274E○○○○–Breaker
F	GY○○0300/0318/0324F○○○○–Breaker

For Grooving/Cutting off ➤ F011, F012

Seat Size	Breaker / CW	GU (Gummy Steel) Neutral	GS (Low) Neutral	GM (Medium) Neutral	GL (Aluminum Alloy) Neutral	05-GM (Cutting off) Hand	GFGS (Hardened steel) Neutral
C	.059", 1.50 mm		●	● (red)			
D	.079", 2.00 mm	●	●	● (red)	●	●	●
E	.094", 2.39 mm	●	●	●			●
	.098", 2.50 mm	●	●	● (red)	●	●	●
F	.118", 3.00 mm	●	●	● (red)	●	●	●
	.125", 3.18 mm	●	●	●			●

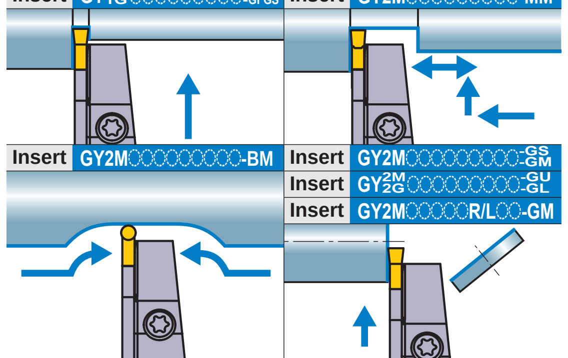
For Multifunctional Grooving ➤ F013, F014

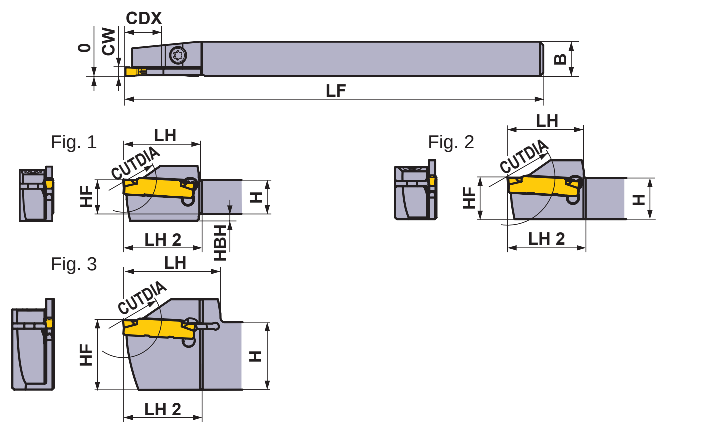
Seat Size	Breaker / CW	MF (Finish)	MS (Low)	MM (Medium)	BM (Copying, Recessing) Ball nose
D	.079", 2.00 mm	●	●	●	●
	.088", 2.24 mm	●			
E	.094", 2.39 mm	●			
	.098", 2.50 mm	●	●	●	●
	.108", 2.74 mm	●			
F	.118", 3.00 mm				●
	RE .008"	●	●	●	
	RE .016"	●	●	●	
	RE .031"			●	
	.125", 3.18 mm				●
	RE .008"	●			
	RE .016"	●			
	.128", 3.24 mm	●			

● (red) : Gauge insert shown dimensions

GY SERIES (EXTERNAL GROOVING for Swiss style lathes)

1-2 00° type holder (Metric)

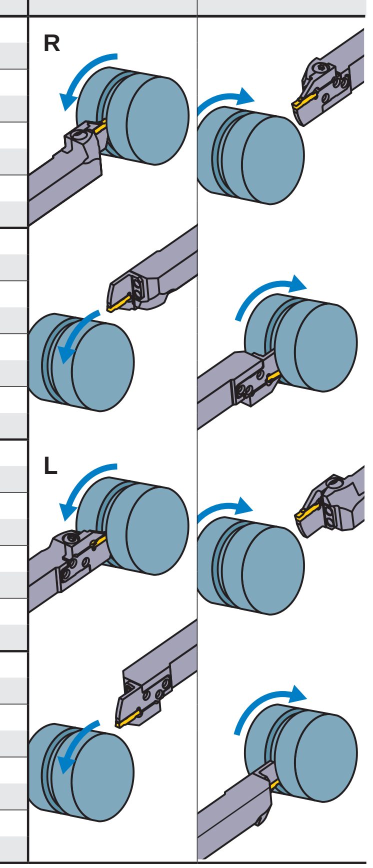




Right hand tool holder shown.

Seat Size	CW (mm)	⁎4 CDX (mm)	CUTDIA (mm)	Type	Hand (R/L)	Order Number: Holder	Order Number: Stock	Fig.	H	B	LF	LH	LH 2	HF	HBH
									Dimensions (mm) ⁎3						
C	1.50	11	22	Mono Block	R	GYSR1010JX00-C11	●	1	10	10	120	22	16	10	2
					L	GYSL1010JX00-C11	●	1	10	10	120	22	16	10	2
		13	26	Mono Block	R	GYSR1212JX00-C13	●	2	12	12	120	22	16	12	—
					L	GYSL1212JX00-C13	●	2	12	12	120	22	16	12	—
		17 ⁎1	34 ⁎2	Mono Block	R	GYSR1616JX00-C17	●	2	16	16	120	27	17	16	—
					L	GYSL1616JX00-C17	●	2	16	16	120	27	17	16	—
		18 ⁎1	36 ⁎2	Mono Block	R	GYSR2012JX00-C18	●	3	20	12	120	28	16	20	—
					L	GYSL2012JX00-C18	●	3	20	12	120	28	16	20	—
D	2.00 2.24	11	22	Mono Block	R	GYSR1010JX00-D11	●	1	10	10	120	22	23	10	2
					L	GYSL1010JX00-D11	●	1	10	10	120	22	23	10	2
		13	26	Mono Block	R	GYSR1212JX00-D13	●	2	12	12	120	22	23	12	—
					L	GYSL1212JX00-D13	●	2	12	12	120	22	23	12	—
		17	34	Mono Block	R	GYSR1616JX00-D17	●	2	16	16	120	27	24	16	—
					L	GYSL1616JX00-D17	●	2	16	16	120	27	24	16	—
		18	36	Mono Block	R	GYSR2012JX00-D18	●	3	20	12	120	28	23	20	—
					L	GYSL2012JX00-D18	●	3	20	12	120	28	23	20	—
E	2.39 2.50 2.74	11	22	Mono Block	R	GYSR1010JX00-E11	●	1	10	10	120	22	23	10	2
					L	GYSL1010JX00-E11	●	1	10	10	120	22	23	10	2
		13	26	Mono Block	R	GYSR1212JX00-E13	●	2	12	12	120	22	23	12	—
					L	GYSL1212JX00-E13	●	2	12	12	120	22	23	12	—
		17	34	Mono Block	R	GYSR1616JX00-E17	●	2	16	16	120	27	24	16	—
					L	GYSL1616JX00-E17	●	2	16	16	120	27	24	16	—
		18	36	Mono Block	R	GYSR2012JX00-E18	●	3	20	12	120	28	23	20	—
					L	GYSL2012JX00-E18	●	3	20	12	120	28	23	20	—
F	3.00 3.18 3.24	11	22	Mono Block	R	GYSR1010JX00-F11	●	1	10	10	120	22	23	10	2
					L	GYSL1010JX00-F11	●	1	10	10	120	22	23	10	2
		13	26	Mono Block	R	GYSR1212JX00-F13	●	2	12	12	120	22	23	12	—
					L	GYSL1212JX00-F13	●	2	12	12	120	22	23	12	—
		17	34	Mono Block	R	GYSR1616JX00-F17	●	2	16	16	120	27	24	16	—
					L	GYSL1616JX00-F17	●	2	16	16	120	27	24	16	—
		18	36	Mono Block	R	GYSR2012JX00-F18	●	3	20	12	120	28	23	20	—
					L	GYSL2012JX00-F18	●	3	20	12	120	28	23	20	—

Cutting Mode: Clockwise / Counterclockwise



CW = Cutting Width **CDX** = Max. Groove Depth **CUTDIA** = Max. Cut Off Diameter

⁎1 The maximum groove depth (**CDX**) varies according to the insert used.
⁎2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.
⁎3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then **LF**, **LH** and **LH 2** values may vary.
⁎4 The maximum groove depth (**CDX**) is limited by the workpiece diameter.

SPARE PARTS

Holder Number	Clamp Screw	Wrench
GYSR/L1010JX00-○11	CS350990T (Clamp Torque : 22 lbf-in)	TKY10R
GYSR/L1212JX00-○13	CS350990T (Clamp Torque : 22 lbf-in)	TKY10R
GYSR/L2012JX00-○18	CS350990T (Clamp Torque : 22 lbf-in)	TKY10R
GYSR/L1616JX00-○17	TS4SBL (Clamp Torque : 31 lbf-in)	TKY15R

Select an Insert

Seat Size	Insert Number
C	GY○○0150C○○○○−Breaker
D	GY○○0200/0224D○○○○−Breaker
E	GY○○0239/0250/0274E○○○○−Breaker
F	GY○○0300/0318/0324F○○○○−Breaker

For Grooving/Cutting off ➤ F011, F012

Seat Size	CW \ Breaker	GU (Gummy Steel)	GS (Low)	GM (Medium)	GL (Aluminum Alloy)	05-GM (Cutting off)	GFGS (Hardened steel)
		Neutral	Neutral	Neutral	Neutral	Hand	Neutral
C	.059", 1.50 mm		●	● (red)			
D	.079", 2.00 mm	●	●	● (red)	●	●	●
E	.094", 2.39 mm	●	●	●			●
	.098", 2.50 mm	●	●	● (red)	●	●	●
F	.118", 3.00 mm	●	●	● (red)	●	●	●
	.125", 3.18 mm	●	●	●			●

For Multifunctional Grooving ➤ F013, F014

Seat Size	CW \ Breaker	MF (Finish)	MS (Low)	MM (Medium)	BM (Copying, Recessing)
					Ball nose
D	.079", 2.00 mm	●	●	●	●
	.088", 2.24 mm	●			
E	.094", 2.39 mm	●			
	.098", 2.50 mm	●	●	●	●
	.108", 2.74 mm	●			
F	.118", 3.00 mm				●
	RE 0.2 mm	●	●	●	
	RE 0.4 mm	●	●	●	
	RE 0.8 mm			●	
	.125", 3.18 mm				●
	RE 0.2 mm	●			
	RE 0.4 mm	●			
	.128", 3.24mm	●			

● (red) : Gauge insert shown dimensions

● : USA Stock

RECOMMENDED CUTTING SPEED (SFM) [For External Grooving / Cutting Off]

	Work Material	Hardness	Grade	Cutting Speed (SFM)
P	Mild Steel	≤160HB	VP20RT	330 – 720
			VP10RT	360 – 755
			NX2525	295 – 690
	Carbon Steel Alloy Steel	160–280HB	VP20RT	260 – 590
			VP10RT	295 – 620
			MY5015	360 – 820
			NX2525	230 – 560
		280HB≤	VP20RT	195 – 460
			VP10RT	230 – 490
			MY5015	295 – 690
			NX2525	180 – 440
M	Stainless Steel	≤270HB	VP20RT	195 – 460
			VP10RT	230 – 490
K	Gray Cast Iron	Tensile Strength ≤300MPa	VP20RT	260 – 590
			VP10RT	295 – 620
			MY5015	460 – 985
	Ductile Cast Iron	Tensile Strength ≤800MPa	VP20RT	195 – 460
			VP10RT	230 – 490
			MY5015	295 – 690
S	Heat Resistant Alloy Titanium Alloy	–	VP20RT	100 – 195
			VP10RT	130 – 230
			RT9010	130 – 230
H	Hardened steel	50HRC≤	BC8110	260 – 395
			MB8025	260 – 395
N	Aluminum Alloy	Content Si<5%	RT9010	655 – 1640
	Aluminum Alloy	Content 5%≤Si≤10%	RT9010	655 – 1640
	Aluminum Alloy	Content Si>10%	RT9010	330 – 655

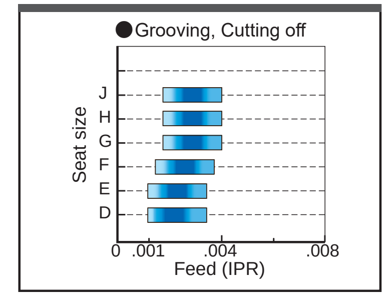
Note 1) VP20RT is the first recommended grade for materials other than hardened steels.
Note 2) For RT9010, VP10RT, VP20RT and MY5015, wet cutting is recommended.

RECOMMENDED CUTTING CONDITIONS [For External Grooving / Cutting Off]

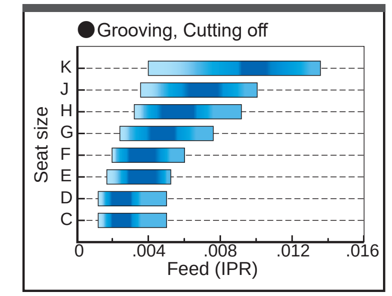
∗Below are the recommended cutting conditions when using the modular type holder GYHR/L2525M00/90-M25R/L with the modular blade GYM25R/LA-○○○.

■Recommended feed rate and depth of cut

GU BREAKER



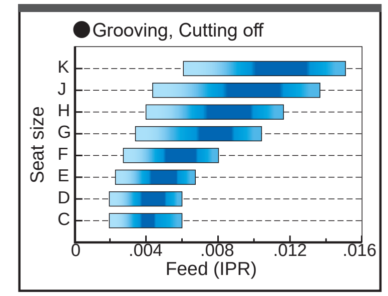
GS BREAKER



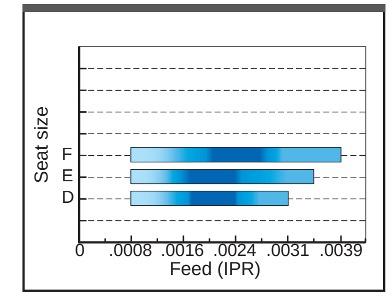
: 1st recommended area

Seat Size			
	Insert Width		Insert Width
C	.059", 1.50 mm	G	.157", 4.00 mm .167", 4.24 mm
D	.079", 2.00 mm .088", 2.24 mm	H	.187", 4.75 mm .197", 5.00 mm .206", 5.24 mm
E	.094", 2.39 mm .098", 2.50 mm .108", 2.74 mm	J	.236", 6.00 mm .248", 6.31 mm .250", 6.35 mm
F	.118", 3.00 mm .125", 3.18 mm .128", 3.24 mm	K	.315", 8.00 mm

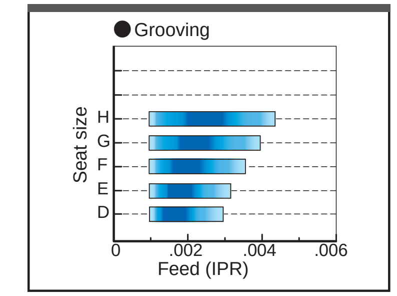
GM BREAKER



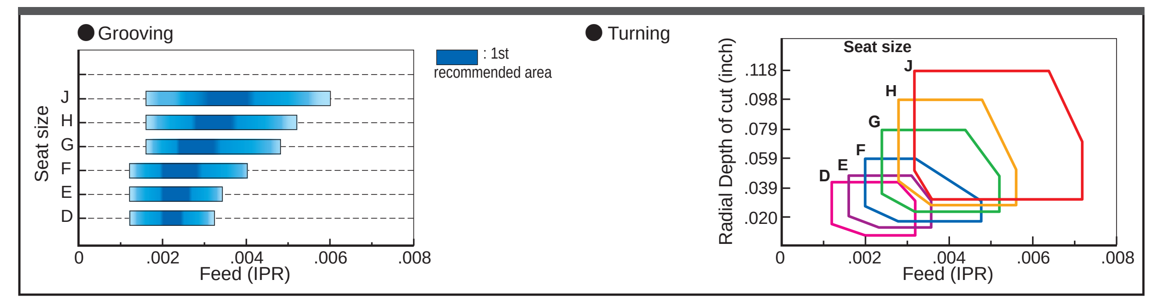
GL BREAKER



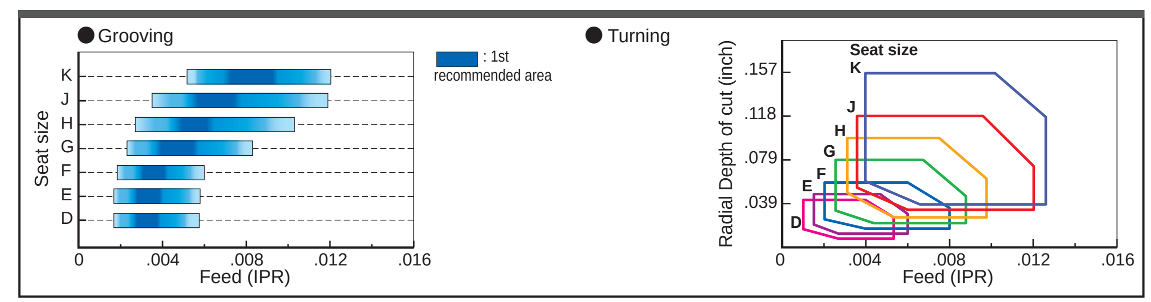
FLAT TOP GFGS (CBN)



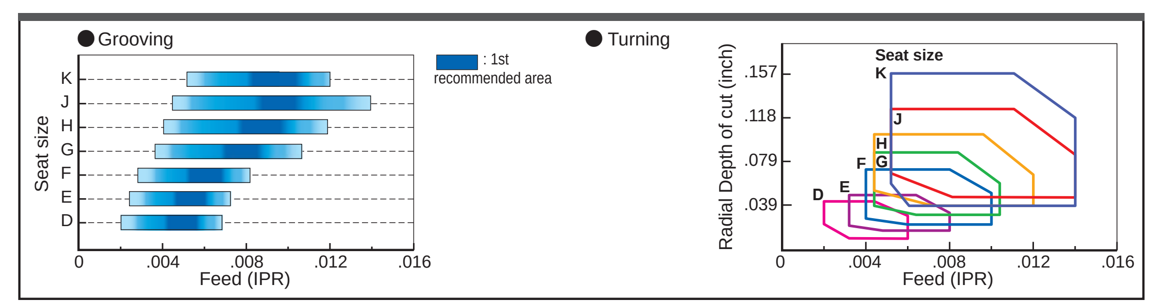
MF BREAKER



MS BREAKER

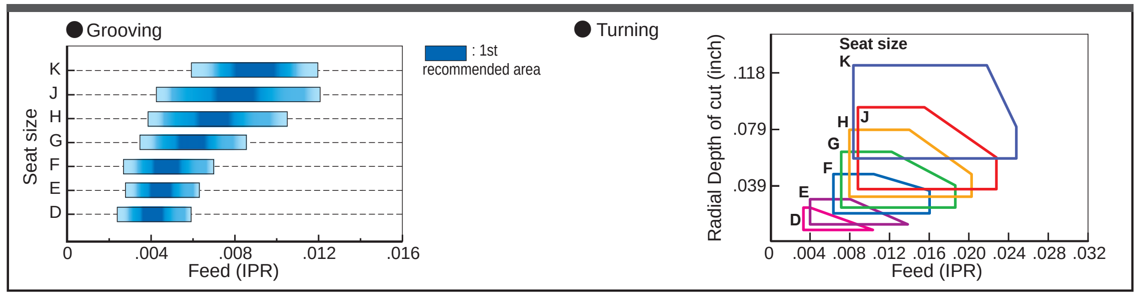


MM BREAKER



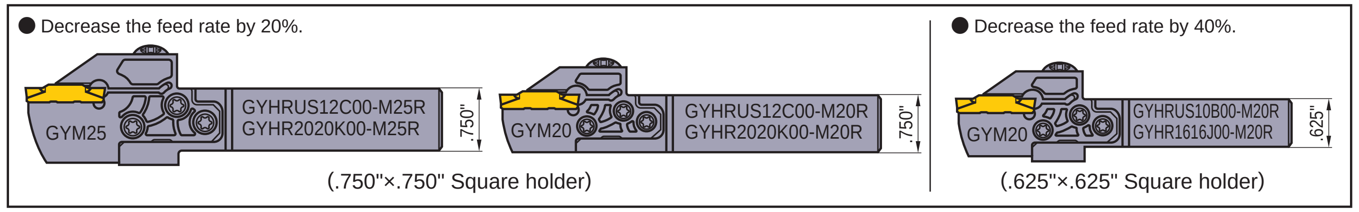
Recommended feed rate and depth of cut

BM BREAKER

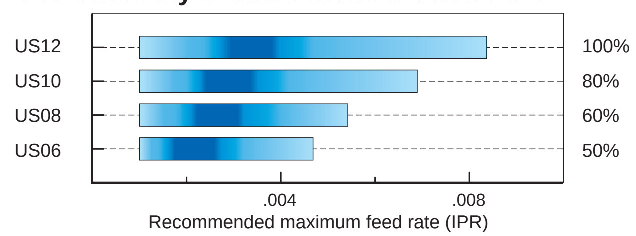


Seat Size	Insert Width
C	.059", 1.50 mm
D	.079", 2.00 mm .088", 2.24 mm
E	.094", 2.39 mm .098", 2.50 mm .108", 2.74 mm
F	.118", 3.00 mm .125", 3.18 mm .128", 3.24 mm
G	.157", 4.00 mm .167", 4.24 mm
H	.187", 4.75 mm .197", 5.00 mm .206", 5.24 mm
J	.236", 6.00 mm .248", 6.31 mm .250", 6.35 mm
K	.315", 8.00 mm

Note 1) When using a combination as shown below, decrease the recommended feed rate by 20% and 40% respectively.



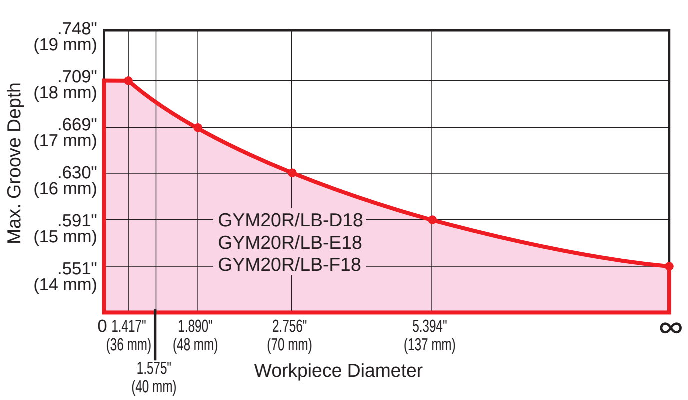
For Swiss style lathes mono block holder

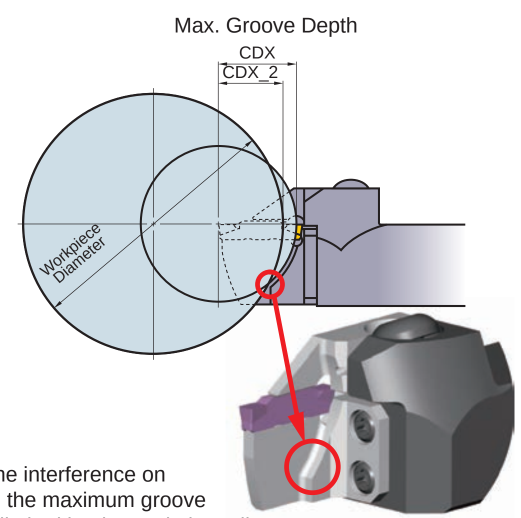


Please refer to the tables of recommended cutting conditions for external grooving.
Apply the percentage ratio shown of each shank size to the values in those tables.

LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

- **When using the modular blade GYM◌◌R/LA-◌◌◌**
  The maximum groove depth is not limited by the workpiece diameter.
- **When using the modular blade GYM◌◌R/LB-◌◌◌**
  The maximum groove depth is limited by the workpiece diameter.

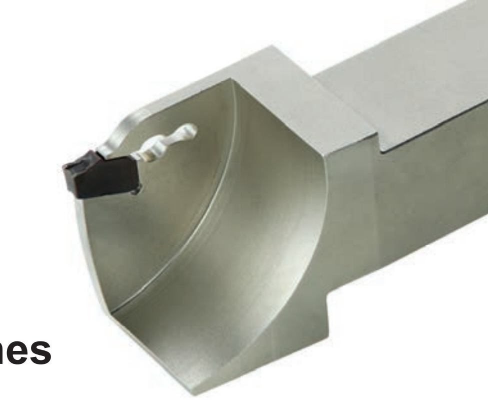




Due to the interference on this part, the maximum groove depth is limited by the workpiece diameter.

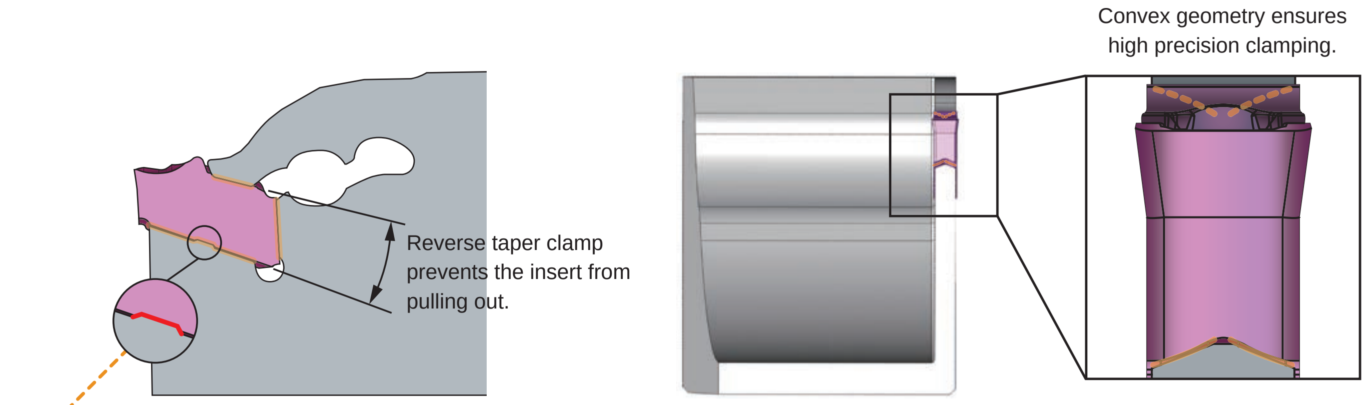
Cutting Off and Grooving System

GW Series



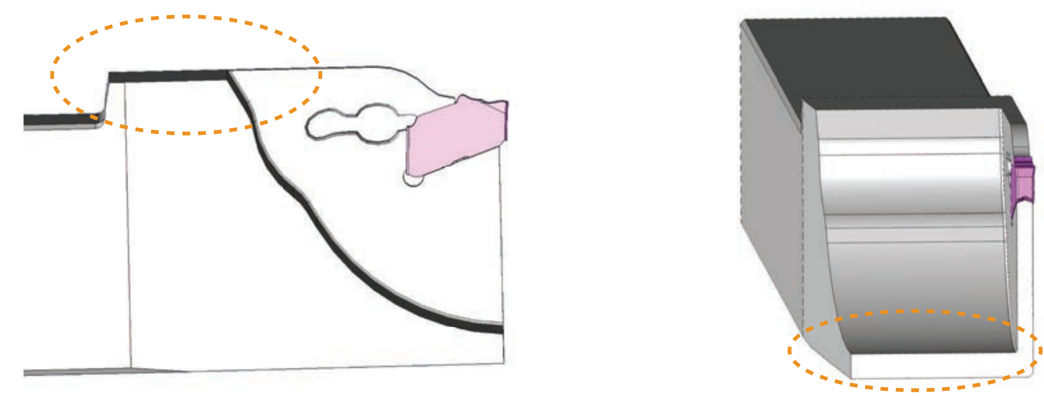
Monoblock Holder for Swiss-type Automatic Lathes

Highly Reliable Insert Clamping



High-Rigidity Holder

Tool deflection caused by cutting resistance and the remaining material pip in the center are greatly reduced.



New Low Resistance and High Lead Angle Insert

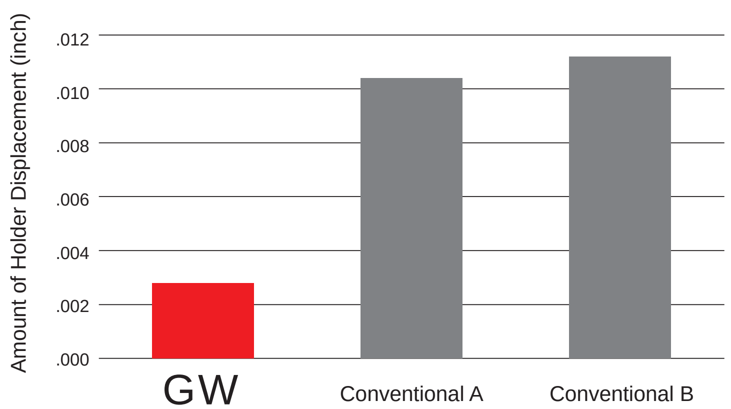
New inserts with a lead angle of 8º have been added to the range to reduce burrs and the remaining material pip in the center.

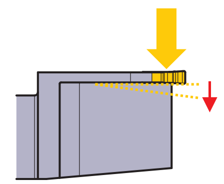
Cutting Performance

Tool Holder Deflection Comparison

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

GW Holder



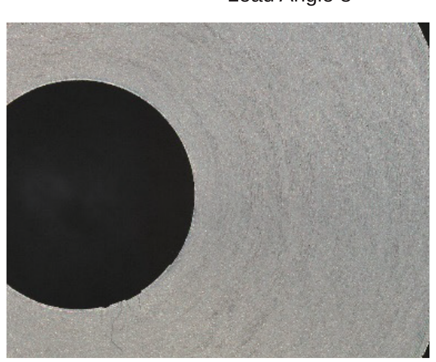


Surface Finish Comparison when Cutting Off : AISI 304

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

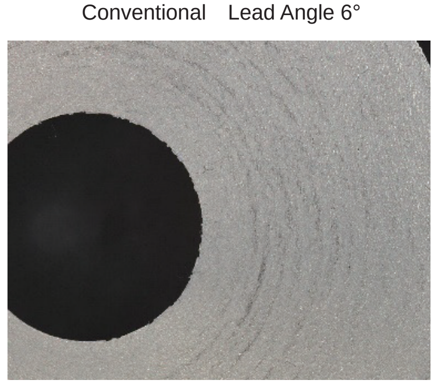
GW Holder

GW Lead Angle 8°



Rz .311 μ-inch

Conventional Lead Angle 6°



Rz .445 μ-inch

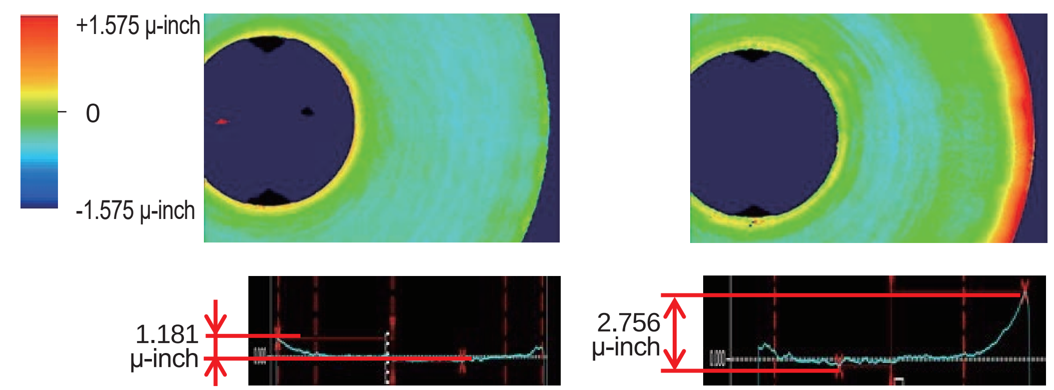
High Lead Angle Effect

<Cutting Conditions>
Work Material : AISI 304 ø1.496 inch
Tool : Cutting Width CW=.079 inch
Cutting Speed : vc=395 SFM
Feed per Rev. : f=.0043 IPR
Cutting Mode : Wet Cutting

Cutting Off & Grooving System

Comparison of the Accuracy of Workpiece When Cutting Off : AISI 304

GW Holder



High accuracy with same lead angle

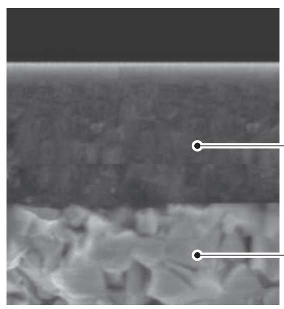
<Cutting Conditions>
Work Material : AISI 304 ø1.496 inch
Tool : Cutting Width CW=.079 inch
Cutting Speed : vc=395 SFM
Feed per Rev. : f=.0043 IPR
Cutting Mode : Wet Cutting

ISO Turning Inserts for Difficult-to-cut Materials

PVD Coated Carbide Grade

MP9015/MP9025

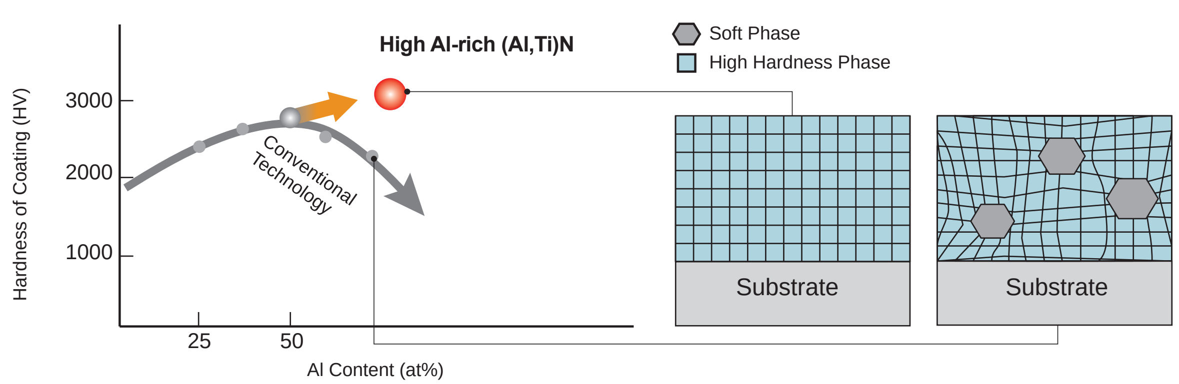
Excellent Wear Resistance when Machining Heat Resistant Super Alloys



MP9015/MP9025

High Al and Conventional Coating Comparison

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



ISO Grade	Grade	Concept	Application
S10	MP9015	First recommendation for general applications.	Heat Resistant Alloys
S30	MP9025	Prevents severe damage for Increased stability.	Heat Resistant Alloys

GW Series Insert Grades

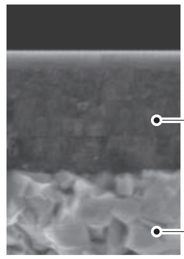
GW Series

Cutting Conditions	P Steel	M Stainless Steel	K Cast Iron	S Heat Resistant Alloy / Titanium Alloy
Stable Cutting	MY5015	VP10RT	MY5015	VP10RT
	VP10RT	VP20RT	VP10RT	VP20RT
	VP20RT	VP30RT	VP20RT	
Unstable Cutting	VP30RT			

F
GROOVING / CUTTING OFF

GW **Series Insert Grades**

MP9000 **Series**

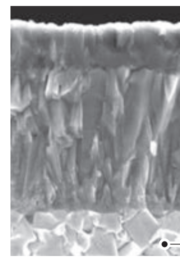


The high Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

High Al-rich (Al,Ti)N Single Layer Coating Technology

Special Cemented Carbide Substrate

MY5015

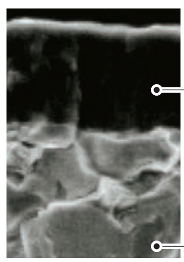


MY5015 is a CVD coated grade with excellent wear resistance even at high temperatures. It provides longer tool life when machining cast and ductile cast irons. Also suitable for high speed continuous cutting of steel.

CVD Coated Carbide

Tough cemented carbide substrate

VP20RT



PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

MIRACLE Coating

Tough cemented carbide substrate (90.5HRA)

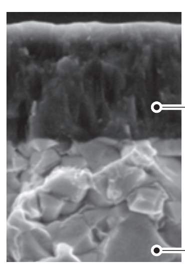
RT9010

RT9010 is a non-coated cemented carbide grade. Suitable for processing non-ferrous metals.

NX2525

NX2525, a cermet grade for finish machining of steel and for good surface finishes at lower cutting speeds.

VP10RT



PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

MIRACLE Coating

Tough cemented carbide substrate (92.0HRA)

BC8110

A CBN coated grade for continuous cutting, which provides longer life when machining hardened steel.

MB8025

MB8025 is a sintered CBN grade for hardened steel.

BLANK INSERTS

Blank inserts for custom grinding

1 Edge Type

2 Edge Type

*** Blank Inserts are not suitable for machining without grinding.**

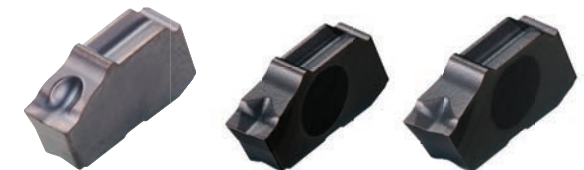
RT9010/RT9020 **for insert blank**

First recommendation for blank inserts is RT9020 due to the tougher carbide substrate and suitable for a wide range of application. RT9010 is a harder substrate than RT9020 and is ideal for long tool life on stable cutting applications.
Coating is recommended for application on steel, stainless steel and cast iron materials.

GW Series

Breaker System Offering Excellent Chip Disposal Properties

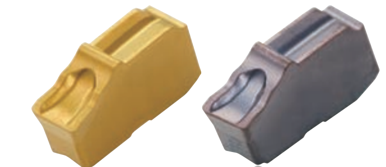
Low Feeds



Neutral | Right Hand (5°) | Right Hand (8°)

GS **Breaker**

Medium Feeds



Neutral | Right Hand / Left Hand (5°)

GM **Breaker**

Correct Use of GY Series GS Breaker

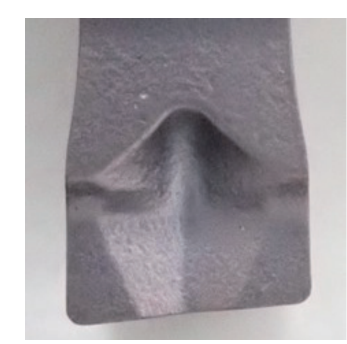
Correct Use of GW Series Inserts

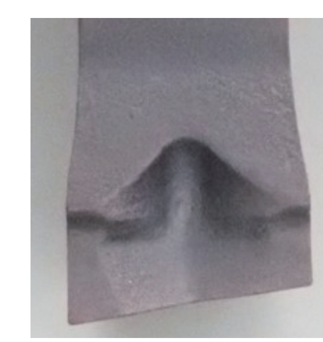
First Recommendation

Improved Fracture Resistance ← → Reduction of Burrs and Core Residue

GM **Breaker** PSIRR=5°	GS **Breaker** PSIRR=5°	GS **Breaker** PSIRR=8°

Reduction of Cutting Resistance ← → Improved Fracture Resistance



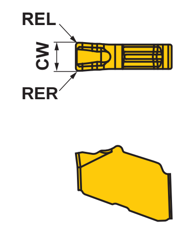


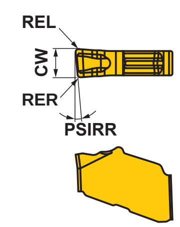
F
GROOVING / CUTTING OFF

GW Series Inserts

(inch)

Application	Order Number	Stock Coating MY5015	VP10RT	VP20RT	VP30RT	CW Cutting Width inch	(mm)	Tolerance	RER REL	PSIRR PSIRL	Geometry
Grooving, Cutting Off	GW1M0200D020N-GS		●	●	●	.079	(2.00)	±.0012	.008	—	
Grooving, Cutting Off	GW1M0239E020N-GS		●	●	●	.094	(2.39)	±.0012	.008	—	
Grooving, Cutting Off	GW1M0300F020N-GS		●	●	●	.118	(3.00)	±.0012	.008	—	
Grooving, Cutting Off	GW1M0400G020N-GS		●	●	●	.157	(4.00)	±.0016	.008	—	
Grooving, Cutting Off	GW1M0200D020N-GM	●	●	●	●	.079	(2.00)	±.0012	.008	—	
Grooving, Cutting Off	GW1M0239E020N-GM	●	●	●	●	.094	(2.39)	±.0012	.008	—	
Grooving, Cutting Off	GW1M0300F030N-GM	●	●	●	●	.118	(3.00)	±.0012	.012	—	
Grooving, Cutting Off	GW1M0400G030N-GM	●	●	●	●	.157	(4.00)	±.0016	.012	—	
Cutting off, Low Feed	GW1M0200D020R05-GS		●	●	●	.079	(2.00)	±.0012	.008	5	
Cutting off, Low Feed	GW1M0239E020R05-GS		●	●	●	.094	(2.39)	±.0012	.008	5	
Cutting off, Low Feed	GW1M0300F020R05-GS		●	●	●	.118	(3.00)	±.0012	.008	5	
Cutting off Low Feed, Lead Angle 8°	GW1M0200D003R08-GS		●	●	●	.079	(2.00)	±.0012	.0012	8	
Cutting off Low Feed, Lead Angle 8°	GW1M0239E003R08-GS		●	●	●	.094	(2.39)	±.0012	.0012	8	
Cutting off Low Feed, Lead Angle 8°	GW1M0300F003R08-GS		●	●	●	.118	(3.00)	±.0012	.0012	8	
Cutting Off	GW1M0200D020R05-GM		●	●	●	.079	(2.00)	±.0012	.008	5	
Cutting Off	GW1M0200D020L05-GM		●	●	●	.079	(2.00)	±.0012	.008	5	
Cutting Off	GW1M0239E020R05-GM		●	●	●	.094	(2.39)	±.0012	.008	5	
Cutting Off	GW1M0239E020L05-GM		●	●	●	.094	(2.39)	±.0012	.008	5	
Cutting Off	GW1M0300F030R05-GM		●	●	●	.118	(3.00)	±.0012	.012	5	
Cutting Off	GW1M0300F030L05-GM		●	●	●	.118	(3.00)	±.0012	.012	5	
Cutting Off	GW1M0400G030R05-GM		●	●	●	.157	(4.00)	±.0016	.012	5	
Cutting Off	GW1M0400G030L05-GM		●	●	●	.157	(4.00)	±.0016	.012	5	Right hand insert shown.



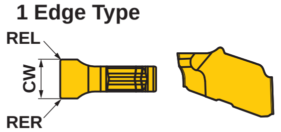


Right hand insert shown.

Blank Inserts

(inch)

Geometry	Order Number	Carbide RT9010	RT9020	Seat Size	CW Grooving Width inch	(mm)	Tolerance	RER	REL
1 Edge Type	GW1B0320D020N	★	★	D	.128	(3.24)	±0.10	.008	.008
	GW1B0440F020N	★	★	F	.175	(4.44)	±0.10	.008	.008
	GW1B0540G020N	★	★	G	.214	(5.44)	±0.10	.008	.008

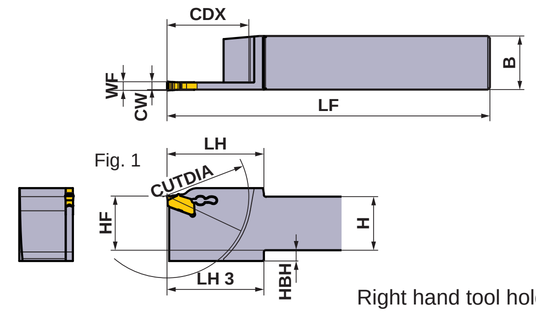


★ Insert blank is not suitable for machining without grinding.

● : USA Stock ★ : Stocked in Japan
(10 inserts in one case) (CBN inserts are available in 1 piece in one case.)

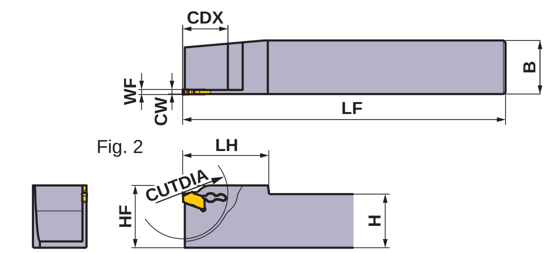
GW SERIES (External for Swiss-Type Automatic Lathes)

Fig. 1



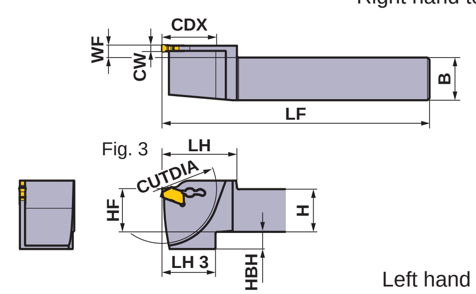
Right hand tool holder shown.

Fig. 2



Right hand tool holder shown.

Fig. 3



Left hand tool holder shown.

Spare Parts

Wrench
GWY39L

(mm)

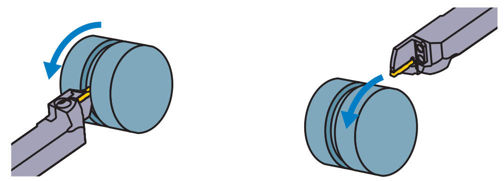
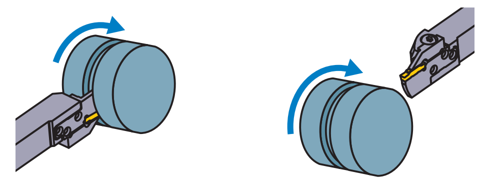
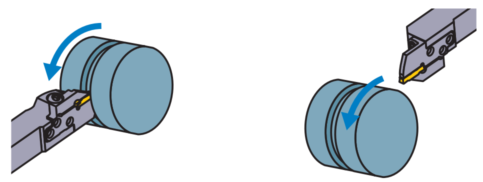
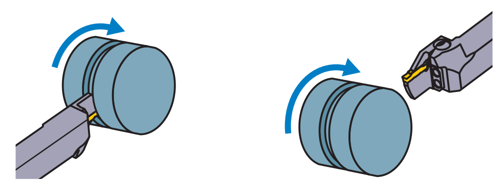
Seat Size	CW	CDX	CUTDIA	Type	Hand (R/L)	Order Number	Stock	H	B	LF	LH	LH 3	HF	WF	HBH	Fig.
D	2.00 .079"	19	38	Mono Block	R	GWSR1616JX00-D38	★	16	16	120	30	30	16	0.3	6	1
		19	38		L	GWSL1616JX00-D38	★	16	16	120	30	30	16	0.3	6	1
		19	38	Mono Block	R	GWSR1915K00-D38	★	19.05	15.875	125	35	35	19.05	0.3	3	1
		19	38		L	GWSL1915K00-D38	★	19.05	15.875	125	35	35	19.05	0.3	3	1
		21	42	Mono Block	R	GWSR2020K00-D42	★	20	20	125	35	25	20	0.3	4	1
		21	42		L	GWSL2020K00-D42	★	20	20	125	35	25	20	0.3	4	1
		21	42	Mono Block	R	GWSR2012K00-D42	★	20	12	125	35	25	20	0.3	4	1
		21	42		L	GWSL2012K00-D42	★	20	12	125	35	25	20	0.3	4	1
		21	42	Mono Block	R	GWSR2525M00-D42	★	25	25	150	40	—	25	0.3	—	2
		21	42		L	GWSL2525M00-D42	★	25	25	150	40	—	25	0.3	—	2
E	2.39 .094"	19	38	Mono Block	R	GWSR1915K00-E38	★	19.05	15.875	125	35	35	19.05	0.2	3	1
		19	38		L	GWSL1915K00-E38	★	19.05	15.875	125	35	35	19.05	0.2	3	1
		21	42	Mono Block	R	GWSR2020K00-E42	★	20	20	125	35	25	20	0.2	4	1
		21	42		L	GWSL2020K00-E42	★	20	20	125	35	25	20	0.2	4	1
		21	42	Mono Block	L	GWSL2020K00-E42-M	★	20	20	125	35	25	20	5.7	8	3
		21	42	Mono Block	R	GWSR2012K00-E42	★	20	12	125	35	25	20	0.2	4	1
		21	42		L	GWSL2012K00-E42	★	20	12	125	35	25	20	0.2	4	1
		21	42	Mono Block	R	GWSR2525M00-E42	★	25	25	150	40	—	25	0.2	—	2
		21	42		L	GWSL2525M00-E42	★	25	25	150	40	—	25	0.2	—	2
F	3.00 .118"	19	38	Mono Block	R	GWSR1915K00-F38	●	19.05	15.875	125	35	35	19.05	0.3	3	1
		19	38		L	GWSL1915K00-F38	●	19.05	15.875	125	35	35	19.05	0.3	3	1
		21	42	Mono Block	R	GWSR2012K00-F42	●	20	12	125	35	25	20	0.3	4	1
		21	42		L	GWSL2012K00-F42	●	20	12	125	35	25	20	0.3	4	1
		21	42	Mono Block	R	GWSR2020K00-F42	●	20	20	125	35	25	20	0.3	4	1
		21	42		L	GWSL2020K00-F42	●	20	20	125	35	25	20	0.3	4	1
		21	42	Mono Block	L	GWSL2020K00-F42-M	●	20	20	125	35	25	20	5.8	8	3
		25.5	51	Mono Block	R	GWSR2020K00-F51	●	20	20	125	35	25	20	0.3	8	1
		25.5	51		L	GWSL2020K00-F51	●	20	20	125	35	25	20	0.3	8	1
		25.5	51	Mono Block	L	GWSL2020K00-F51-M	●	20	20	125	35	25	20	5.8	8	3
		25.5	51	Mono Block	R	GWSR2525M00-F51	●	25	25	150	40	40	25	0.3	3	1
		25.5	51		L	GWSL2525M00-F51	●	25	25	150	40	40	25	0.3	3	1
		32.5	65	Mono Block	R	GWSR2020M00-F65	●	20	20	150	40	33	20	0.3	10	1
		32.5	65		L	GWSL2020M00-F65	●	20	20	150	40	33	20	0.3	10	1
		38	76	Mono Block	R	GWSR2525M00-F76	●	25	25	150	45	45	25	0.3	5	1
		38	76		L	GWSL2525M00-F76	●	25	25	150	45	45	25	0.3	5	1
G	4.00	38	76	Mono Block	R	GWSR2525M00-G76	★	25	25	150	45	45	25	0.4	5	1
		38	76		L	GWSL2525M00-G76	★	25	25	150	45	45	25	0.4	5	1

(H, B, LF, LH, LH 3, HF, WF, HBH = Dimensions (mm))

CW = Cutting Width **CDX =** Max. Groove Depth **CUTDIA =** Max. Cut Off Diameter

● : USA Stock ★ : Stocked in Japan

Cutting Mode

Clockwise	Anticlockwise
R 	R 
L 	L 

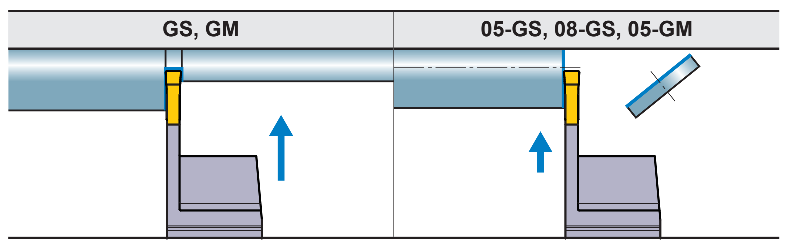
Insert Selection

Seat Size	Insert Type
D	GW1M0200D
E	GW1M0239E
F	GW1M0300F
G	GW1M0400G

For grooving/cutting off breaker

Seat Size	Breaker / CW	GS (Low) Neutral	GM (Medium) Neutral	05-GS (Low) With hand	08-GS (Low) With hand	05-GM (Cutting off) With hand
D	.079", 2.00 mm	●	●	●	●	●
E	.094", 2.39 mm	●	●	●	●	●
F	.118", 3.00 mm	●	●	●	●	●
G	.157", 4.00 mm	●	●			●

● : Standard insert with dimensions



F
GROOVING / CUTTING OFF

Cutting Off & Grooving System

Recommended Cutting Speed [For External Grooving / Cutting Off]

	Workpiece Material	Properties	Grade	Cutting Speed vc (SFM)
P	Mild Steel	Hardness ≤160HB	VP20RT	330 – 720
			VP10RT	360 – 755
			NX2525	295 – 690
	Carbon Steel Alloy Steel	Hardness 160–280HB	VP20RT	260 – 590
			VP10RT	295 – 620
			MY5015	360 – 820
			NX2525	230 – 560
		Hardness 280HB≤	VP20RT	195 – 460
			VP10RT	230 – 490
			MY5015	295 – 690
			NX2525	180 – 440
M	Stainless Steels	Hardness ≤270HB	VP20RT	195 – 460
			VP10RT	230 – 490
K	Gray Cast Irons	Tensile Strength ≤300MPa	VP20RT	260 – 590
			VP10RT	295 – 620
			MY5015	460 – 985
	Ductile Cast Irons	Tensile Strength ≤800MPa	VP20RT	195 – 460
			VP10RT	230 – 490
			MY5015	295 – 690
S	Heat Resistant Alloys Titanium Alloys	–	MP9015	130 – 330
			MP9025	100 – 295
			VP20RT	100 – 195
			VP10RT/ RT9010	130 – 230
H	Hardened Steel	50HRC≤	BC8110/MB8025	260 – 395

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

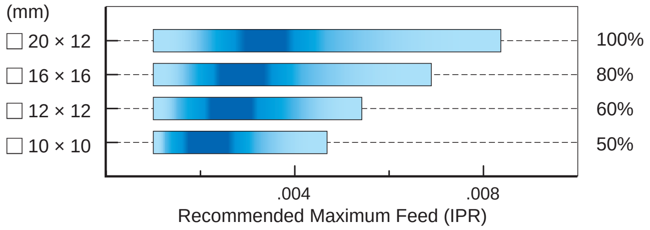
	Workpiece Material	Properties	Grade	Cutting Speed vc (SFM)
N	Aluminum Alloys	Content Si<5%	RT9010	655 – 1640
	Aluminum Alloys	Content 5%≤Si≤10%	RT9010	655 – 1640
	Aluminum Alloys	Content Si>10%	RT9010	330 – 655

F
GROOVING / CUTTING OFF

RECOMMENDED CUTTING CONDITIONS [For External Grooving / Cutting Off]

Recommended cutting conditions when combining a GYHR/L2525M00/90-M24R/L modular holder and GYM25R/LA-◌◌◌ modular blade.

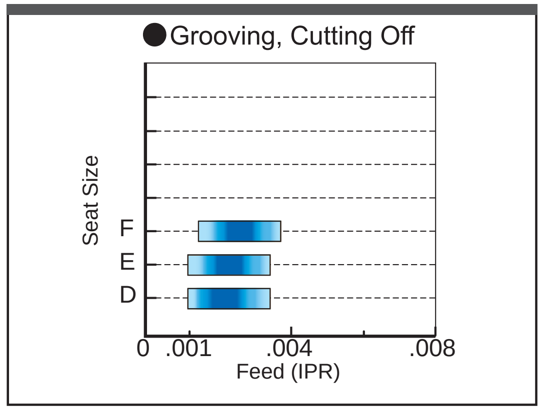
■ In the case of mono block type holder for Swiss-type lathes



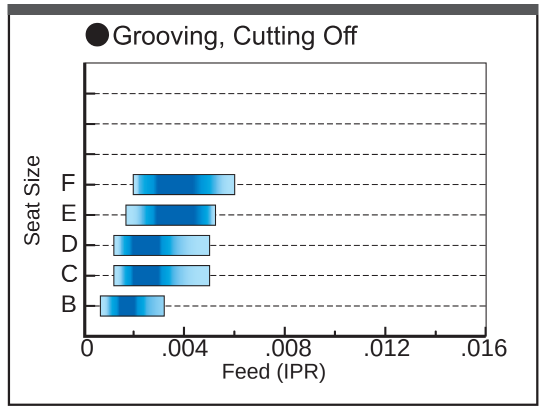
Please refer to the tables above on recommended cutting conditions for external grooving and cutting off.
Apply the percentage ratio shown on each shank size with the values in the table.

■ Recommended feed rate and depth of cut

GU BREAKER

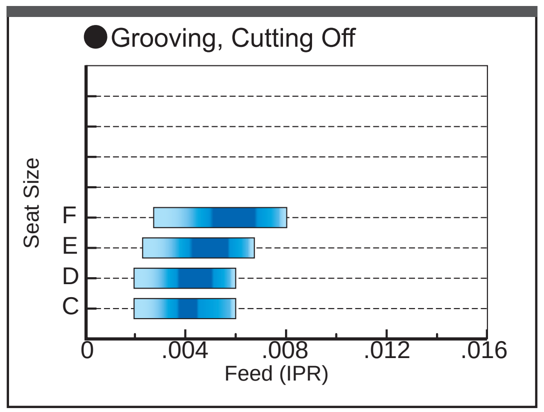


GS BREAKER

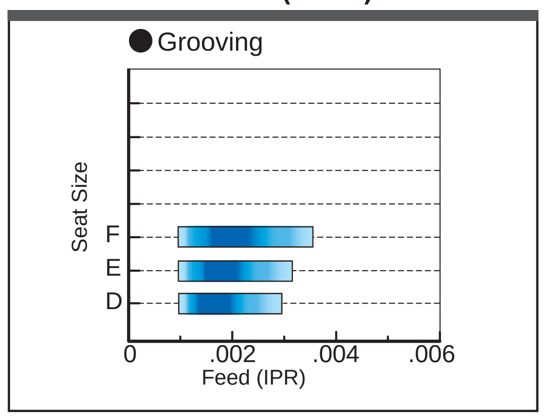


Seat Size	Insert Width
B	.047", 1.20 mm
C	.059", 1.50 mm
D	.079", 2.00 mm .088", 2.24 mm
E	.094", 2.39 mm .098", 2.50 mm .108", 2.74 mm
F	.118", 3.00 mm .125", 3.18 mm .128", 3.24 mm

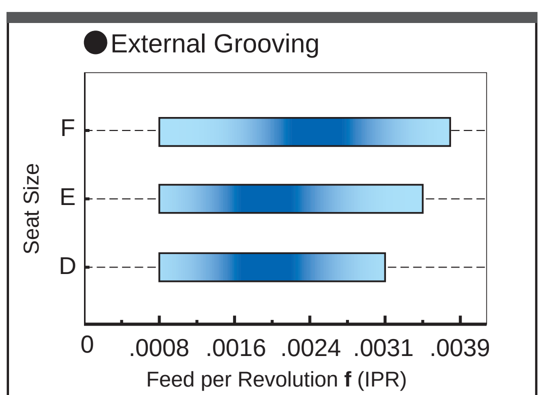
GM BREAKER



FLAT TOP GFGS (CBN)

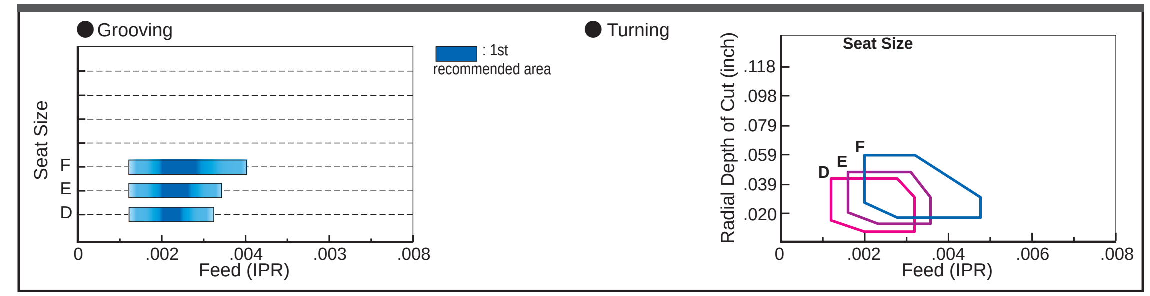


GL BREAKER



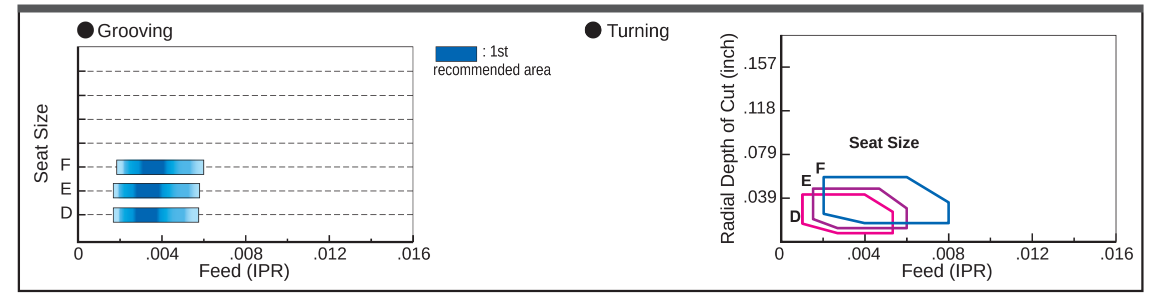
■ : 1st recommended area

MF BREAKER

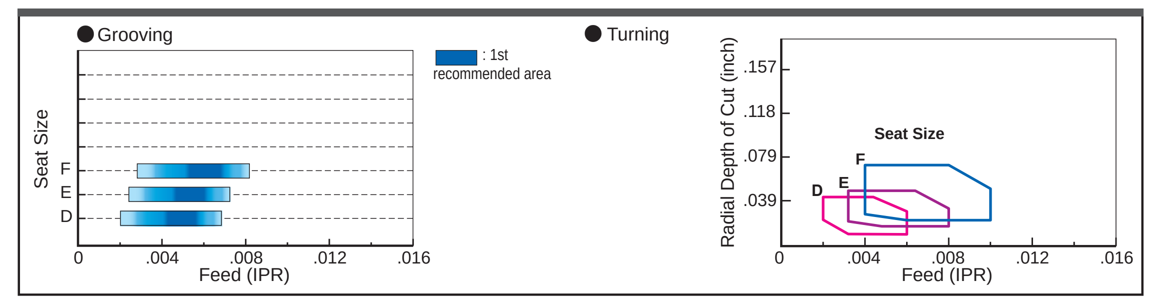


Seat Size	Insert Width
C	.059", 1.50 mm
D	.079", 2.00 mm .088", 2.24 mm
E	.094", 2.39 mm .098", 2.50 mm .108", 2.74 mm
F	.118", 3.00 mm .125", 3.18 mm .128", 3.24 mm

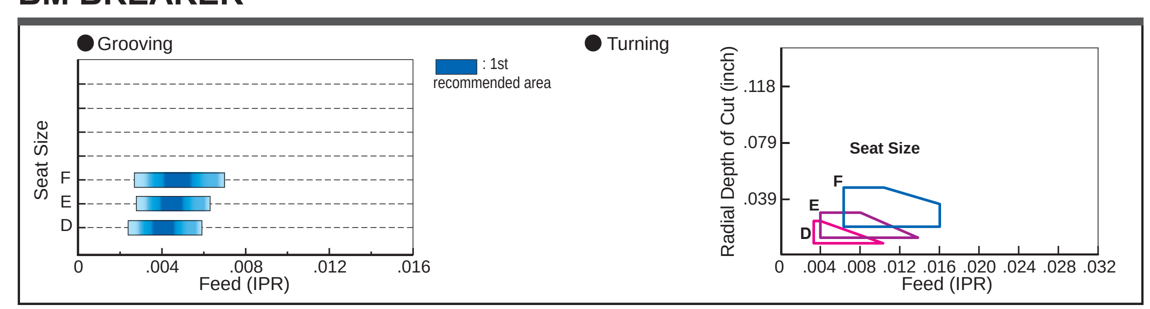
MS BREAKER



MM BREAKER



BM BREAKER



F

GROOVING / CUTTING OFF

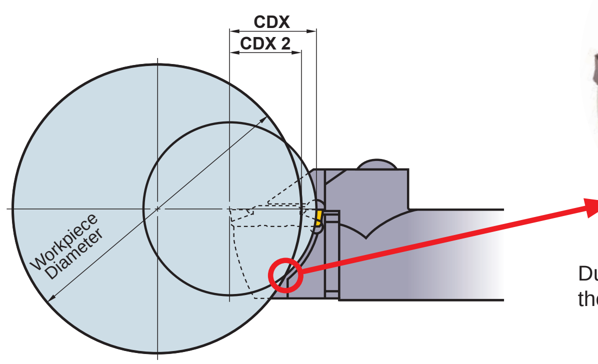
F

GROOVING / CUTTING OFF

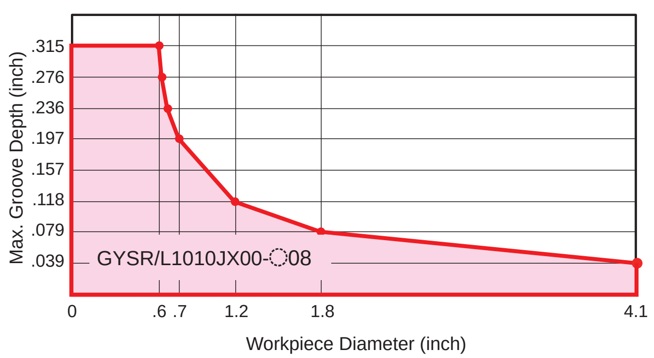
LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

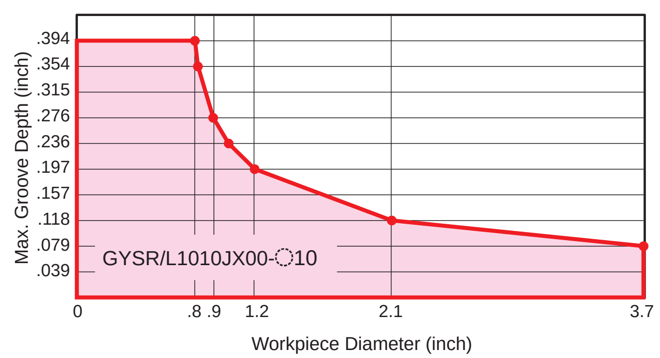
•In The Case of Mono Block Type Holder for Swiss-Type Lathes

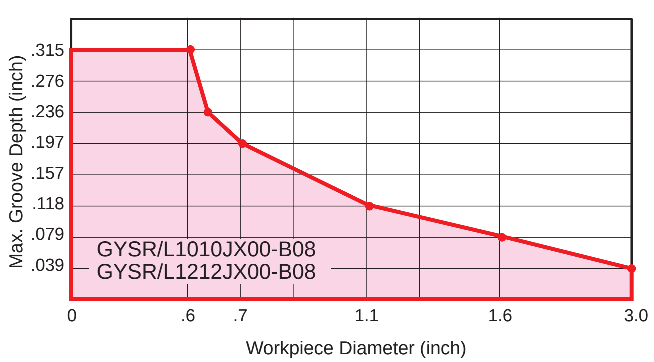
The maximum groove depth is limited by the workpiece diameter.

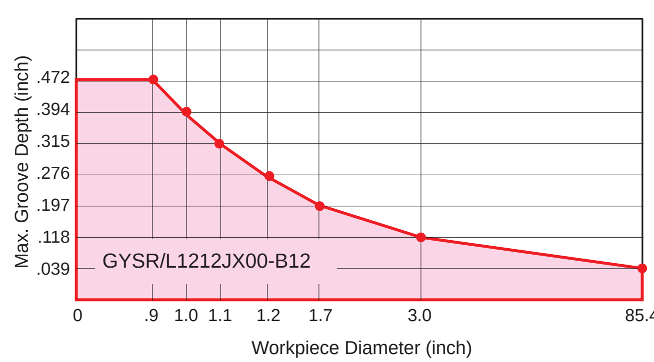


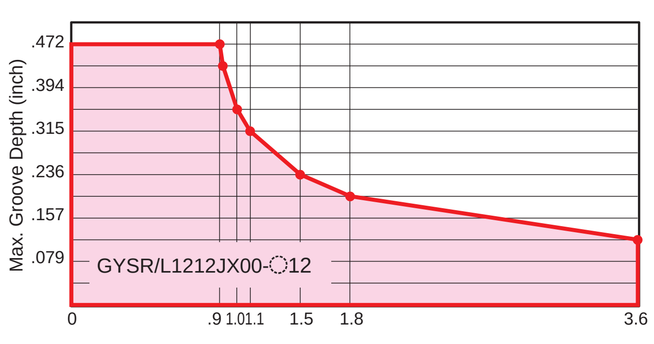
Due to interference, the maximum groove depth is limited by the workpiece diameter.

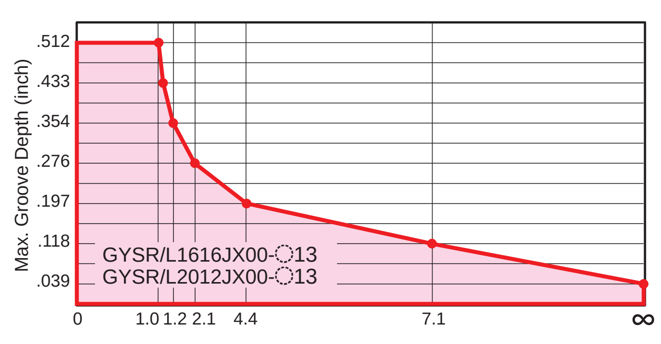












GW Series

Recommended Cutting Conditions

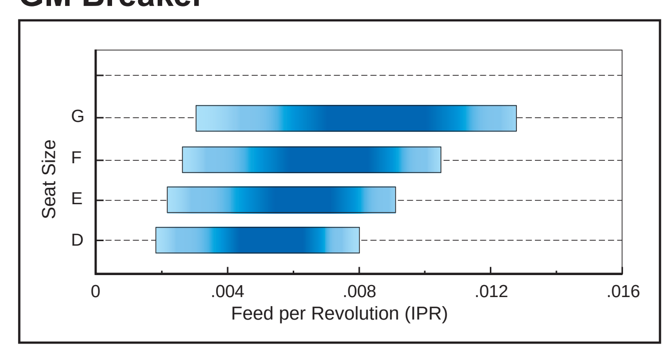
■Cutting Speed

	Workpiece Material	Properties	Grade	Cutting Speed vc (SFM)
P	Mild Steel	Hardness ≤160HB	VP20RT	330 – 785
			VP10RT	360 – 820
	Carbon Steel Alloy Steel	Hardness 160－280HB	VP20RT	260 – 655
			VP10RT	295 – 690
			VP30RT	195 – 590
			MY5015	360 – 820
		Hardness ≥280HB	VP20RT	195 – 525
			VP10RT	230 – 560
			VP30RT	130 – 460
			MY5015	295 – 690
M	Stainless Steels	Hardness ≤270HB	VP20RT	195 – 590
			VP10RT	230 – 620
			VP30RT	130 – 525
K	Gray Cast Irons	Tensile Strength ≤300MPa	VP20RT	260 – 655
			VP10RT	295 – 690
			MY5015	460 – 985
	Ductile Cast Irons	Tensile Strength ≤800MPa	VP20RT	195 – 525
			VP10RT	230 – 560
			MY5015	295 – 690
S	Heat Resistant Alloys Titanium Alloys	–	VP20RT	100 – 195
			VP10RT	130 – 230

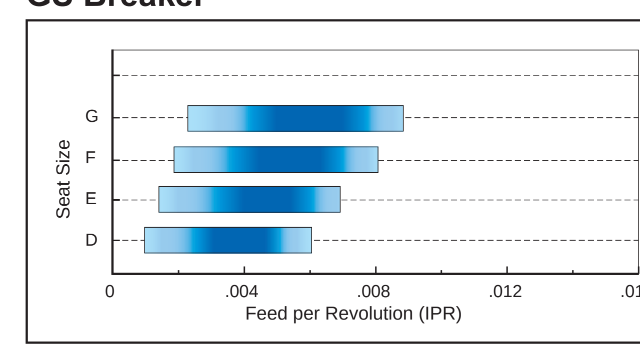
Note 1) VP20RT is the first recommended grade for materials.
Note 2) For VP10RT, VP20RT, VP30RT and MY5015, wet cutting is recommended.

■Feed per Revolution

GM Breaker



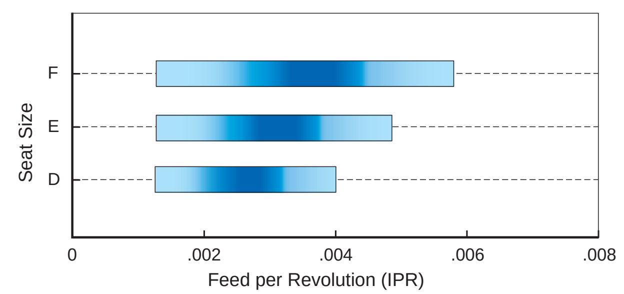
GS Breaker



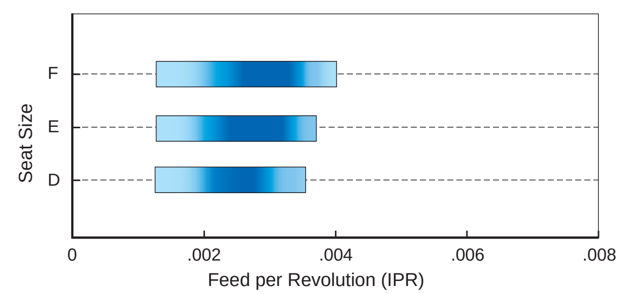
Chip Breaker	Feed per Revolution (IPR)			
	Seat Size D	Seat Size E	Seat Size F	Seat Size G
GM Breaker	.0020 – .0079	.0024 – .0091	.0028 – .0102	.0031 – .0126
GS Breaker	.0012 – .0059	.0016 – .0067	.0020 – .0079	.0024 – .0087

Cutting Off Feed per Revolution

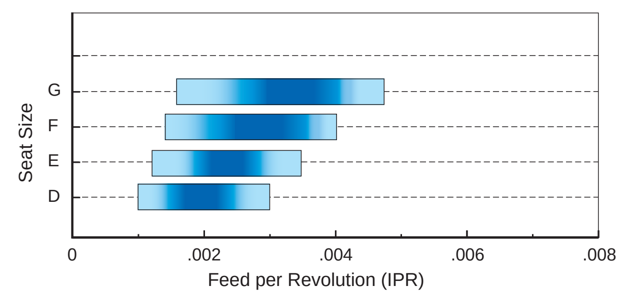
R05-GS Breaker



R08-GS Breaker



R/L05-GM Breaker

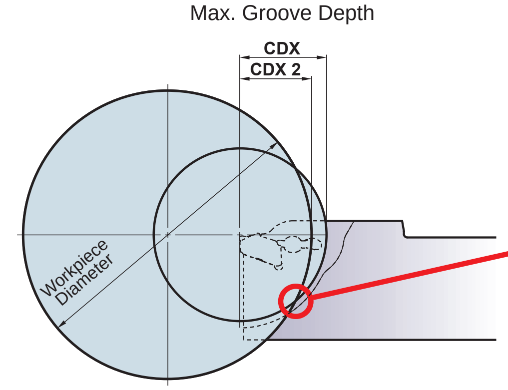


Chip Breaker	PSIPR	Hand	Feed per Revolution (IPR)			
			Seat Size D	Seat Size E	Seat Size F	Seat Size G
R05-GS	5°	R	.0012 – .0039	.0012 – .0047	.0012 – .0055	–
R08-GS	8°	R	.0012 – .0031	.0012 – .0035	.0012 – .0055	–
R05-GM	5°	R/L	.0020 – .0059	.0024 – .0067	.0028 – .0079	.0031 – .0091

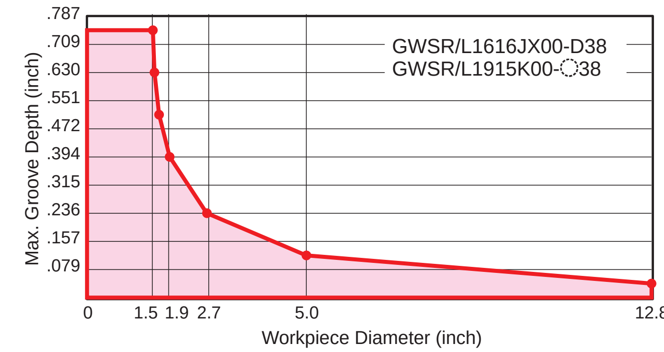
LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

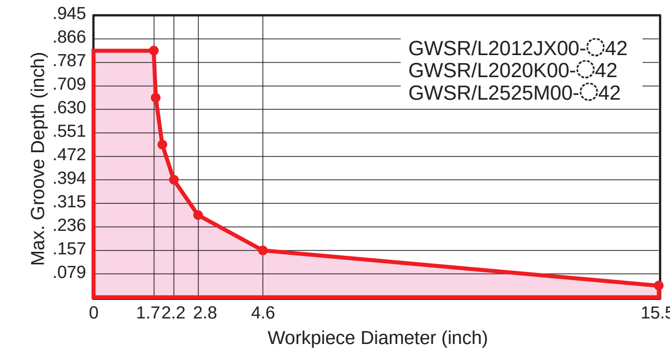
•In The Case of Mono Block Type Holder for Swiss-Type Lathes

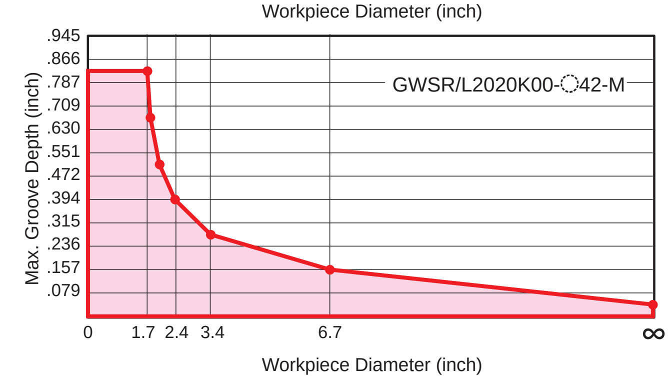
The maximum groove depth is limited by the workpiece diameter.

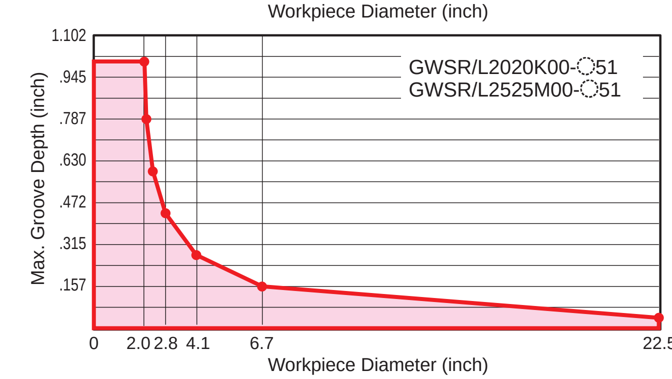


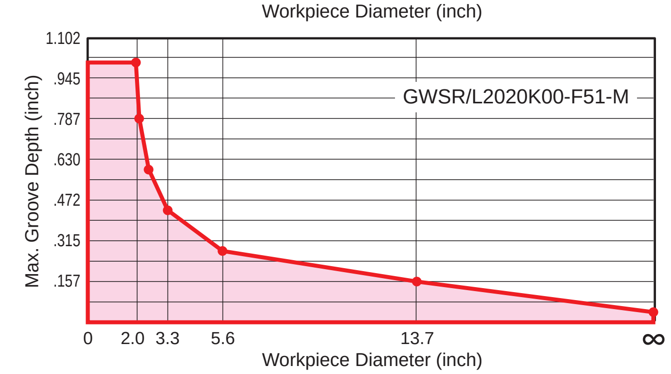
Due to interference, the maximum groove depth is limited by the workpiece diameter.

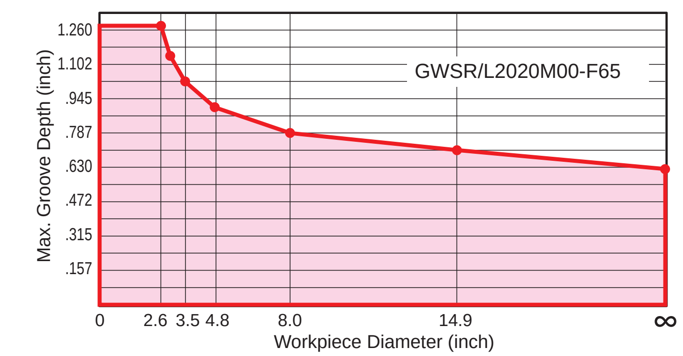


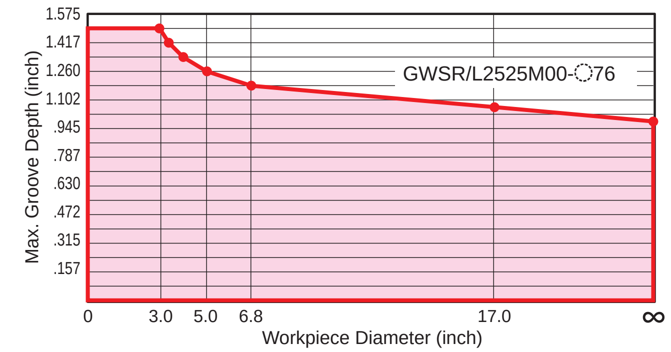








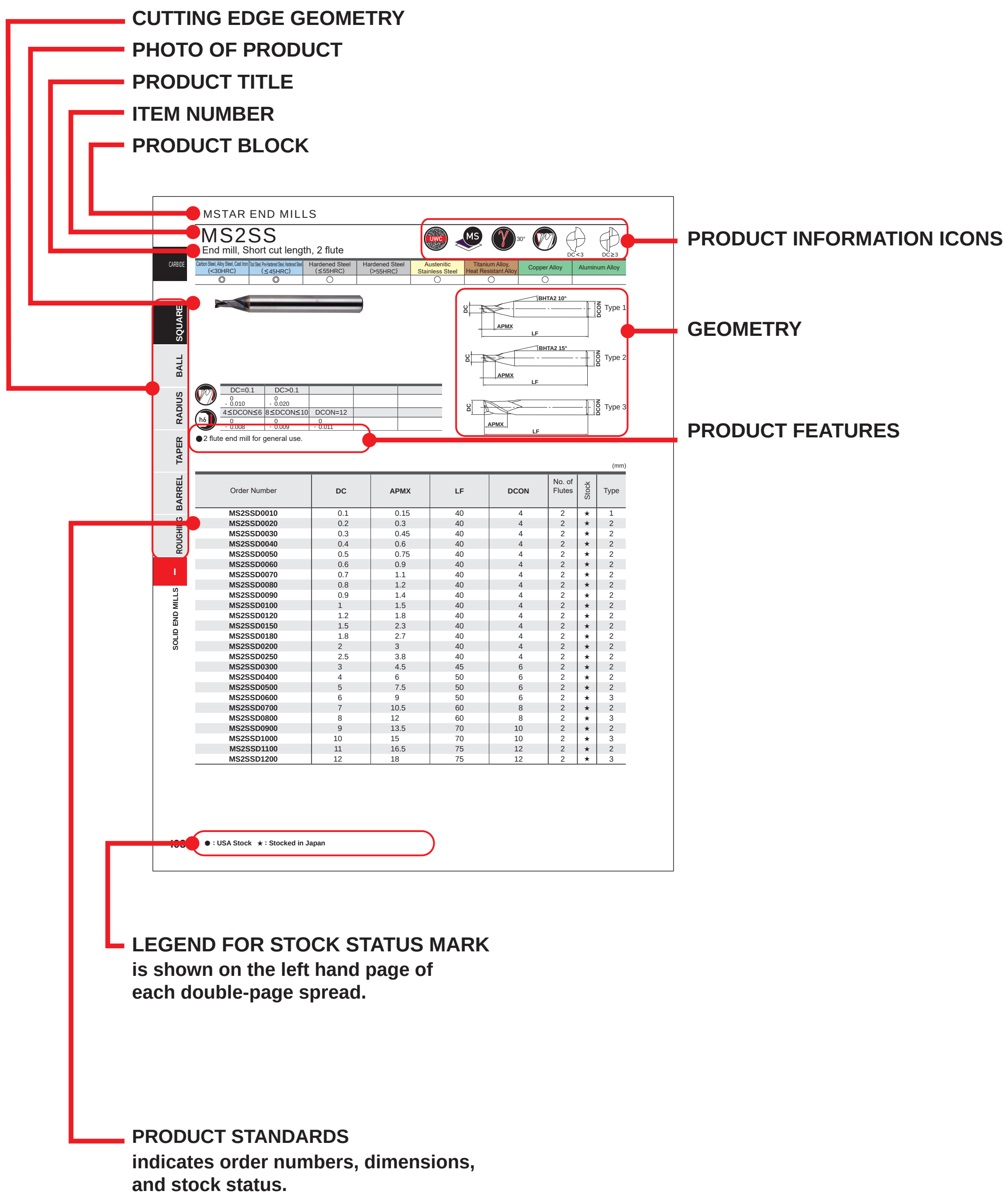




HOW TO READ THE STANDARD OF SOLID END MILLS

●How this section page is organized

①Organized according to cutting mode for milling. (Refer to END MILL LIST.)



●To Order: Please specify product title and order number.

MILLING

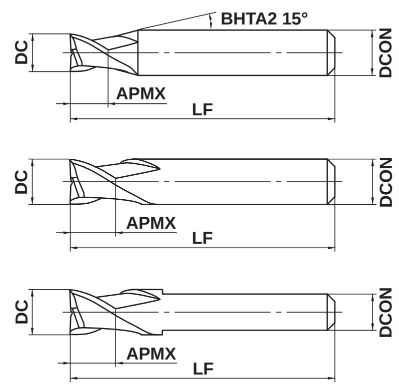
SOLID CARBIDE END MILLS

SOLID ENDMILL STANDARD

MS2ES

End mill, 2 flute, For Swiss style lathes

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



3≤DC≤12				
0 - 0.020				
4≤DCON≤6	7≤DCON≤10			
0 - 0.008	0 - 0.009			

● 2 flute end mill.

Overall length 35mm

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS2ESD0300L35S04	3	3	35	4	2	●	1
MS2ESD0350L35S04	3.5	3.5	35	4	2	●	1
MS2ESD0400L35S04	4	4	35	4	2	●	2
MS2ESD0500L35S05	5	5	35	5	2	●	2
MS2ESD0500L35S06	5	5	35	6	2	●	1
MS2ESD0600L35S05	6	6	35	5	2	●	3
MS2ESD0600L35S06	6	6	35	6	2	●	2
MS2ESD0700L35S07	7	6	35	7	2	●	2
MS2ESD0800L35S07	8	6	35	7	2	●	3
MS2ESD0800L35S08	8	6	35	8	2	●	2
MS2ESD1000L35S07	10	6	35	7	2	●	3
MS2ESD1000L35S10	10	6	35	10	2	●	2
MS2ESD1200L35S10	12	6	35	10	2	●	3

Overall length 45mm

(mm)

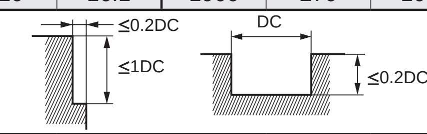
Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS2ESD0300L45S04	3	3	45	4	2	●	1
MS2ESD0350L45S04	3.5	3.5	45	4	2	●	1
MS2ESD0400L45S04	4	4	45	4	2	●	2
MS2ESD0500L45S06	5	5	45	6	2	●	1
MS2ESD0600L45S06	6	6	45	6	2	●	2
MS2ESD0700L45S07	7	7	45	7	2	●	2
MS2ESD0800L45S07	8	8	45	7	2	●	3
MS2ESD0800L45S08	8	8	45	8	2	●	2
MS2ESD1000L45S07	10	10	45	7	2	●	3
MS2ESD1000L45S10	10	10	45	10	2	●	2
MS2ESD1200L45S10	12	12	45	10	2	●	3

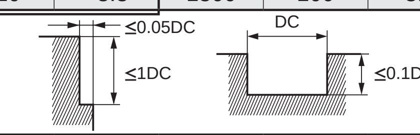
●: USA Stock

RECOMMENDED CUTTING CONDITIONS

Work Material	Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI 35, AISI P20 etc.			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21 etc.			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V etc.			Hardened steel (45−55HRC) AISI H13 etc.		
DC (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)
3	10000	600	23.6	7000	400	15.7	6000	300	11.8	5000	120	4.7
4	7500	600	23.6	5200	400	15.7	4500	300	11.8	4000	120	4.7
5	6000	600	23.6	4200	400	15.7	3600	300	11.8	3200	120	4.7
6	5000	600	23.6	3500	400	15.7	3000	300	11.8	2700	120	4.7
7	4500	560	22.0	3000	360	14.2	2700	280	11.0	2300	110	4.3
8	4000	520	20.5	2800	350	13.8	2400	260	10.2	2000	110	4.3
10	3200	450	17.7	2200	300	11.8	1900	230	9.1	1600	100	3.9
12	2700	410	16.1	1900	270	10.6	1600	210	8.3	1300	100	3.9

Depth of cut





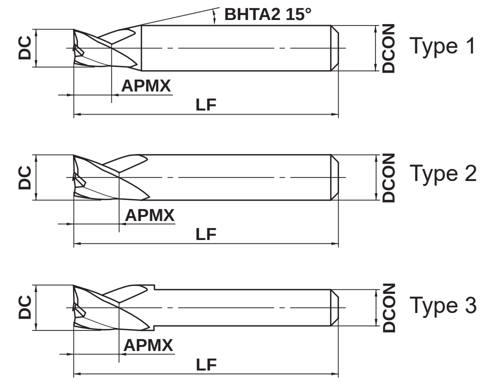
DC:Dia.

Note 1) When cutting austenitic stainless steel, the use of water-soluble cutting fluid is especially effective.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below of the above value.
Note 4) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.

MS3ES

End mill, 3 flute, For Swiss style lathes

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



3≤DC≤12				
0 - 0.020				
4≤DCON≤6	7≤DCON≤10			
0 - 0.008	0 - 0.009			

● 3 flute end mill.

Overall length 35mm

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS3ESD0300L35S04	3	3	35	4	3	●	1
MS3ESD0350L35S04	3.5	3.5	35	4	3	●	1
MS3ESD0400L35S04	4	4	35	4	3	●	2
MS3ESD0500L35S05	5	5	35	5	3	●	2
MS3ESD0500L35S06	5	5	35	6	3	●	1
MS3ESD0600L35S05	6	6	35	5	3	●	3
MS3ESD0600L35S06	6	6	35	6	3	●	2
MS3ESD0700L35S07	7	6	35	7	3	●	2
MS3ESD0800L35S07	8	6	35	7	3	●	3
MS3ESD0800L35S08	8	6	35	8	3	●	2
MS3ESD1000L35S07	10	6	35	7	3	●	3
MS3ESD1000L35S10	10	6	35	10	3	●	2
MS3ESD1200L35S10	12	6	35	10	3	●	3

Overall length 45mm

(mm)

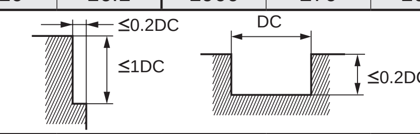
Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS3ESD0300L45S04	3	3	45	4	3	●	1
MS3ESD0350L45S04	3.5	3.5	45	4	3	●	1
MS3ESD0400L45S04	4	4	45	4	3	●	2
MS3ESD0500L45S06	5	5	45	6	3	●	1
MS3ESD0600L45S06	6	6	45	6	3	●	2
MS3ESD0700L45S07	7	7	45	7	3	●	2
MS3ESD0800L45S07	8	8	45	7	3	●	3
MS3ESD0800L45S08	8	8	45	8	3	●	2
MS3ESD1000L45S07	10	10	45	7	3	●	3
MS3ESD1000L45S10	10	10	45	10	3	●	2
MS3ESD1200L45S10	12	12	45	10	3	●	3

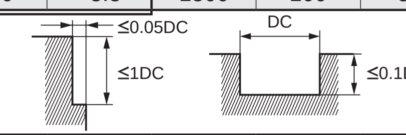
● : USA Stock

RECOMMENDED CUTTING CONDITIONS

Work Material	Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI 35, AISI P20 etc.			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21 etc.			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V etc.			Hardened steel (45−55HRC) AISI H13 etc.		
DC (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)
3	10000	600	23.6	7000	400	15.7	6000	300	11.8	5000	120	4.7
4	7500	600	23.6	5200	400	15.7	4500	300	11.8	4000	120	4.7
5	6000	600	23.6	4200	400	15.7	3600	300	11.8	3200	120	4.7
6	5000	600	23.6	3500	400	15.7	3000	300	11.8	2700	120	4.7
7	4500	560	22.0	3000	360	14.2	2700	280	11.0	2300	110	4.3
8	4000	520	20.5	2800	350	13.8	2400	260	10.2	2000	110	4.3
10	3200	450	17.7	2200	300	11.8	1900	230	9.1	1600	100	3.9
12	2700	410	16.1	1900	270	10.6	1600	210	8.3	1300	100	3.9

Depth of cut





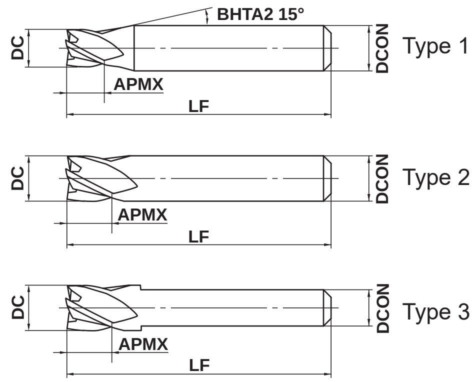
DC:Dia.

Note 1) When cutting austenitic stainless steel, the use of water-soluble cutting fluid is especially effective.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below of the above value.
Note 4) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionally.

MS4EC

End mill, 4 flute, For Swiss style lathes

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



	DC≤12	DC>12
	0 - 0.020	0 - 0.030
h6	4≤DCON≤6	7≤DCON≤10
	0 - 0.008	0 - 0.009

●4 flute end mill.

Overall length 35mm

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS4ECD0300L35S04	3	3	35	4	4	●	1
MS4ECD0350L35S04	3.5	3.5	35	4	4	●	1
MS4ECD0400L35S04	4	4	35	4	4	●	2
MS4ECD0500L35S05	5	5	35	5	4	●	2
MS4ECD0500L35S06	5	5	35	6	4	●	1
MS4ECD0600L35S05	6	6	35	5	4	●	3
MS4ECD0600L35S06	6	6	35	6	4	●	2
MS4ECD0700L35S07	7	6	35	7	4	●	2
MS4ECD0800L35S07	8	6	35	7	4	●	3
MS4ECD0800L35S08	8	6	35	8	4	●	2
MS4ECD1000L35S07	10	6	35	7	4	●	3
MS4ECD1000L35S10	10	6	35	10	4	●	2
MS4ECD1200L35S10	12	6	35	10	4	●	3

Overall length 45mm

(mm)

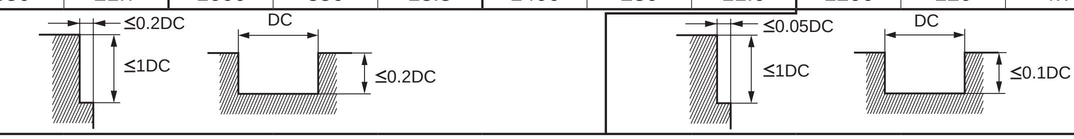
Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
MS4ECD0300L45S04	3	3	45	4	4	●	1
MS4ECD0350L45S04	3.5	3.5	45	4	4	●	1
MS4ECD0400L45S04	4	4	45	4	4	●	2
MS4ECD0500L45S06	5	5	45	6	4	●	1
MS4ECD0600L45S06	6	6	45	6	4	●	2
MS4ECD0700L45S07	7	7	45	7	4	●	2
MS4ECD0800L45S07	8	8	45	7	4	●	3
MS4ECD0800L45S08	8	8	45	8	4	●	2
MS4ECD1000L45S07	10	10	45	7	4	●	3
MS4ECD1000L45S10	10	10	45	10	4	●	2
MS4ECD1200L45S10	12	12	45	10	4	●	3
MS4ECD1400L45S10	14	14	45	10	4	●	3

● : USA Stock

RECOMMENDED CUTTING CONDITIONS

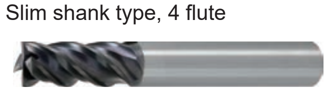
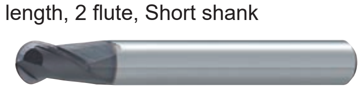
Work Material	Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI 35, AISI P20 etc.			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21 etc.			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V etc.			Hardened steel (45—55HRC) AISI H13 etc.		
DC (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)
3	10000	900	35.4	7000	600	23.6	6000	450	17.7	5000	180	7.1
4	7500	900	35.4	5200	600	23.6	4500	450	17.7	4000	180	7.1
5	6000	900	35.4	4200	600	23.6	3600	450	17.7	3200	180	7.1
6	5000	900	35.4	3500	600	23.6	3000	450	17.7	2700	180	7.1
7	4500	840	33.1	3000	540	21.3	2700	420	16.5	2300	160	6.3
8	4000	780	30.7	2800	520	20.5	2400	390	15.4	2000	160	6.3
10	3200	680	26.8	2200	450	17.7	1900	340	13.4	1600	140	5.5
12	2700	620	24.4	1900	410	16.1	1600	310	12.2	1300	120	4.7
14	2300	550	21.7	1600	350	13.8	1400	280	11.0	1200	120	4.7

Depth of cut

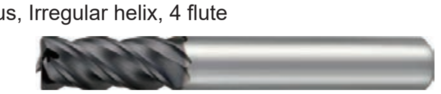


DC:Dia.

Note 1) When cutting austenitic stainless steel, the use of water-soluble cutting fluid is especially effective.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.

Product Code	Shape		Size Range	Sizes	P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool Steel, Prehardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminum Alloy
Square End Mills												
MP2ES	End mill, 2 flute, For swiss-type lathe		METRIC DC 3 – 10	7	◎	◎	○		○	○	○	
MP3ES	End mill, 3 flute, For swiss-type lathe		METRIC DC 3 – 12	10	◎	◎	○		○	○	○	
MP3MC	End mill, Medium cut length, 3 flute		INCH DC .0312 – .5000	11	◎	◎	○		○	○		
MP4EC	End mill, 4 flute, For swiss-type lathe		METRIC DC 3 – 14	14	◎	◎	○		○	○	○	
MP4MC	End mill, Medium cut length, 4 flute		INCH DC .0312 – .5000	11	◎	◎	○		○	○		
MPMHV	End mill, Irregular helix, Slim shank type, 4 flute		METRIC DC 1-12	12	◎	◎	○		◎	○		
MPMHV	End mill, Irregular helix, 4 flute		METRIC DC 7-12	6	◎	◎	○		◎	○		
MPJHV	End mill, Irregular helix, For vertical wall finishing, 4 flute		METRIC DC 1-12	19	◎	◎	○		◎	○		
MP4JC	End mill, Semi long cut length, 4 flute		INCH DC .0625 – .5000	8	◎	◎	○		○	○		
Ball Nose End Mills												
MP2SSB	Ball nose, Short cut length, 2 flute, Short shank		METRIC RE 0.1 – 6	16	◎	◎	◎		○	○	○	
MP2SB	Ball nose, Short cut length, 2 flute		METRIC RE 0.1 – 6	29	◎	◎	◎		○	○	○	
MP2MB	Ball nose, Medium cut length, 2 flute		INCH RE .0156- .2500 METRIC RE 0.25 – 6	8 21	◎	◎	◎		○	○	○	

I SOLID END MILLS

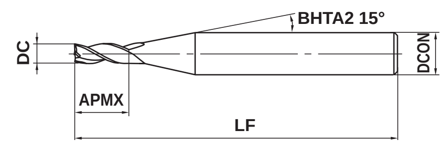
Product Code	Shape		Size Range	Sizes	P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool Steel, Prehardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminum Alloy
Ball Nose End Mills												
MP2SDB	Ball nose, Short cut length, 2 flute, High strength		METRIC RE 0.5 – 6	16	◎	◎	◎					
MP2XLB	Ball nose, Short cut length, 2 flute, Long neck		METRIC RE 0.05 – 3	232	◎	◎	◎		○	○	○	
MP3XB	Ball nose, Taper neck, For deep slotting of forging dies, 3 Flute		METRIC RE 0.5 – 6	34	◎	◎	◎		○	○	○	
Radius End Mills												
MP4MRB	Corner radius, Medium cut length, 4 flute		INCH DC .1250 – .5000	24	◎	◎	◎		○	○		
MPMHVRB	Corner radius, Irregular helix, 4 flute		METRIC DC 1-12	59	◎	◎	○		◎	○		
MPMHVRB	Corner radius, Irregular helix, Slim shank type, 4 flute		METRIC DC 10-12	9	◎	◎	○		◎	○		
MPXLRB	Corner radius, For precise, High efficiency mould and die machining, 4 flute		METRIC DC 0.2-6	101	◎	◎	◎		○	○	○	
Chamfer Cutter												
MP3C	Chamfer cutter, 3 flute		METRIC DC 2 – 12	6	◎	◎	◎		○	○		

I SOLID END MILLS

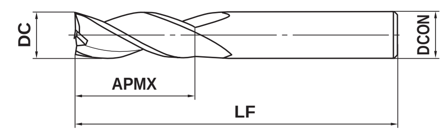
MP3MC -Inch Sizes

End mill, Medium cut length, 3 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	No.F*	Stock	Type
MP3MCD1/32	.0312	.0780	1.50	.1250	3	●	1
MP3MCD1/16	.0625	.1560	1.50	.1250	3	●	1
MP3MCD3/32	.0938	.2340	1.50	.1250	3	●	1
MP3MCD1/8	.1250	.3130	1.50	.1250	3	●	2
MP3MCD5/32	.1562	.3910	2.00	.2500	3	●	1
MP3MCD3/16	.1875	.4690	2.00	.2500	3	●	1
MP3MCD7/32	.2188	.5470	2.50	.2500	3	●	1
MP3MCD1/4	.2500	.6250	2.50	.2500	3	●	2
MP3MCD5/16	.3125	.7810	2.75	.3125	3	●	2
MP3MCD3/8	.3750	.9380	3.00	.3750	3	●	2
MP3MCD1/2	.5000	1.2500	3.50	.5000	3	●	2

* Number of Flutes

DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock

MS plus End Mill Series

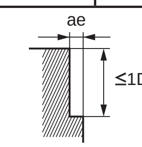
Recommended Cutting Conditions

Shoulder Milling

(inch)

Workpiece Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**
1/32	30000	53.1	.006	30000	53.1	.006	28000	49.6	.006	20000	35.4	.002
1/16	30000	70.9	.012	15000	35.4	.012	14000	33.1	.012	10000	23.6	.003
3/32	13400	31.7	.019	10000	23.6	.019	9400	22.2	.019	6700	15.8	.006
1/8	10000	35.4	.025	7500	26.6	.025	7000	24.8	.025	5000	17.7	.006
5/32	8000	33.1	.031	6000	24.8	.031	5600	23.1	.031	4000	16.5	.008
3/16	6700	31.7	.037	5000	23.6	.037	4700	22.2	.037	3300	15.6	.009
7/32	5700	26.9	.044	4300	20.3	.044	4000	18.9	.044	2900	13.7	.011
1/4	5000	26.6	.050	3800	20.2	.050	3500	18.6	.050	2500	13.3	.013
5/16	4000	23.6	.062	3000	17.7	.062	2800	16.5	.062	2000	11.8	.016
3/8	3300	23.4	.075	2500	17.7	.075	2300	16.3	.075	1700	12.0	.019
1/2	2500	17.7	.100	1900	13.5	.100	1800	12.8	.100	1300	9.2	.025

Depth of Cut



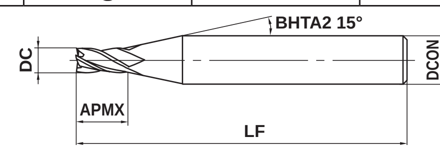
DC : Dia

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

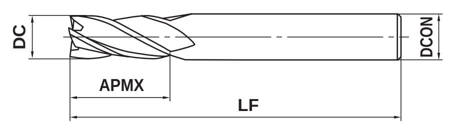
MP4MC - Inch Sizes

End mill, Medium cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	No.F*	Stock	Type
MP4MCD1/32	.0312	.0780	1.50	.1250	4	●	1
MP4MCD1/16	.0625	.1560	1.50	.1250	4	●	1
MP4MCD3/32	.0938	.2340	1.50	.1250	4	●	1
MP4MCD1/8	.1250	.3130	1.50	.1250	4	●	2
MP4MCD5/32	.1562	.3910	2.00	.2500	4	●	1
MP4MCD3/16	.1875	.4690	2.00	.2500	4	●	1
MP4MCD7/32	.2188	.5470	2.50	.2500	4	●	1
MP4MCD1/4	.2500	.6250	2.50	.2500	4	●	2
MP4MCD5/16	.3125	.7810	2.75	.3125	4	●	2
MP4MCD3/8	.3750	.9380	3.00	.3750	4	●	2
MP4MCD1/2	.5000	1.2500	3.50	.5000	4	●	2

* Number of Flutes

DC = Cutting dia. **LF** = Functional length
APMX = Depth of cut max. **DCON** = Connection dia.

● **: USA Stock**

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

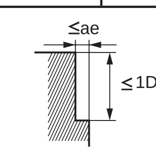
Recommended Cutting Conditions

Shoulder Milling

(inch)

Workpiece Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae
1/32	30000	70.9	.006	30000	70.9	.006	28000	66.1	.006	20000	47.2	.002
1/16	20100	63.3	.012	15000	47.2	.012	14000	44.1	.012	10000	31.5	.003
3/32	13400	42.2	.019	10000	31.5	.019	9400	29.6	.019	6700	21.1	.005
1/8	10000	47.2	.025	7500	35.4	.025	7000	33.1	.025	5000	23.6	.006
5/32	8000	44.1	.031	6000	33.1	.031	5600	30.9	.031	4000	22.0	.008
3/16	6700	42.2	.037	5000	31.5	.037	4700	29.6	.037	3300	20.8	.009
7/32	5700	35.9	.044	4300	27.1	.044	4000	25.2	.044	2900	18.3	.011
1/4	5000	35.4	.050	3800	26.9	.050	3500	24.8	.050	2500	17.7	.013
5/16	4000	31.5	.062	3000	23.6	.062	2800	22.0	.062	2000	15.7	.016
3/8	3300	31.2	.075	2500	23.6	.075	2300	21.7	.075	1700	16.1	.019
1/2	2500	23.6	.100	1900	18.0	.100	1800	17.0	.100	1300	12.3	.025

Depth of Cut



DC : Dia

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

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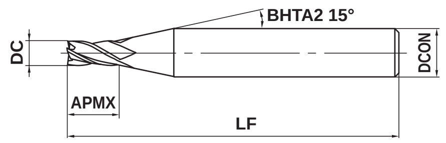
SOLID END MILLS

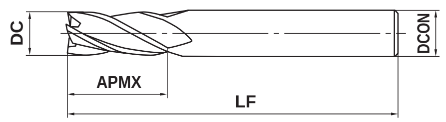
MP4JC - Inch Sizes

End mill, Semi long cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	**.250"≤DCON≤.375"**	**DCON=.500"**	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP4JCD1/16	.0625	.2500	1.50	.1250	4	●	1
MP4JCD3/32	.0938	.3750	1.50	.1250	4	●	1
MP4JCD1/8	.1250	.5000	2.00	.1250	4	●	2
MP4JCD3/16	.1875	.7500	2.50	.2500	4	●	1
MP4JCD1/4	.2500	1.0000	2.50	.2500	4	●	2
MP4JCD5/16	.3125	1.2500	2.75	.3125	4	●	2
MP4JCD3/8	.3750	1.5000	3.50	.3750	4	●	2
MP4JCD1/2	.5000	2.0000	4.50	.5000	4	●	2

* Number of Flutes

DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock

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SOLID END MILLS

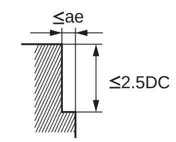
Recommended Cutting Conditions

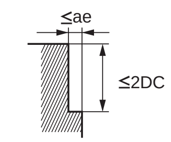
Shoulder Milling

(inch)

Workpiece Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut **ae**
1/16	18100	39.9	.012	14000	30.9	.012	12000	26.5	.012	10000	22.0	.0010
3/32	12000	26.5	.019	9400	20.7	.019	8000	17.6	.019	6700	14.8	.0020
1/8	9000	29.8	.025	7000	23.1	.025	6000	19.8	.025	5000	16.5	.0030
3/16	6000	26.5	.037	4700	20.7	.037	4000	17.6	.037	3300	14.6	.0040
1/4	4500	22.7	.050	3500	17.6	.050	3000	15.1	.050	2500	12.6	.0050
5/16	3600	19.8	.062	2800	15.4	.062	2400	13.2	.062	2000	11.0	.0060
3/8	3000	19.8	.075	2300	15.2	.075	2000	13.2	.075	1700	11.3	.0080
1/2	2300	15.2	.100	1800	11.9	.100	1500	9.9	.100	1300	8.6	.0100

Depth of Cut





DC : Dia

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

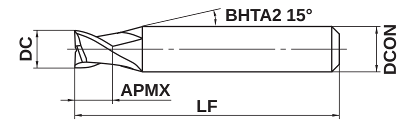
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP2ES

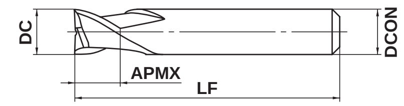
End mill, 2 flute, For swiss-type lathe

30° DC<6 DC≥6

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



Type1



Type2

3≤DC≤10				
- 0.010 - 0.030				
4≤DCON≤6	**7≤DCON≤10**			
0 - 0.008	0 - 0.009			

● 2 flute end mill.

(mm)

Order Number	DC	APMX	LF	DCON	No.F*	Stock	Type
MP2ESD0300S04	3	4.5	50	4	2	●	1
MP2ESD0400S04	4	6	50	4	2	●	2
MP2ESD0500S06	5	7.5	50	6	2	●	1
MP2ESD0600S06	6	9	50	6	2	★	2
MP2ESD0700S07	7	10.5	50	7	2	★	2
MP2ESD0800S08	8	12	50	8	2	★	2
MP2ESD1000S10	10	15	50	10	2	●	2

* Number of Flutes

DC = Cutting dia. **LF** = Functional length
APMX = Depth of cut max. **DCON** = Connection dia.

● : USA Stock ★ : Stocked in Japan

MS plus End Mill Series

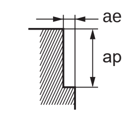
Recommended Cutting Conditions

Side Milling

(inch)

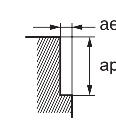
Workpiece Material		Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
Dia. DC (mm)	(inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	10000	23.6	.118	.024	7000	15.7	.118	.024	6000	11.8	.118	.024
4	.157	7500	23.6	.157	.024	5200	15.7	.157	.024	4500	11.8	.157	.024
5	.197	6000	23.6	.197	.024	4200	15.7	.197	.024	3600	11.8	.197	.024
6	.236	5000	23.6	.236	.024	3500	15.7	.236	.024	3000	11.8	.236	.024
7	.276	4500	22.0	.276	.024	3200	14.2	.276	.024	2700	11.0	.276	.024
8	.315	4000	20.5	.315	.024	2800	13.8	.315	.024	2400	10.2	.315	.024
10	.394	3200	17.7	.394	.024	2200	11.8	.394	.024	1900	9.1	.394	.024

Depth of Cut



Workpiece Material		Hardened steel (45−55HRC) AISI H13				Copper, Copper Alloy			
Dia. DC (mm)	(inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	5000	4.7	.118	.008	13000	30.7	.118	.024
4	.157	4000	4.7	.157	.008	9500	29.9	.157	.024
5	.197	3200	4.7	.197	.008	7600	29.9	.197	.024
6	.236	2700	4.7	.236	.008	6400	30.3	.236	.024
7	.276	2300	4.3	.276	.008	5500	26.8	.276	.024
8	.315	2000	4.3	.315	.008	4800	24.4	.315	.024
10	.394	1600	3.9	.394	.008	3800	20.9	.394	.024

Depth of Cut



Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP2ES

End mill, 2 flute, For swiss-type lathe

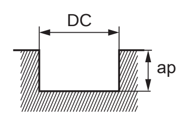
Recommended Cutting Conditions

■Slotting

(inch)

Workpiece Material		Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	10000	23.6	.024	7000	15.7	.024	6000	11.8	.024
4	.157	7500	23.6	.024	5200	15.7	.024	4500	11.8	.024
5	.197	6000	23.6	.024	4200	15.7	.024	3600	11.8	.024
6	.236	5000	23.6	.024	3500	15.7	.024	3000	11.8	.024
7	.276	4500	22.0	.024	3200	14.2	.024	2700	11.0	.024
8	.315	4000	20.5	.024	2800	13.8	.024	2400	10.2	.024
10	.394	3200	17.7	.024	2200	11.8	.024	1900	9.1	.024

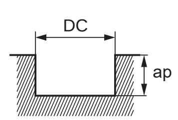
Depth of Cut



DC:Dia.

Workpiece Material		Hardened steel (45−55HRC) AISI H13			Copper, Copper Alloy		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	5000	4.7	.008	13000	30.7	.024
4	.157	4000	4.7	.008	9500	29.9	.024
5	.197	3200	4.7	.008	7600	29.9	.024
6	.236	2700	4.7	.008	6400	30.3	.024
7	.276	2300	4.3	.008	5500	26.8	.024
8	.315	2000	4.3	.008	4800	24.4	.024
10	.394	1600	3.9	.008	3800	20.9	.024

Depth of Cut



DC:Dia.

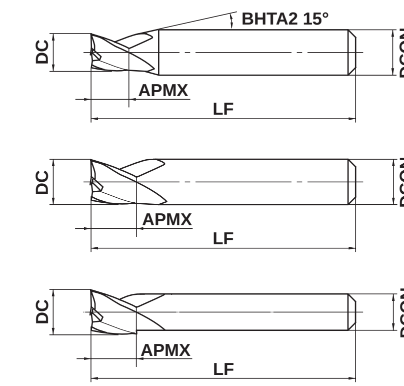
Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

MP3ES

End mill, 3 flute, For swiss-type lathe

UWC MS+ 30° DC<6

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



3≦DC≦12		
- 0.010 - 0.030		
4≦DCON≦6	**7≦DCON≦10**	**DCON=12**
0 - 0.008	0 - 0.009	0 - 0.011

h6

●3 flute end mill.

(mm)

Order Number	DC	APMX	LF	DCON	★ No.F	Stock	Type
MP3ESD0300S04	3	4.5	50	4	3	●	1
MP3ESD0400S04	4	6	50	4	3	★	2
MP3ESD0500S06	5	7.5	50	6	3	●	1
MP3ESD0600S06	6	9	50	6	3	★	2
MP3ESD0700S07	7	10.5	50	7	3	●	2
MP3ESD0800S08	8	12	50	8	3	★	2
MP3ESD0900S10	9	13.5	50	10	3	★	1
MP3ESD1000S10	10	15	50	10	3	●	2
MP3ESD1200S10	12	15	50	10	3	●	3
MP3ESD1200S12	12	15	50	12	3	★	2

★ Number of Flutes

DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

MP3ES

End mill, 3 flute, For swiss-type lathe

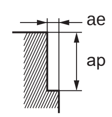
Recommended Cutting Conditions

Side Milling

(inch)

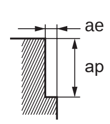
Workpiece Material		Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	10000	28.3	.118	.024	7000	18.9	.118	.024	6000	14.2	.118	.024
4	.157	7500	28.3	.157	.024	5200	18.9	.157	.024	4500	14.2	.157	.024
5	.197	6000	28.3	.197	.024	4200	18.9	.197	.024	3600	14.2	.197	.024
6	.236	5000	28.3	.236	.024	3500	18.9	.236	.024	3000	14.2	.236	.024
7	.276	4500	26.4	.276	.024	3200	17.3	.276	.024	2700	13.4	.276	.024
8	.315	4000	24.4	.315	.024	2800	16.5	.315	.024	2400	12.2	.315	.024
9	.354	3500	22.8	.354	.024	2500	15.0	.354	.024	2100	11.4	.354	.024
10	.394	3200	21.3	.394	.024	2200	14.2	.394	.024	1900	11.0	.394	.024
12	.472	2700	19.3	.472	.024	1900	12.6	.472	.024	1600	9.8	.472	.024

Depth of Cut



Workpiece Material		Hardened steel (45—55HRC) AISI H13				Copper, Copper Alloy			
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	5000	5.5	.118	.008	13000	37.0	.118	.024
4	.157	4000	5.5	.157	.008	9500	35.8	.157	.024
5	.197	3200	5.5	.197	.008	7600	35.8	.197	.024
6	.236	2700	5.5	.236	.008	6400	36.2	.236	.024
7	.276	2300	5.1	.276	.008	5500	32.3	.276	.024
8	.315	2000	5.1	.315	.008	4800	29.1	.315	.024
9	.354	1800	5.1	.354	.008	4200	27.6	.354	.024
10	.394	1600	4.7	.394	.008	3800	25.2	.394	.024
12	.472	1300	4.7	.472	.008	3200	22.8	.472	.024

Depth of Cut



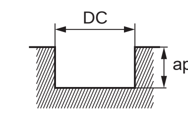
Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionally.

Slotting

(inch)

Workpiece Material		Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	10000	28.3	.024	7000	18.9	.024	6000	14.2	.024
4	.157	7500	28.3	.024	5200	18.9	.024	4500	14.2	.024
5	.197	6000	28.3	.024	4200	18.9	.024	3600	14.2	.024
6	.236	5000	28.3	.024	3500	18.9	.024	3000	14.2	.024
7	.276	4500	26.4	.024	3200	17.3	.024	2700	13.4	.024
8	.315	4000	24.4	.024	2800	16.5	.024	2400	12.2	.024
9	.354	3500	22.8	.024	2500	15.0	.024	2100	11.4	.024
10	.394	3200	21.3	.024	2200	14.2	.024	1900	11.0	.024
12	.472	2700	19.3	.024	1900	12.6	.024	1600	9.8	.024

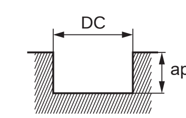
Depth of Cut



DC:Dia.

Workpiece Material		Hardened steel (45—55HRC) AISI H13			Copper, Copper Alloy		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	5000	5.5	.008	13000	37.0	.024
4	.157	4000	5.5	.008	9500	35.8	.024
5	.197	3200	5.5	.008	7600	35.8	.024
6	.236	2700	5.5	.008	6400	36.2	.024
7	.276	2300	5.1	.008	5500	32.3	.024
8	.315	2000	5.1	.008	4800	29.1	.024
9	.354	1800	5.1	.008	4200	27.6	.024
10	.394	1600	4.7	.008	3800	25.2	.024
12	.472	1300	4.7	.008	3200	22.8	.024

Depth of Cut



DC:Dia.

Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionally.

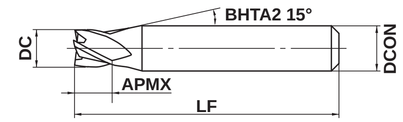
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP4EC

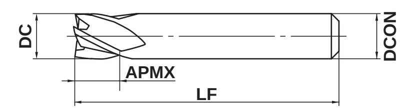
End mill, 4 flute, For swiss-type lathe

30° DC<6

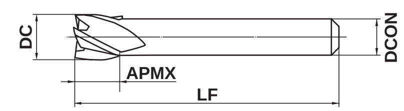
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○	○	



Type1



Type2



Type3

3≤DC≤12	DC=14			
-0.010 -0.030	-0.010 -0.040			
4≤DCON≤6	**7≤DCON≤10**	**DCON=12**		
0 -0.008	0 -0.009	0 -0.011		

●4 flute end mill.

(mm)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP4ECD0300S04	3	4.5	50	4	4	●	1
MP4ECD0350S04	3.5	5	50	4	4	★	1
MP4ECD0400S04	4	6	50	4	4	●	2
MP4ECD0500S06	5	7.5	50	6	4	●	1
MP4ECD0600S06	6	9	50	6	4	●	2
MP4ECD0700S07	7	10.5	50	7	4	★	2
MP4ECD0800S07	8	12	50	7	4	★	3
MP4ECD0800S08	8	12	50	8	4	●	2
MP4ECD0900S10	9	13.5	50	10	4	●	1
MP4ECD1000S07	10	15	50	7	4	★	3
MP4ECD1000S10	10	15	50	10	4	●	2
MP4ECD1200S10	12	15	50	10	4	●	3
MP4ECD1200S12	12	15	50	12	4	★	2
MP4ECD1400S10	14	15	50	10	4	●	3

* Number of Flutes

DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock ★ : Stocked in Japan

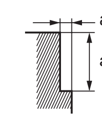
Recommended Cutting Conditions

■Side Milling

(inch)

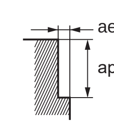
Workpiece Material		Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	10000	35.4	.118	.024	7000	23.6	.118	.024	6000	17.7	.118	.024
3.5	.138	8500	35.4	.138	.024	6000	23.6	.138	.024	5100	17.7	.138	.024
4	.157	7500	35.4	.157	.024	5200	23.6	.157	.024	4500	17.7	.157	.024
5	.197	6000	35.4	.197	.024	4200	23.6	.197	.024	3600	17.7	.197	.024
6	.236	5000	35.4	.236	.024	3500	23.6	.236	.024	3000	17.7	.236	.024
7	.276	4500	33.1	.276	.024	3200	21.3	.276	.024	2700	16.5	.276	.024
8	.315	4000	30.7	.315	.024	2800	20.5	.315	.024	2400	15.4	.315	.024
9	.354	3500	28.3	.354	.024	2500	18.9	.354	.024	2100	14.2	.354	.024
10	.394	3200	26.8	.394	.024	2200	17.7	.394	.024	1900	13.4	.394	.024
12	.472	2700	24.4	.472	.024	1900	16.1	.472	.024	1600	12.2	.472	.024
14	.551	2300	21.7	.551	.024	1600	13.8	.551	.024	1400	11.0	.551	.024

Depth of cut



Workpiece Material		Hardened steel (45−55HRC) AISI H13				Copper, Copper Alloy			
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	5000	7.1	.118	.008	13000	47.2	.118	.024
3.5	.138	4500	7.1	.138	.008	11000	47.2	.138	.024
4	.157	4000	7.1	.157	.008	9500	43.3	.157	.024
5	.197	3200	7.1	.197	.008	7600	43.3	.197	.024
6	.236	2700	7.1	.236	.008	6400	43.3	.236	.024
7	.276	2300	6.3	.276	.008	5500	39.4	.276	.024
8	.315	2000	6.3	.315	.008	4800	37.0	.315	.024
9	.354	1800	5.9	.354	.008	4200	33.9	.354	.024
10	.394	1600	5.5	.394	.008	3800	31.9	.394	.024
12	.472	1300	4.7	.472	.008	3200	28.7	.472	.024
14	.551	1200	4.7	.551	.008	2700	25.6	.551	.024

Depth of cut



Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP4EC

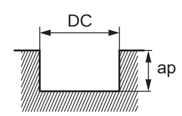
End mill, 4 flute, For small automatic lathes

■Slotting

(inch)

Workpiece Material		Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	10000	35.4	.024	7000	23.6	.024	6000	17.7	.024
3.5	.138	8500	35.4	.024	6000	23.6	.024	5100	17.7	.024
4	.157	7500	35.4	.024	5200	23.6	.024	4500	17.7	.024
5	.197	6000	35.4	.024	4200	23.6	.024	3600	17.7	.024
6	.236	5000	35.4	.024	3500	23.6	.024	3000	17.7	.024
7	.276	4500	33.1	.024	3200	21.3	.024	2700	16.5	.024
8	.315	4000	30.7	.024	2800	20.5	.024	2400	15.4	.024
9	.354	3500	28.3	.024	2500	18.9	.024	2100	14.2	.024
10	.394	3200	26.8	.024	2200	17.7	.024	1900	13.4	.024
12	.472	2700	24.4	.024	1900	16.1	.024	1600	12.2	.024
14	.551	2300	21.7	.024	1600	13.8	.024	1400	11.0	.024

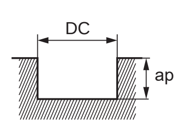
Depth of Cut



DC:Dia.

Workpiece Material		Hardened steel (45−55HRC) AISI H13			Copper, Copper Alloy		
Dia. DC (mm)	Dia. DC (inch)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
3	.118	5000	7.1	.008	13000	47.2	.024
3.5	.138	4500	7.1	.008	11000	47.2	.024
4	.157	4000	7.1	.008	9500	43.3	.024
5	.197	3200	7.1	.008	7600	43.3	.024
6	.236	2700	7.1	.008	6400	43.3	.024
7	.276	2300	6.3	.008	5500	39.4	.024
8	.315	2000	6.3	.008	4800	37.0	.024
9	.354	1800	5.9	.008	4200	33.9	.024
10	.394	1600	5.5	.008	3800	31.9	.024
12	.472	1300	4.7	.008	3200	28.7	.024
14	.551	1200	4.7	.008	2700	25.6	.024

Depth of Cut



DC:Dia.

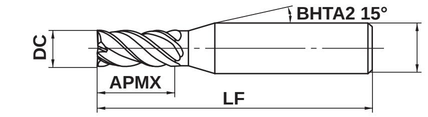
Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.
Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

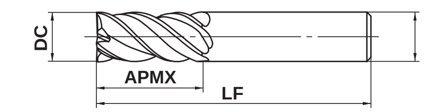
MPMHV

End mill, Medium cut length, 4 flute, Irregular helix flutes

37°
40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	○		





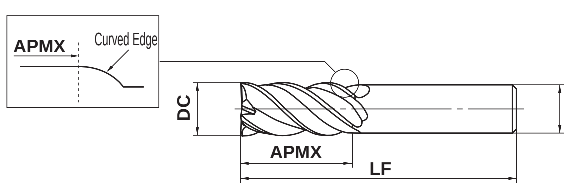
	DC≤12	DC>12			
	0 - 0.02	0 - 0.03			
h5	DCON=4	DCON=6	DCON=8		
	0 - 0.005	0 - 0.005	0 - 0.006		
h6	DCON=6(DC=8)	DCON=8(DC=10)	DCON=10	12≤DCON≤16	DCON=20
	0 - 0.008	0 - 0.009	0 - 0.009	0 - 0.011	0 - 0.013

●4 flute irregular helix end mill for reduced vibration when machining stainless and carbon steels.
●Larger selection of the slim shank type.

(mm)

Order Number	DC	APMX	LF	DCON	No.F*	Stock	Type	
MPMHVD0100	1	2.5	45	4	4	★	1	
MPMHVD0150	1.5	3.8	45	4	4	★	1	
MPMHVD0200	2	5	45	4	4	★	1	
MPMHVD0250	2.5	6.3	45	4	4	★	1	
MPMHVD0300	3	7.5	45	6	4	★	1	
MPMHVD0400	4	10	45	6	4	★	1	
MPMHVD0500	5	12.5	50	6	4	★	1	
MPMHVD0600	6	15	60	6	4	★	2	
MPMHVD0700	7	17.5	70	8	4	★	1	
MPMHVD0800	8	20	70	8	4	★	2	
MPMHVD1000	10	25	80	10	4	★	2	
MPMHVD1200	12	30	100	12	4	★	2	

* Number of Flutes



■Slim Shank

(mm)

Order Number	DC	APMX	LF	DCON	No.F*	Stock	Type	
MPMHVD0700S06	7	17.5	80	6	4	★	3	
MPMHVD0800S06	8	20	90	6	4	★	3	
MPMHVD0900S08	9	22.5	90	8	4	★	3	
MPMHVD1000S08	10	25	100	8	4	★	3	
MPMHVD1100S10	11	28	100	10	4	★	3	
MPMHVD1200S10	12	30	110	10	4	★	3	

* Number of Flutes
★ : Stocked in Japan

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MPMHV

End mill, Medium cut length, 4 flute, Irregular helix flutes

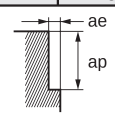
Recommended Cutting Conditions

■Side Milling

(mm)

Workpiece Material	Carbon steel, Alloy steel (180–280HB) Ductile Cast Iron				Carbon steel, Alloy steel (280–350HB) Pre-hardened steel, Alloy tool steel				Austenitic stainless steel (≤200HB) Titanium alloys				Hardened Steel (45–52HRC)			
DC	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
1	38000	910	1.7	0.2	31000	500	1.7	0.2	25000	500	1.7	0.2	18000	290	1.7	0.05
1.5	27000	970	2.5	0.3	22000	530	2.5	0.3	18000	500	2.5	0.3	13000	310	2.5	0.08
2	21000	1500	3.5	0.4	17000	820	3.5	0.4	14000	640	3.5	0.4	10000	320	3.5	0.1
2.5	18000	1700	4.2	0.5	15000	900	4.2	0.5	12000	820	4.2	0.5	8500	360	4.2	0.13
3	16000	1800	5	0.6	13000	940	5	0.6	11000	880	5	0.6	7400	380	5	0.15
4	12000	1700	7	0.8	9500	950	7	0.8	8000	900	7	0.8	5600	400	7	0.2
5	9500	1800	8.5	1	7600	1100	8.5	1	6400	900	8.5	1	4500	430	8.5	0.25
6	8000	2100	10	1.2	6400	1300	10	1.2	5300	1100	10	1.2	3700	440	10	0.3
7	6800	2000	12	1.4	5500	1400	12	1.4	4500	1200	12	1.4	3200	450	12	0.35
8	6000	2000	13.5	1.6	4800	1400	13.5	1.6	4000	1200	13.5	1.6	2800	450	13.5	0.4
10	4800	2100	17	2	3800	1500	17	2	3200	1100	17	2	2200	440	17	0.5
12	4000	1900	20.5	2.4	3200	1400	20.5	2.4	2700	1100	20.5	2.4	1900	380	20.5	0.6

Depth of cut

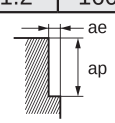


■Side Milling (Slim Shank)

(mm)

Workpiece Material	Carbon steel, Alloy steel (180–280HB) Ductile Cast Iron				Carbon steel, Alloy steel (280–350HB) Pre-hardened steel, Alloy tool steel				Austenitic stainless steel (≤200HB) Titanium alloys				Hardened Steel (45–52HRC)			
DC	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
7	4100	1200	12	0.7	3300	860	12	0.7	2700	700	12	0.7	1900	270	12	0.35
8	3600	1200	13.5	0.8	2900	870	13.5	0.8	2400	720	13.5	0.8	1700	270	13.5	0.4
9	3200	1200	15	0.9	2500	900	15	0.9	2100	660	15	0.9	1500	270	15	0.45
10	2900	1300	17	1	2300	920	17	1	1900	670	17	1	1300	260	17	0.5
11	2600	1200	18.5	1.1	2100	880	18.5	1.1	1700	520	18.5	1.1	1200	190	18.5	0.55
12	2400	1200	20.5	1.2	1900	840	20.5	1.2	1600	650	20.5	1.2	1100	220	20.5	0.6

Depth of cut



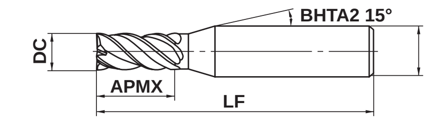
Note 1) Water-soluble cutting fluids are recommended for stainless steel and titanium alloys. Air blowing is recommended for carbon steel.
Note 2) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.

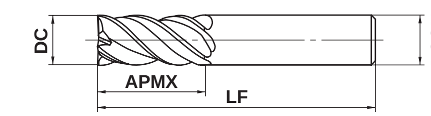
MPJHV

End mill, Semi long cut length, 4 flute, Irregular helix flutes

UWC MS+ 37.5° 40° APMX=DCx3.3 38° 40° APMX=DCx4

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	○		





	DC≤12	DC>12			
	0 / - 0.02	0 / - 0.03			
h5	DCON=4	DCON=6	DCON=8		
	0 / - 0.005	0 / - 0.005	0 / - 0.006		
h6	DCON=10	DCON=12	DCON=16	DCON=20	
	0 / - 0.009	0 / - 0.011	0 / - 0.011	0 / - 0.013	

- 4 flute irregular helix end mill for reduced vibration when machining stainless and carbon steels.
- Semi long flute length suitable for vertical wall finishing.

(mm)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MPJHVD0100AP04	1	4	45	4	4	★	1
MPJHVD0150AP06	1.5	6	45	4	4	★	1
MPJHVD0200AP06	2	6.5	60	6	4	★	1
MPJHVD0200AP08	2	8	60	6	4	★	1
MPJHVD0250AP10	2.5	10	60	6	4	★	1
MPJHVD0300AP10	3	10	60	6	4	★	1
MPJHVD0300AP12	3	12	60	6	4	★	1
MPJHVD0400AP13	4	13	60	6	4	★	1
MPJHVD0400AP16	4	16	60	6	4	★	1
MPJHVD0500AP17	5	17	60	6	4	★	1
MPJHVD0500AP20	5	20	60	6	4	★	1
MPJHVD0600AP20	6	20	60	6	4	★	2
MPJHVD0600AP24	6	24	60	6	4	★	2
MPJHVD0800AP26	8	26	80	8	4	★	2
MPJHVD0800AP32	8	32	80	8	4	★	2
MPJHVD1000AP33	10	33	100	10	4	★	2
MPJHVD1000AP40	10	40	100	10	4	★	2
MPJHVD1200AP40	12	40	110	12	4	★	2
MPJHVD1200AP48	12	48	110	12	4	★	2

* Number of Flutes

DC = Cutting Diameter
APMX = Depth of Cut Max.
LF = Functional Length
DCON = Connection Diameter

★ : Stocked in Japan

CARBIDE
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SOLID END MILLS

MPJHV

End mill, Semi long cut length, 4 flute, Irregular helix flutes

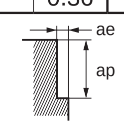
Recommended Cutting Conditions

Side Milling

(mm)

Workpiece Material		Carbon steel, Alloy steel (180–280HB) Ductile Cast Iron				Carbon steel, Alloy steel (280–350HB) Pre-hardened steel, Alloy tool steel				Austenitic stainless steel (≤200HB) Titanium alloys				Hardened Steel (45–52HRC)			
DC	APMX	n (min⁻¹)	vf (mm/min)	ap	ae	n (min⁻¹)	vf (mm/min)	ap	ae	n (min⁻¹)	vf (mm/min)	ap	ae	n (min⁻¹)	vf (mm/min)	ap	ae
1	4	19000	300	3	0.03	15000	240	3	0.03	13000	210	3	0.03	13000	160	3	0.02
1.5	6	16000	320	4.5	0.05	13000	260	4.5	0.05	11000	220	4.5	0.05	8500	170	4.5	0.03
2	6.5	15000	500	5	0.1	12000	380	5	0.1	10000	320	5	0.1	7700	220	5	0.06
	8	14000	470	6	0.06	11000	350	6	0.06	9500	300	6	0.06	7300	200	6	0.04
2.5	10	13000	660	7.5	0.08	11000	520	7.5	0.08	8900	390	7.5	0.08	6300	250	7.5	0.05
3	10	13000	890	7.4	0.15	10000	620	7.4	0.15	8400	470	7.4	0.15	5900	300	7.4	0.09
	12	12000	820	9	0.09	9500	590	9	0.09	8000	450	9	0.09	5600	280	9	0.06
4	13	9400	940	9.9	0.2	7500	650	9.9	0.2	6300	530	9.9	0.2	4700	320	9.9	0.12
	16	9000	900	12	0.12	7200	620	12	0.12	6000	500	12	0.12	4500	310	12	0.08
5	17	7500	990	12.4	0.25	6000	680	12.4	0.25	5000	560	12.4	0.25	3800	350	12.4	0.15
	20	7200	950	15	0.15	5700	650	15	0.15	4800	540	15	0.15	3600	330	15	0.1
6	20	6300	1100	14.9	0.3	5000	760	14.9	0.3	4200	640	14.9	0.3	3200	350	14.9	0.18
	24	6000	1000	18	0.18	4800	730	18	0.18	4000	610	18	0.18	3000	330	18	0.12
8	26	4700	1100	19.8	0.4	3800	800	19.8	0.4	3100	620	19.8	0.4	2400	360	19.8	0.24
	32	4500	1000	24	0.24	3600	760	24	0.24	3000	600	24	0.24	2300	350	24	0.16
10	33	3800	1000	24.8	0.5	3000	760	24.8	0.5	2500	590	24.8	0.5	1900	330	24.8	0.3
	40	3600	970	30	0.3	2900	730	30	0.3	2400	570	30	0.3	1800	310	30	0.2
12	40	3100	1000	29.7	0.6	2500	720	29.7	0.6	2100	550	29.7	0.6	1600	300	29.7	0.36
	48	3000	970	36	0.36	2400	690	36	0.36	2000	520	36	0.36	1500	280	36	0.24

Depth of cut

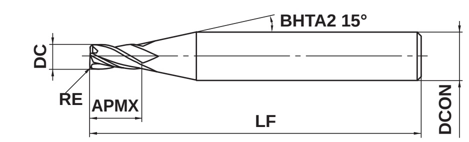


Note 1) Water-soluble cutting fluids are recommended for stainless steel and titanium alloys. Air blowing is recommended for carbon steel.
Note 2) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.

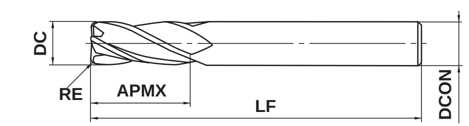
MP4MRB - Inch Sizes

Corner radius, Medium cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○		



Type 1



Type 2

	RE<.0200"	.0200"≤RE≤.0450"
DC<.3750"	± .0006"	± .0008"
DC=.5000"	± .0008"	± .0008"

DC<.5000"	DC=.5000"
0 / - .0008"	0 / - .0012"

DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"
0 / - .00024"	0 / - .00035"	0 / - .00043"

(inch)

Order Number	DC	RE	APMX	LF	DCON	No.F*	Stock	Type
MP4MRBD1/8R010	.1250	.0100	.3130	1.50	.1250	4	●	2
MP4MRBD1/8R015	.1250	.0150	.3130	1.50	.1250	4	●	2
MP4MRBD1/8R020	.1250	.0200	.3130	1.50	.1250	4	●	2
MP4MRBD3/16R010	.1875	.0100	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R015	.1875	.0150	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R020	.1875	.0200	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R030	.1875	.0300	.4690	2.00	.2500	4	●	1
MP4MRBD1/4R010	.2500	.0100	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R015	.2500	.0150	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R020	.2500	.0200	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R030	.2500	.0300	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R045	.2500	.0450	.6250	2.50	.2500	4	●	2
MP4MRBD5/16R015	.3125	.0150	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R020	.3125	.0200	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R030	.3125	.0300	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R045	.3125	.0450	.7810	2.75	.3125	4	●	2
MP4MRBD3/8R015	.3750	.0150	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R020	.3750	.0200	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R030	.3750	.0300	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R045	.3750	.0450	.9380	3.00	.3750	4	●	2
MP4MRBD1/2R015	.5000	.0150	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R020	.5000	.0200	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R030	.5000	.0300	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R045	.5000	.0450	1.2500	3.50	.5000	4	●	2

* Number of Flutes

DC = Cutting dia.
RE = Corner radius
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock

MP4MRB - Inch Sizes

Corner radius, Medium cut length, 4 flute

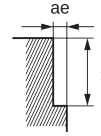
Recommended Cutting Conditions

Shoulder Milling

(inch)

Workpiece Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ae
1/8	10000	47.2	.025	7500	8.9	.025	7000	8.3	.025	5000	5.9	.006
3/16	6700	42.2	.037	5000	7.9	.037	4700	7.4	.037	3300	5.2	.009
1/4	5000	35.4	.050	3800	6.7	.050	3500	6.2	.050	2500	4.4	.013
5/16	4000	31.5	.062	3000	5.9	.062	2800	5.5	.062	2000	3.9	.016
3/8	3300	31.2	.075	2500	5.9	.075	2300	5.4	.075	1700	4.0	.019
1/2	2500	23.6	.100	1900	4.5	.100	1800	4.3	.100	1300	3.1	.025

Depth of Cut



DC : Dia

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionally.

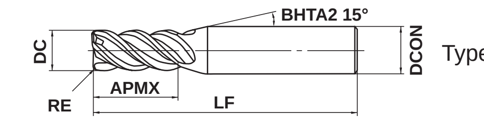
MS plus End Mill Series

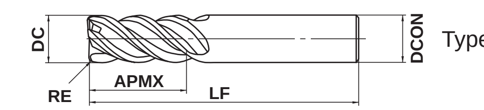
MPMHVRB

Corner radius, Medium cut length, 4 flute, Irregular helix flutes

37°
40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	○		





0.1≤RE≤5				
±0.015				
DC≤12	DC>12			
0 / - 0.02	0 / - 0.03			
DCON=4	DCON=6	DCON=8		
0 / - 0.005	0 / - 0.005	0 / - 0.006		
DCON=8(DC=10)	DCON=10(DC=12)	DCON=10	12≤DCON≤16	DCON=20
0 / - 0.009	0 / - 0.009	0 / - 0.009	0 / - 0.011	0 / - 0.013

●4 flute irregular helix end mill for reduced vibration when machining stainless and carbon steels.

(mm)

Order Number	DC	RE	APMX	LF	DCON	No.F*	Stock	Type
MPMHVRBD0100R010	1	0.1	2.5	45	4	4	★	1
MPMHVRBD0100R020	1	0.2	2.5	45	4	4	★	1
MPMHVRBD0200R010	2	0.1	5	45	4	4	★	1
MPMHVRBD0200R020	2	0.2	5	45	4	4	★	1
MPMHVRBD0200R030	2	0.3	5	45	4	4	★	1
MPMHVRBD0200R050	2	0.5	5	45	4	4	★	1
MPMHVRBD0300R010	3	0.1	7.5	45	6	4	★	1
MPMHVRBD0300R020	3	0.2	7.5	45	6	4	★	1
MPMHVRBD0300R030	3	0.3	7.5	45	6	4	★	1
MPMHVRBD0300R050	3	0.5	7.5	45	6	4	★	1
MPMHVRBD0400R010	4	0.1	10	45	6	4	★	1
MPMHVRBD0400R020	4	0.2	10	45	6	4	★	1
MPMHVRBD0400R030	4	0.3	10	45	6	4	★	1
MPMHVRBD0400R050	4	0.5	10	45	6	4	★	1
MPMHVRBD0400R100	4	1	10	45	6	4	★	1
MPMHVRBD0500R010	5	0.1	12.5	50	6	4	★	1
MPMHVRBD0500R020	5	0.2	12.5	50	6	4	★	1
MPMHVRBD0500R030	5	0.3	12.5	50	6	4	★	1
MPMHVRBD0500R050	5	0.5	12.5	50	6	4	★	1
MPMHVRBD0500R100	5	1	12.5	50	6	4	★	1
MPMHVRBD0600R010	6	0.1	15	60	6	4	★	2
MPMHVRBD0600R020	6	0.2	15	60	6	4	★	2
MPMHVRBD0600R030	6	0.3	15	60	6	4	★	2
MPMHVRBD0600R050	6	0.5	15	60	6	4	★	2
MPMHVRBD0600R100	6	1	15	60	6	4	★	2
MPMHVRBD0800R020	8	0.2	20	70	8	4	★	2
MPMHVRBD0800R030	8	0.3	20	70	8	4	★	2
MPMHVRBD0800R050	8	0.5	20	70	8	4	★	2
MPMHVRBD0800R100	8	1	20	70	8	4	★	2
MPMHVRBD0800R150	8	1.5	20	70	8	4	★	2
MPMHVRBD0800R200	8	2	20	70	8	4	★	2
MPMHVRBD0800R250	8	2.5	20	70	8	4	★	2

* Number of Flutes

★ : Stocked in Japan

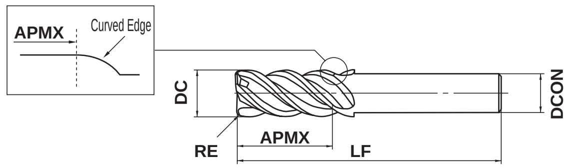
MPMHVRB

Corner radius, Medium cut length, 4 flute, Irregular helix flutes

(mm)

Order Number	DC	RE	APMX	LF	DCON	* No.F	Stock	Type
MPMHVRBD0800R300	8	3	20	70	8	4	●	2
MPMHVRBD1000R020	10	0.2	25	80	10	4	●	2
MPMHVRBD1000R030	10	0.3	25	80	10	4	●	2
MPMHVRBD1000R050	10	0.5	25	80	10	4	●	2
MPMHVRBD1000R100	10	1	25	80	10	4	●	2
MPMHVRBD1000R150	10	1.5	25	80	10	4	●	2
MPMHVRBD1000R200	10	2	25	80	10	4	●	2
MPMHVRBD1000R250	10	2.5	25	80	10	4	●	2
MPMHVRBD1000R300	10	3	25	80	10	4	●	2
MPMHVRBD1200R030	12	0.3	30	100	12	4	●	2
MPMHVRBD1200R050	12	0.5	30	100	12	4	●	2
MPMHVRBD1200R100	12	1	30	100	12	4	●	2
MPMHVRBD1200R150	12	1.5	30	100	12	4	●	2
MPMHVRBD1200R200	12	2	30	100	12	4	●	2
MPMHVRBD1200R300	12	3	30	100	12	4	●	2

* Number of Flutes



Type3

Slim Shank

(mm)

Order Number	DC	RE	APMX	LF	DCON	* No.F	Stock	Type
MPMHVRBD1000R030S08	10	0.3	25	100	8	4	●	3
MPMHVRBD1000R050S08	10	0.5	25	100	8	4	●	3
MPMHVRBD1000R100S08	10	1	25	100	8	4	●	3
MPMHVRBD1000R200S08	10	2	25	100	8	4	●	3
MPMHVRBD1200R030S10	12	0.3	30	110	10	4	●	3
MPMHVRBD1200R050S10	12	0.5	30	110	10	4	●	3
MPMHVRBD1200R100S10	12	1	30	110	10	4	●	3
MPMHVRBD1200R200S10	12	2	30	110	10	4	●	3
MPMHVRBD1200R300S10	12	3	30	110	10	4	●	3

* Number of Flutes

DC = Cutting Diameter
RE = Corner Radius
APMX = Depth of Cut Max.
LF = Functional Length
DCON = Connection Diameter

★ : Stocked in Japan

CARBIDE | CHAMFER | SQUARE | BALL | RADIUS | I | SOLID END MILLS

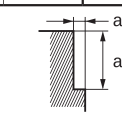
Recommended Cutting Conditions

Side Milling

(mm)

Workpiece Material	Carbon steel, Alloy steel (180–280HB) Ductile Cast Iron				Carbon steel, Alloy steel (280−350HB) Pre-hardened steel, Alloy tool steel				Austenitic stainless steel (≤200HB) Titanium alloys				Hardened Steel (45−52HRC)			
DC	n (min^{-1})	vf (mm/min)	ap	ae	n (min^{-1})	vf (mm/min)	ap	ae	n (min^{-1})	vf (mm/min)	ap	ae	n (min^{-1})	vf (mm/min)	ap	ae
1	38000	910	1.7	0.2	31000	500	1.7	0.2	25000	500	1.7	0.2	18000	290	1.7	0.05
2	21000	1500	3.5	0.4	17000	820	3.5	0.4	14000	640	3.5	0.4	10000	320	3.5	0.1
3	16000	1800	5	0.6	13000	940	5	0.6	11000	880	5	0.6	7400	380	5	0.15
4	12000	1700	7	0.8	9500	950	7	0.8	8000	900	7	0.8	5600	400	7	0.2
5	9500	1800	8.5	1	7600	1100	8.5	1	6400	900	8.5	1	4500	430	8.5	0.25
6	8000	2100	10	1.2	6400	1300	10	1.2	5300	1100	10	1.2	3700	440	10	0.3
8	6000	2000	13.5	1.6	4800	1400	13.5	1.6	4000	1200	13.5	1.6	2800	450	13.5	0.4
10	4800	2100	17	2	3800	1500	17	2	3200	1100	17	2	2200	440	17	0.5
12	4000	1900	20.5	2.4	3200	1400	20.5	2.4	2700	1100	20.5	2.4	1900	380	20.5	0.6
16	3000	1400	27.2	3.2	2400	1100	27.2	3.2	2000	840	27.2	3.2	1400	340	27.2	0.8
20	2400	1200	34	4	1900	840	34	4	1600	670	34	4	1100	260	34	1

Depth of cut



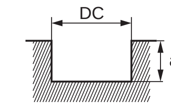
Note 1) When using a slim shank with DC=10 or 12, reduce the cutting speed by 60%, the feed rate by 80%, and the depth of cut ae by 50% from the above conditions.
Note 2) Water-soluble cutting fluids are recommended for stainless steel and titanium alloys. Air blowing is recommended for carbon steel.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

Slotting

(mm)

Workpiece Material	Carbon steel, Alloy steel (180–280HB) Ductile Cast Iron			Carbon steel, Alloy steel (280−350HB) Pre-hardened steel, Alloy tool steel			Austenitic stainless steel (≤200HB) Titanium alloys			Hardened Steel (45−52HRC)		
DC	n (min^{-1})	vf (mm/min)	ap	n (min^{-1})	vf (mm/min)	ap	n (min^{-1})	vf (mm/min)	ap	n (min^{-1})	vf (mm/min)	ap
1	31000	620	0.5	24000	380	0.5	20000	320	0.5	9500	110	0.2
2	17000	650	2	14000	450	2	11000	350	2	4800	130	0.4
3	13000	940	3	10000	660	3	8500	510	3	3200	140	0.6
4	9500	820	4	7600	600	4	6400	460	4	2400	150	0.8
5	7600	910	5	6100	670	5	5100	510	5	1900	170	1
6	6400	860	6	5100	630	6	4200	470	6	1600	190	1.2
8	4800	1000	8	3800	750	8	3200	580	8	1200	190	1.6
10	3800	910	10	3100	680	10	2500	500	10	950	150	2
12	3200	920	12	2500	660	12	2100	500	12	800	160	2.4
16	2400	690	16	1900	500	16	1600	380	16	600	120	3.2
20	1900	550	20	1500	400	20	1300	310	20	480	96	4

Depth of cut



DC: Diameter

Note 4) Slotting is not recommended when using a slim shank type.

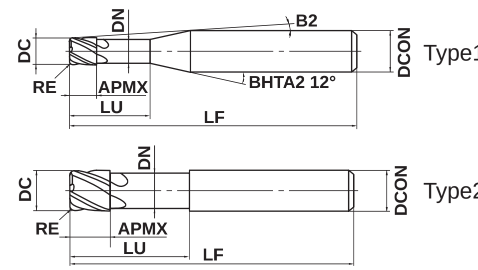
CARBIDE | CHAMFER | SQUARE | BALL | RADIUS | I | SOLID END MILLS

MPXLRB

Corner radius, Short cut length, Long neck

30°
DC≤0.3
DC≥0.4

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎		○	○	○	



0.05≤RE≤0.5				
±0.005				
0.2≤DC≤6				
0 - 0.01				
4≤DCON≤6				
h5 0 - 0.005				

●Suitable for high precision and highly efficient mould and die machining.

(mm)

Order Number	DC	RE	APMX	LU	DN	LF	DCON	No.F*	Stock	Type
MPXLRBD0020R005N005	0.2	0.05	0.2	0.5	0.18	50	4	2	★	1
MPXLRBD0020R005N010	0.2	0.05	0.2	1	0.18	50	4	2	★	1
MPXLRBD0030R005N010	0.3	0.05	0.3	1	0.28	50	4	2	★	1
MPXLRBD0030R005N020	0.3	0.05	0.3	2	0.28	50	4	2	★	1
MPXLRBD0040R005N020	0.4	0.05	0.4	2	0.37	50	4	4	★	1
MPXLRBD0040R005N030	0.4	0.05	0.4	3	0.37	50	4	4	★	1
MPXLRBD0040R005N040	0.4	0.05	0.4	4	0.37	50	4	4	★	1
MPXLRBD0050R005N020	0.5	0.05	0.5	2	0.47	50	4	4	★	1
MPXLRBD0050R005N030	0.5	0.05	0.5	3	0.47	50	4	4	★	1
MPXLRBD0050R005N040	0.5	0.05	0.5	4	0.47	50	4	4	★	1
MPXLRBD0050R005N050	0.5	0.05	0.5	5	0.47	50	4	4	★	1
MPXLRBD0060R005N020	0.6	0.05	0.6	2	0.57	50	4	4	★	1
MPXLRBD0060R005N040	0.6	0.05	0.6	4	0.57	50	4	4	★	1
MPXLRBD0060R005N060	0.6	0.05	0.6	6	0.57	50	4	4	★	1
MPXLRBD0080R005N040	0.8	0.05	0.8	4	0.77	50	4	4	★	1
MPXLRBD0080R005N060	0.8	0.05	0.8	6	0.77	50	4	4	★	1
MPXLRBD0100R005N030	1	0.05	1	3	0.96	50	4	4	★	1
MPXLRBD0100R005N040	1	0.05	1	4	0.96	50	4	4	★	1
MPXLRBD0100R005N050	1	0.05	1	5	0.96	50	4	4	★	1
MPXLRBD0100R005N060	1	0.05	1	6	0.96	50	4	4	★	1
MPXLRBD0100R005N080	1	0.05	1	8	0.96	50	4	4	★	1
MPXLRBD0100R005N100	1	0.05	1	10	0.96	50	4	4	★	1
MPXLRBD0100R005N120	1	0.05	1	12	0.96	50	4	4	★	1
MPXLRBD0100R010N030	1	0.1	1	3	0.96	50	4	4	★	1
MPXLRBD0100R010N040	1	0.1	1	4	0.96	50	4	4	★	1
MPXLRBD0100R010N050	1	0.1	1	5	0.96	50	4	4	★	1
MPXLRBD0100R010N060	1	0.1	1	6	0.96	50	4	4	★	1
MPXLRBD0100R010N080	1	0.1	1	8	0.96	50	4	4	★	1
MPXLRBD0100R010N100	1	0.1	1	10	0.96	50	4	4	★	1
MPXLRBD0100R010N120	1	0.1	1	12	0.96	50	4	4	★	1
MPXLRBD0120R010N100	1.2	0.1	1.2	10	1.16	50	4	4	★	1
MPXLRBD0120R020N100	1.2	0.2	1.2	10	1.16	50	4	4	★	1
MPXLRBD0150R010N060	1.5	0.1	1.5	6	1.44	50	4	4	★	1
MPXLRBD0150R010N120	1.5	0.1	1.5	12	1.44	50	4	4	★	1

* Number of Flutes
★ : Stocked in Japan

MS plus End Mill Series

(mm)

Order Number	DC	RE	APMX	LU	DN	LF	DCON	No.F*	Stock	Type
MPXLRBD0150R010N180	1.5	0.1	1.5	18	1.44	60	4	4	★	1
MPXLRBD0150R020N060	1.5	0.2	1.5	6	1.44	50	4	4	★	1
MPXLRBD0150R020N120	1.5	0.2	1.5	12	1.44	50	4	4	★	1
MPXLRBD0150R020N180	1.5	0.2	1.5	18	1.44	60	4	4	★	1
MPXLRBD0150R030N060	1.5	0.3	1.5	6	1.44	50	4	4	★	1
MPXLRBD0150R030N120	1.5	0.3	1.5	12	1.44	50	4	4	★	1
MPXLRBD0150R030N180	1.5	0.3	1.5	18	1.44	60	4	4	★	1
MPXLRBD0200R010N080	2	0.1	2	8	1.94	50	4	4	★	1
MPXLRBD0200R010N120	2	0.1	2	12	1.94	50	4	4	★	1
MPXLRBD0200R010N160	2	0.1	2	16	1.94	60	4	4	★	1
MPXLRBD0200R010N200	2	0.1	2	20	1.94	60	4	4	★	1
MPXLRBD0200R010N240	2	0.1	2	24	1.94	70	4	4	★	1
MPXLRBD0200R020N080	2	0.2	2	8	1.94	50	4	4	★	1
MPXLRBD0200R020N120	2	0.2	2	12	1.94	50	4	4	★	1
MPXLRBD0200R020N160	2	0.2	2	16	1.94	60	4	4	★	1
MPXLRBD0200R020N200	2	0.2	2	20	1.94	60	4	4	★	1
MPXLRBD0200R020N240	2	0.2	2	24	1.94	70	4	4	★	1
MPXLRBD0200R030N080	2	0.3	2	8	1.94	50	4	4	★	1
MPXLRBD0200R030N120	2	0.3	2	12	1.94	50	4	4	★	1
MPXLRBD0200R030N160	2	0.3	2	16	1.94	60	4	4	★	1
MPXLRBD0200R030N200	2	0.3	2	20	1.94	60	4	4	★	1
MPXLRBD0200R030N240	2	0.3	2	24	1.94	70	4	4	★	1
MPXLRBD0300R010N080	3	0.1	3	8	2.9	60	6	4	★	1
MPXLRBD0300R010N120	3	0.1	3	12	2.9	60	6	4	★	1
MPXLRBD0300R010N180	3	0.1	3	18	2.9	70	6	4	★	1
MPXLRBD0300R010N240	3	0.1	3	24	2.9	70	6	4	★	1
MPXLRBD0300R010N300	3	0.1	3	30	2.9	70	6	4	★	1
MPXLRBD0300R010N360	3	0.1	3	36	2.9	90	6	4	★	1
MPXLRBD0300R020N120	3	0.2	3	12	2.9	60	6	4	★	1
MPXLRBD0300R020N180	3	0.2	3	18	2.9	60	6	4	★	1
MPXLRBD0300R020N240	3	0.2	3	24	2.9	70	6	4	★	1
MPXLRBD0300R020N300	3	0.2	3	30	2.9	70	6	4	★	1
MPXLRBD0300R020N360	3	0.2	3	36	2.9	90	6	4	★	1
MPXLRBD0300R030N120	3	0.3	3	12	2.9	60	6	4	★	1
MPXLRBD0300R030N180	3	0.3	3	18	2.9	60	6	4	★	1
MPXLRBD0300R030N240	3	0.3	3	24	2.9	70	6	4	★	1
MPXLRBD0300R030N300	3	0.3	3	30	2.9	70	6	4	★	1
MPXLRBD0300R030N360	3	0.3	3	36	2.9	90	6	4	★	1
MPXLRBD0300R050N120	3	0.5	3	12	2.9	60	6	4	★	1
MPXLRBD0300R050N180	3	0.5	3	18	2.9	60	6	4	★	1
MPXLRBD0300R050N240	3	0.5	3	24	2.9	70	6	4	★	1
MPXLRBD0300R050N300	3	0.5	3	30	2.9	70	6	4	★	1
MPXLRBD0300R050N360	3	0.5	3	36	2.9	90	6	4	★	1
MPXLRBD0400R010N160	4	0.1	4	16	3.9	70	6	4	★	1
MPXLRBD0400R010N240	4	0.1	4	24	3.9	70	6	4	★	1
MPXLRBD0400R010N320	4	0.1	4	32	3.9	70	6	4	★	1
MPXLRBD0400R010N480	4	0.1	4	48	3.9	90	6	4	★	1
MPXLRBD0400R020N160	4	0.2	4	16	3.9	70	6	4	★	1
MPXLRBD0400R020N240	4	0.2	4	24	3.9	70	6	4	★	1
MPXLRBD0400R020N320	4	0.2	4	32	3.9	70	6	4	★	1
MPXLRBD0400R020N480	4	0.2	4	48	3.9	90	6	4	★	1
MPXLRBD0400R030N160	4	0.3	4	16	3.9	70	6	4	★	1

* Number of Flutes ★ : Stocked in Japan

MPXLRB

Corner radius, Short cut length, Long neck

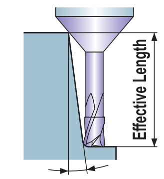
(mm)

Order Number	DC	RE	APMX	LU	DN	LF	DCON	No.F⋆	Stock	Type
MPXLRBD0400R030N240	4	0.3	4	24	3.9	70	6	4	★	1
MPXLRBD0400R030N320	4	0.3	4	32	3.9	70	6	4	★	1
MPXLRBD0400R030N480	4	0.3	4	48	3.9	90	6	4	★	1
MPXLRBD0400R050N160	4	0.5	4	16	3.9	70	6	4	★	1
MPXLRBD0400R050N240	4	0.5	4	24	3.9	70	6	4	★	1
MPXLRBD0400R050N320	4	0.5	4	32	3.9	70	6	4	★	1
MPXLRBD0400R050N480	4	0.5	4	48	3.9	90	6	4	★	1
MPXLRBD0600R010N240	6	0.1	6	24	5.85	70	6	4	★	2
MPXLRBD0600R010N480	6	0.1	6	48	5.85	100	6	4	★	2
MPXLRBD0600R020N240	6	0.2	6	24	5.85	70	6	4	★	2
MPXLRBD0600R020N480	6	0.2	6	48	5.85	100	6	4	★	2
MPXLRBD0600R030N240	6	0.3	6	24	5.85	70	6	4	★	2
MPXLRBD0600R030N480	6	0.3	6	48	5.85	100	6	4	★	2
MPXLRBD0600R050N240	6	0.5	6	24	5.85	70	6	4	★	2
MPXLRBD0600R050N480	6	0.5	6	48	5.85	100	6	4	★	2

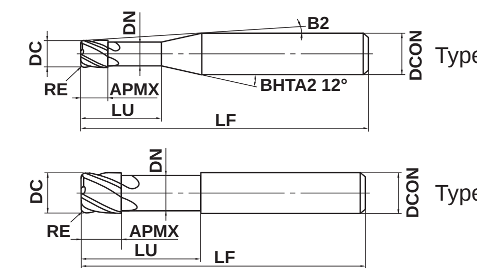
⋆ Number of Flutes

★ : Stocked in Japan

■Effective Length for Inclined Angle



Inclined Angle



(mm)

Order Number	DC	B2	0.5°	1°	2°	3°	Type
MPXLRBD0020R005N005	0.2	11.4°	0.5	0.5	0.6	0.7	1
MPXLRBD0020R005N010	0.2	10.8°	1	1.1	1.2	1.3	1
MPXLRBD0030R005N010	0.3	10.8°	1	1.1	1.2	1.3	1
MPXLRBD0030R005N020	0.3	9.8°	2.1	2.2	2.4	2.7	1
MPXLRBD0040R005N020	0.4	9.8°	2.1	2.2	2.4	2.6	1
MPXLRBD0040R005N030	0.4	8.9°	3.1	3.3	3.6	4	1
MPXLRBD0040R005N040	0.4	8.2°	4.2	4.3	4.8	5.3	1
MPXLRBD0050R005N020	0.5	9.7°	2.1	2.2	2.4	2.6	1
MPXLRBD0050R005N030	0.5	8.9°	3.1	3.3	3.6	4	1
MPXLRBD0050R005N040	0.5	8.1°	4.2	4.3	4.8	5.3	1
MPXLRBD0050R005N050	0.5	7.5°	5.2	5.4	6	6.6	1
MPXLRBD0060R005N020	0.6	9.7°	2.1	2.2	2.4	2.6	1
MPXLRBD0060R005N040	0.6	8.1°	4.2	4.3	4.8	5.3	1
MPXLRBD0060R005N060	0.6	6.9°	6.2	6.5	7.2	7.9	1
MPXLRBD0080R005N040	0.8	7.9°	4.2	4.3	4.8	5.3	1
MPXLRBD0080R005N060	0.8	6.8°	6.2	6.5	7.2	7.9	1
MPXLRBD0100R005N030	1	8.3°	3.2	3.4	3.8	4.2	1
MPXLRBD0100R005N040	1	7.6°	4.3	4.5	5	5.6	1
MPXLRBD0100R005N050	1	7.0°	5.4	5.6	6.2	6.9	1
MPXLRBD0100R005N060	1	6.5°	6.4	6.7	7.4	8.2	1
MPXLRBD0100R005N080	1	5.6°	8.5	8.9	9.8	10.9	1
MPXLRBD0100R005N100	1	5.0°	10.6	11.1	12.2	13.5	1
MPXLRBD0100R005N120	1	4.5°	12.7	13.3	14.6	16.2	1
MPXLRBD0100R010N030	1	8.4°	3.2	3.4	3.8	4.2	1
MPXLRBD0100R010N040	1	7.6°	4.3	4.5	5	5.5	1
MPXLRBD0100R010N050	1	7.0°	5.3	5.6	6.2	6.9	1
MPXLRBD0100R010N060	1	6.5°	6.4	6.7	7.4	8.2	1
MPXLRBD0100R010N080	1	5.6°	8.5	8.9	9.8	10.8	1
MPXLRBD0100R010N100	1	5.0°	10.6	11.1	12.2	13.5	1
MPXLRBD0100R010N120	1	4.5°	12.7	13.3	14.6	16.2	1
MPXLRBD0120R010N100	1.2	4.8°	10.6	11.1	12.2	13.5	1
MPXLRBD0120R020N100	1.2	4.8°	10.6	11.1	12.2	13.5	1
MPXLRBD0150R010N060	1.5	6.0°	6.4	6.7	7.3	8.1	1
MPXLRBD0150R010N120	1.5	4.0°	12.6	13.2	14.5	16.1	1
MPXLRBD0150R010N180	1.5	3.0°	18.9	19.7	21.7	24	1
MPXLRBD0150R020N060	1.5	6.0°	6.4	6.7	7.3	8.1	1
MPXLRBD0150R020N120	1.5	4.0°	12.6	13.2	14.5	16	1
MPXLRBD0150R020N180	1.5	3.0°	18.9	19.7	21.7	⋆	1
MPXLRBD0150R030N060	1.5	6.1°	6.3	6.6	7.3	8	1
MPXLRBD0150R030N120	1.5	4.0°	12.6	13.2	14.5	16	1
MPXLRBD0150R030N180	1.5	3.0°	18.9	19.7	21.6	⋆	1
MPXLRBD0200R010N080	2	4.5°	8.5	8.8	9.7	10.8	1

⋆ No Interference

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MPXLRB

Corner radius, Short cut length, Long neck

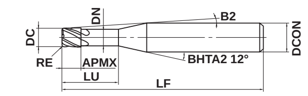
(mm)

Order Number	DC	B2	0.5°	1°	2°	3°	Type
MPXLRBD0200R010N120	2	3.4°	12.6	13.2	14.5	16.1	1
MPXLRBD0200R010N160	2	2.8°	16.8	17.6	19.3	*	1
MPXLRBD0200R010N200	2	2.3°	21	21.9	24.1	*	1
MPXLRBD0200R010N240	2	2.0°	25.2	26.3	*	*	1
MPXLRBD0200R020N080	2	4.5°	8.5	8.8	9.7	10.7	1
MPXLRBD0200R020N120	2	3.4°	12.6	13.2	14.5	*	1
MPXLRBD0200R020N160	2	2.8°	16.8	17.6	19.3	*	1
MPXLRBD0200R020N200	2	2.3°	21	21.9	24	*	1
MPXLRBD0200R020N240	2	2.0°	25.1	26.3	*	*	1
MPXLRBD0200R030N080	2	4.5°	8.5	8.8	9.7	10.7	1
MPXLRBD0200R030N120	2	3.5°	12.6	13.2	14.5	16	1
MPXLRBD0200R030N160	2	2.8°	16.8	17.5	19.2	*	1
MPXLRBD0200R030N200	2	2.3°	21	21.9	24	*	1
MPXLRBD0200R030N240	2	2.0°	25.1	26.3	*	*	1
MPXLRBD0300R010N080	3	5.7°	8.4	8.8	9.6	10.7	1
MPXLRBD0300R010N120	3	4.5°	12.6	13.1	14.4	16	1
MPXLRBD0300R010N180	3	3.4°	18.8	19.7	21.6	23.9	1
MPXLRBD0300R010N240	3	2.8°	25.1	26.2	28.8	*	1
MPXLRBD0300R010N300	3	2.3°	31.3	32.7	35.9	*	1
MPXLRBD0300R010N360	3	2.0°	37.6	39.3	*	*	1
MPXLRBD0300R020N120	3	4.5°	12.6	13.1	14.4	15.9	1
MPXLRBD0300R020N180	3	3.4°	18.8	19.6	21.6	23.9	1
MPXLRBD0300R020N240	3	2.8°	25.1	26.2	28.7	*	1
MPXLRBD0300R020N300	3	2.3°	31.3	32.7	35.9	*	1
MPXLRBD0300R020N360	3	2.0°	37.6	39.3	43.1	*	1
MPXLRBD0300R030N120	3	4.5°	12.5	13.1	14.4	15.9	1
MPXLRBD0300R030N180	3	3.5°	18.8	19.6	21.5	23.9	1
MPXLRBD0300R030N240	3	2.8°	25.1	26.2	28.7	*	1
MPXLRBD0300R030N300	3	2.3°	31.3	32.7	35.9	*	1
MPXLRBD0300R030N360	3	2.0°	37.6	39.2	*	*	1
MPXLRBD0300R050N120	3	4.6°	12.5	13.1	14.3	15.8	1
MPXLRBD0300R050N180	3	3.5°	18.8	19.6	21.5	23.8	1
MPXLRBD0300R050N240	3	2.8°	25.1	26.2	28.7	*	1
MPXLRBD0300R050N300	3	2.3°	31.3	32.7	35.9	*	1
MPXLRBD0300R050N360	3	2.0°	37.6	39.2	*	*	1
MPXLRBD0400R010N160	4	2.8°	16.7	17.5	19.2	*	1
MPXLRBD0400R010N240	4	2.0°	25.1	26.2	*	*	1
MPXLRBD0400R010N320	4	1.6°	33.4	34.9	*	*	1
MPXLRBD0400R010N480	4	1.1°	50.1	52.3	*	*	1
MPXLRBD0400R020N160	4	2.8°	16.7	17.5	19.2	*	1
MPXLRBD0400R020N240	4	2.0°	25.1	26.2	*	*	1
MPXLRBD0400R020N320	4	1.6°	33.4	34.9	*	*	1
MPXLRBD0400R020N480	4	1.1°	50.1	52.3	*	*	1
MPXLRBD0400R030N160	4	2.8°	16.7	17.5	19.1	*	1
MPXLRBD0400R030N240	4	2.0°	25.1	26.2	*	*	1
MPXLRBD0400R030N320	4	1.6°	33.4	34.9	*	*	1
MPXLRBD0400R030N480	4	1.1°	50.1	52.3	*	*	1
MPXLRBD0400R050N160	4	2.8°	16.7	17.4	19.1	*	1
MPXLRBD0400R050N240	4	2.0°	25.1	26.2	*	*	1
MPXLRBD0400R050N320	4	1.6°	33.4	34.9	*	*	1
MPXLRBD0400R050N480	4	1.1°	50.1	52.3	*	*	1
MPXLRBD0600R010N240	6	—	*	*	*	*	2

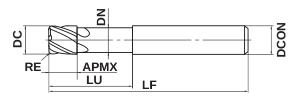
* No Interference

MS plus End Mill Series

Type1



Type2



(mm)

Order Number	DC	B2	0.5°	1°	2°	3°	Type
MPXLRBD0600R010N480	6	—	*	*	*	*	2
MPXLRBD0600R020N240	6	—	*	*	*	*	2
MPXLRBD0600R020N480	6	—	*	*	*	*	2
MPXLRBD0600R030N240	6	—	*	*	*	*	2
MPXLRBD0600R030N480	6	—	*	*	*	*	2
MPXLRBD0600R050N240	6	—	*	*	*	*	2
MPXLRBD0600R050N480	6	—	*	*	*	*	2

* No Interference

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MPXLRB

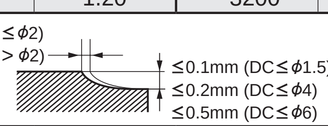
Corner radius, Short cut length, Long neck

Recommended Cutting Conditions

(mm)

Workpiece Material		Carbon steel, Alloy steel (180−280HB) Pre-hardened steel, Alloy tool steel Precipitation stainless steel (<450HB)				Hardened Steel (45−52HRC)			
DC	LU	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
0.2	0.5	30000	180	0.003	0.04	30000	150	0.003	0.04
	1	30000	120	0.003	0.04	30000	100	0.003	0.04
0.3	1	30000	210	0.003	0.08	30000	180	0.003	0.08
	2	30000	120	0.003	0.08	30000	100	0.003	0.08
0.4	2	31000	970	0.005	0.10	31000	810	0.005	0.10
	3	31000	790	0.004	0.10	31000	660	0.004	0.10
	4	31000	540	0.003	0.10	31000	450	0.003	0.10
0.5	2	31000	1500	0.006	0.12	31000	1300	0.006	0.12
	3	31000	1300	0.005	0.12	31000	1100	0.005	0.12
	4	31000	970	0.004	0.12	31000	810	0.004	0.12
	5	25000	790	0.004	0.12	25000	660	0.004	0.12
0.6	2	31000	2100	0.020	0.13	31000	1800	0.020	0.13
	4	25000	1300	0.015	0.13	25000	1100	0.015	0.13
	6	20000	790	0.008	0.13	20000	660	0.008	0.13
0.8	4	25000	3200	0.025	0.20	25000	2700	0.025	0.20
	6	20000	2100	0.020	0.20	20000	1800	0.020	0.20
1	3	24000	2400	0.045	0.30	20000	2000	0.045	0.30
	4	24000	1900	0.040	0.30	20000	1600	0.040	0.30
	5	24000	1800	0.035	0.25	20000	1500	0.035	0.25
	6	20000	1400	0.030	0.25	17000	1200	0.030	0.25
	8	20000	1000	0.020	0.20	17000	880	0.020	0.20
	10	15000	800	0.015	0.10	13000	670	0.015	0.10
	12	15000	370	0.010	0.01	13000	310	0.010	0.01
1.2	10	18000	1500	0.030	0.25	15000	1300	0.030	0.25
1.5	6	20000	2400	0.050	0.40	17000	2000	0.050	0.40
	12	15000	1400	0.040	0.30	13000	1200	0.040	0.30
	18	12000	670	0.010	0.15	10000	560	0.010	0.15
2	8	15000	2600	0.050	0.50	13000	2200	0.050	0.50
	12	15000	2100	0.045	0.50	13000	1800	0.045	0.50
	16	14000	1900	0.040	0.35	12000	1600	0.040	0.35
	20	14000	1100	0.015	0.25	12000	960	0.015	0.25
	24	9300	930	0.010	0.20	7800	780	0.010	0.20
3	8	12000	3300	0.100	0.80	10000	2800	0.100	0.80
	12	12000	3100	0.080	0.80	10000	2600	0.080	0.80
	18	11000	3100	0.070	0.70	9600	2600	0.070	0.70
	24	11000	2600	0.060	0.50	9300	2200	0.060	0.50
	30	9000	1300	0.030	0.40	7500	1100	0.030	0.40
	36	6200	910	0.010	0.30	5200	760	0.010	0.30
4	16	9000	3200	0.100	1.00	7500	2700	0.100	1.00
	24	7900	2500	0.085	0.80	6600	2100	0.085	0.80
	32	6900	1600	0.040	0.70	5800	1400	0.040	0.70
	48	4800	740	0.010	0.35	4000	620	0.010	0.35
6	24	5500	2700	0.120	1.50	4600	2263	0.120	1.50
	48	3800	1200	0.050	1.20	3200	1000	0.050	1.20

Depth of cut



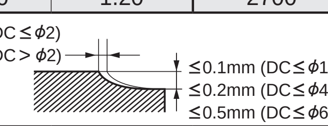
DC: Diameter

Note 1) The cutting conditions above are a guide only to machining with cutting edges with a corner radius. When machining with peripheral cutting edges, use the minimum feed rate as a guide.
Note 2) The revolution and feed rate can be increased with a smaller depth of cut.
Note 3) When profile machining, conditions may differ considerably depending on the workpiece material geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a workpiece material.
Note 4) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

(mm)

Workpiece Material		Austenitic stainless steel (≤200HB) Titanium alloys (<450HB)				Copper, Copper alloys			
DC	LU	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
0.2	0.5	33000	170	0.003	0.04	30000	150	0.003	0.08
	1	30000	110	0.003	0.04	30000	100	0.003	0.08
0.3	1	30000	200	0.003	0.08	30000	180	0.003	0.16
	2	30000	110	0.003	0.08	30000	100	0.003	0.16
0.4	2	31000	930	0.005	0.10	31000	810	0.005	0.20
	3	31000	750	0.004	0.10	31000	660	0.004	0.20
	4	31000	510	0.003	0.10	31000	450	0.003	0.20
0.5	2	31000	1400	0.006	0.12	31000	1300	0.006	0.24
	3	31000	1200	0.005	0.12	31000	1100	0.005	0.24
	4	31000	930	0.004	0.12	31000	810	0.004	0.24
	5	25000	750	0.004	0.12	25000	660	0.004	0.24
0.6	2	31000	2000	0.020	0.13	31000	1800	0.020	0.26
	4	25000	1200	0.015	0.13	25000	1100	0.015	0.26
	6	20000	750	0.008	0.13	20000	660	0.008	0.26
0.8	4	25000	3100	0.025	0.20	25000	2700	0.025	0.40
	6	20000	2000	0.020	0.20	20000	1800	0.020	0.40
1	3	23000	2300	0.045	0.30	20000	2000	0.045	0.60
	4	23000	1800	0.040	0.30	20000	1600	0.040	0.60
	5	23000	1700	0.035	0.25	20000	1500	0.035	0.50
	6	19000	1300	0.030	0.25	17000	1200	0.030	0.50
	8	19000	1000	0.020	0.20	17000	880	0.020	0.40
	10	14000	770	0.015	0.10	13000	670	0.015	0.20
	12	14000	350	0.010	0.01	13000	310	0.010	0.02
1.2	10	17000	1400	0.030	0.25	15000	1300	0.030	0.50
1.5	6	19000	2300	0.050	0.40	14700	1700	0.050	0.80
	12	14000	1300	0.040	0.30	11000	1000	0.040	0.60
	18	11000	640	0.010	0.15	8600	480	0.010	0.30
2	8	14000	2500	0.050	0.50	11000	1900	0.050	1.00
	12	14000	2000	0.045	0.50	11000	1500	0.045	1.00
	16	13000	1800	0.040	0.35	10000	1300	0.040	0.70
	20	13000	1100	0.015	0.25	10000	830	0.015	0.50
	24	8900	890	0.010	0.20	6700	670	0.010	0.40
3	8	11000	3200	0.100	0.80	8600	2400	0.100	1.60
	12	11000	2900	0.080	0.80	8600	2200	0.080	1.60
	18	11000	2900	0.070	0.70	8300	2200	0.070	1.40
	24	10000	2500	0.060	0.50	8000	1900	0.060	1.00
	30	8600	1200	0.030	0.40	6500	950	0.030	0.80
	36	5900	870	0.010	0.30	4500	660	0.010	0.60
4	16	8600	3100	0.100	1.00	6500	2300	0.100	2.00
	24	7500	2400	0.085	0.80	5700	1800	0.085	1.60
	32	6600	1600	0.040	0.70	5000	1200	0.040	1.40
	48	4600	710	0.010	0.35	3400	530	0.010	0.70
6	24	5200	2600	0.120	1.50	4000	1900	0.120	3.00
	48	3600	1100	0.050	1.20	2700	870	0.050	2.40

Depth of cut



DC: Diameter

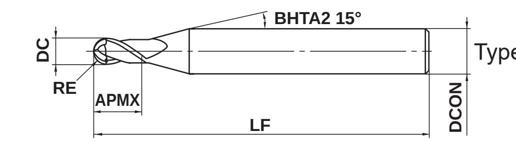
Note 1) The cutting conditions above are a guide only to machining with cutting edges with a corner radius. When machining with peripheral cutting edges, use the minimum feed rate as a guide.
Note 2) The revolution and feed rate can be increased with a smaller depth of cut.
Note 3) When profile machining, conditions may differ considerably depending on the workpiece material geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a workpiece material.
Note 4) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

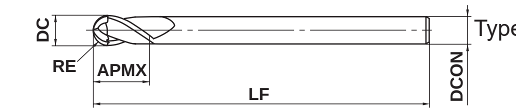
Memo

MP2MB -Inch Sizes

Ball nose, Medium cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





.0312"≤DCON≤.5000"			
±.0002"			
DCON=.125"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00020"	0 - .00024"	0 - .00031"	

● 2 flute ball nose end mills with medium cutting edge length for general purpose. Excellent performance for a wide range of workpiece material such as carbon steel, alloy steel and hardened steel.

(inch)

Order Number	RE	DC	APMX	LF	DCON	No.F*	Stock	Type
MP2MBD1/32	.0156	.0312	.0630	1.50	.1250	2	●	1
MP2MBD1/16	.0312	.0625	.1250	1.50	.1250	2	●	1
MP2MBD1/8	.0625	.1250	.2500	1.50	.1250	2	●	2
MP2MBD3/16	.0938	.1875	.3750	2.00	.2500	2	●	1
MP2MBD1/4	.1250	.2500	.5000	2.50	.2500	2	●	2
MP2MBD5/16	.1562	.3125	.6250	3.25	.3125	2	●	2
MP2MBD3/8	.1875	.3750	.7500	3.50	.3750	2	●	2
MP2MBD1/2	.2500	.5000	1.0000	4.00	.5000	2	●	2

* Number of Flutes

RE = Radius of ball nose
DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock

MP2MB - Inch Sizes

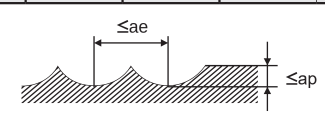
Ball nose, Medium cut length, 2 flute

Recommended Cutting Conditions

(inch)

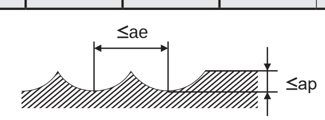
Workpiece Material		Mild Steel, Carbon Steel (180-280HB) Alloy Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel (<450HB)						Austenitic Stainless Steels (≤200HB) Titanium Alloys					
		α≤15°		α>15°				α≤15°		α>15°			
DC	RE	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
1/32	**0.397**	40000	189.0	40000	189.0	.002	.003	40000	157.5	40000	74.8	.002	.003
1/16	**0.794**	40000	255.9	40000	255.9	.004	.006	40000	255.9	32000	126.0	.004	.006
1/8	**1.588**	40000	295.3	40000	295.3	.005	.012	32000	236.2	22000	133.9	.005	.012
3/16	**2.381**	25000	236.2	25000	236.2	.008	.020	20000	212.6	13000	90.6	.008	.020
1/4	**3.175**	21000	228.3	21000	228.3	.010	.024	17000	185.0	10000	78.7	.010	.024
5/16	**3.969**	16000	177.2	16000	177.2	.012	.032	13000	141.7	8000	59.1	.012	.032
3/8	**4.763**	13000	141.7	13000	141.7	.020	.039	10000	114.2	6400	47.2	.020	.039
1/2	**6.35**	9000	98.4	9000	98.4	.020	.047	8500	90.6	5300	43.3	.020	.047

Depth of Cut

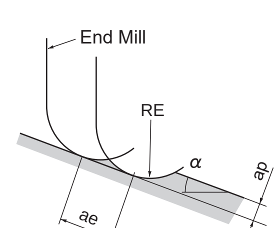


Workpiece Material		Hardened Steel (40-55HRC)						Copper, Copper Alloys					
		α≤15°		α>15°				α≤15°		α>15°			
DC	RE	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
1/32	**.397**	40000	126.0	40000	59.8	.002	.003	40000	189.0	40000	189.0	.002	.003
1/16	**.794**	40000	204.7	32000	100.8	.004	.006	40000	255.9	40000	255.9	.004	.006
1/8	**1.588**	32000	189.0	22000	107.1	.005	.012	40000	295.3	40000	295.3	.005	.012
3/16	**2.381**	20000	170.1	13000	72.5	.008	.020	25000	236.2	25000	236.2	.008	.020
1/4	**3.175**	17000	148.0	10000	63.0	.010	.024	21000	228.3	21000	228.3	.010	.024
5/16	**3.969**	13000	113.4	8000	47.3	.012	.032	16000	177.2	16000	177.2	.012	.032
3/8	**4.763**	10000	91.4	6400	37.8	.020	.039	13000	141.7	13000	141.7	.020	.039
1/2	**6.35**	8500	72.5	5300	34.6	.020	.047	9000	98.4	9000	98.4	.020	.047

Depth of Cut



(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) If the rigidity of the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and the feed rate proportionately.



ae = Pick Feed

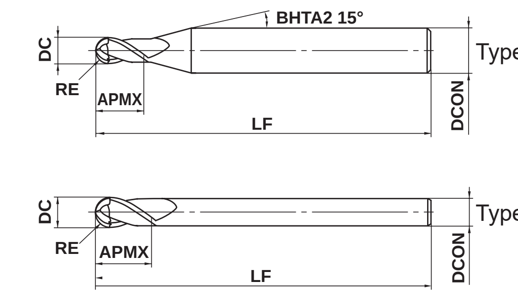
MS plus End Mill Series

MP2SSB

Ball nose, Short cut length, 2 flute, Short shank

UWC MS+ 30°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	



0.1≤RE≤6				
±0.005				
4≤DCON≤6	8≤DCON≤10	DCON=12		
0 - 0.005	0 - 0.006	0 - 0.008		

● 2-flute ball nose end mills with short cutting edge length for general purpose. Excellent performance for a wide range of workpiece materials such as carbon steel, alloy steel and hardened steel.

(mm)

Order Number	RE	DC	APMX	LF	DCON	*No.F	Stock	Type
MP2SSBR0010	0.1	**0.2**	0.2	40	4	2	●	1
MP2SSBR0020	0.2	**0.4**	0.4	40	4	2	●	1
MP2SSBR0030	0.3	**0.6**	0.6	40	4	2	●	1
MP2SSBR0040	0.4	**0.8**	0.8	40	4	2	●	1
MP2SSBR0050	0.5	**1**	1	40	4	2	●	1
MP2SSBR0050S06	0.5	**1**	1	40	6	2	●	1
MP2SSBR0075	0.75	**1.5**	1.5	40	4	2	●	1
MP2SSBR0075S06	0.75	**1.5**	1.5	40	6	2	●	1
MP2SSBR0100	1	**2**	2	45	6	2	●	1
MP2SSBR0150	1.5	**3**	3	45	6	2	●	1
MP2SSBR0200	2	**4**	4	45	6	2	●	1
MP2SSBR0250	2.5	**5**	5	50	6	2	●	1
MP2SSBR0300	3	**6**	6	50	6	2	●	2
MP2SSBR0400	4	**8**	8	60	8	2	●	2
MP2SSBR0500	5	**10**	10	70	10	2	●	2
MP2SSBR0600	6	**12**	12	75	12	2	●	2

* Number of Flutes

RE = Radius of ball nose
DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

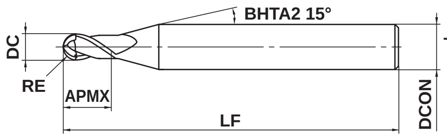
● : USA Stock

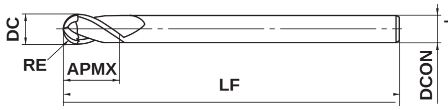
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP2SB

Ball nose, Short cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





0.1≤RE≤6			
±0.005			
4≤DCON≤6	8≤DCON≤10	DCON=12	
0 / - 0.005	0 / - 0.006	0 / - 0.008	

● 2-flute ball nose end mills with short cutting edge length for general purpose. Excellent performance for a wide range of workpiece materials such as carbon steel, alloy steel and hardened steel.

(mm)

Order Number	RE	DC	APMX	LF	DCON	No.F *	Stock	Type
MP2SBR0010	0.1	0.2	0.3	45	4	2	●	1
MP2SBR0015	0.15	0.3	0.5	45	4	2	●	1
MP2SBR0020	0.2	0.4	0.6	45	4	2	●	1
MP2SBR0020S06	0.2	0.4	0.6	50	6	2	●	1
MP2SBR0025	0.25	0.5	0.8	45	4	2	●	1
MP2SBR0030	0.3	0.6	0.9	45	4	2	●	1
MP2SBR0030S06	0.3	0.6	0.9	50	6	2	●	1
MP2SBR0035	0.35	0.7	1.1	45	4	2	●	1
MP2SBR0040	0.4	0.8	1.2	45	4	2	●	1
MP2SBR0040S06	0.4	0.8	1.2	50	6	2	●	1
MP2SBR0045	0.45	0.9	1.4	45	4	2	●	1
MP2SBR0050	0.5	1	1.5	45	4	2	●	1
MP2SBR0050S06	0.5	1	1.5	50	6	2	●	1
MP2SBR0060	0.6	1.2	1.8	45	4	2	●	1
MP2SBR0070	0.7	1.4	2.1	45	4	2	●	1
MP2SBR0075	0.75	1.5	2.3	45	4	2	●	1
MP2SBR0075S06	0.75	1.5	2.3	50	6	2	●	1
MP2SBR0080	0.8	1.6	2.4	45	4	2	●	1
MP2SBR0090	0.9	1.8	2.7	45	4	2	●	1
MP2SBR0100	1	2	3	50	4	2	●	1
MP2SBR0100S06	1	2	3	50	6	2	●	1
MP2SBR0125	1.25	2.5	3.8	50	4	2	●	1
MP2SBR0150	1.5	3	4.5	70	6	2	●	1
MP2SBR0200	2	4	6	70	6	2	●	1
MP2SBR0250	2.5	5	7.5	80	6	2	●	1
MP2SBR0300	3	6	9	80	6	2	●	2
MP2SBR0400	4	8	12	90	8	2	●	2
MP2SBR0500	5	10	15	100	10	2	●	2
MP2SBR0600	6	12	18	110	12	2	●	2

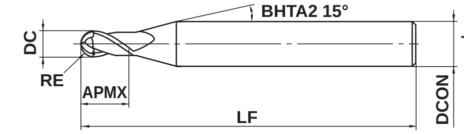
* Number of Flutes

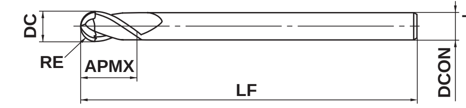
MS plus End Mill Series

MP2MB

Ball nose, Medium cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





0.25≤RE≤6			
±0.005			
4≤DCON≤6	8≤DCON≤10	DCON=12	
0 / - 0.005	0 / - 0.006	0 / - 0.008	

● 2-flute ball nose end mills with medium cutting edge length for general purpose. Excellent performance for a wide range of workpiece materials such as carbon steel, alloy steel and hardened steel.

(mm)

Order Number	RE	DC	APMX	LF	DCON	No.F *	Stock	Type
MP2MBR0025	0.25	0.5	1	45	4	2	●	1
MP2MBR0030	0.3	0.6	1.2	45	4	2	●	1
MP2MBR0040	0.4	0.8	1.6	45	4	2	●	1
MP2MBR0050	0.5	1	2.5	45	4	2	●	1
MP2MBR0060	0.6	1.2	2.5	45	4	2	●	1
MP2MBR0070	0.7	1.4	3	45	4	2	●	1
MP2MBR0075	0.75	1.5	4	45	4	2	●	1
MP2MBR0080	0.8	1.6	4	45	4	2	●	1
MP2MBR0090	0.9	1.8	5	45	4	2	●	1
MP2MBR0100	1	2	6	50	4	2	●	1
MP2MBR0125	1.25	2.5	6	50	4	2	●	1
MP2MBR0150S03	1.5	3	8	70	3	2	●	2
MP2MBR0150	1.5	3	8	70	6	2	●	1
MP2MBR0175	1.75	3.5	8	70	6	2	●	1
MP2MBR0200S04	2	4	8	70	4	2	●	2
MP2MBR0200	2	4	8	70	6	2	●	1
MP2MBR0250	2.5	5	12	80	6	2	●	1
MP2MBR0300	3	6	12	80	6	2	●	2
MP2MBR0400	4	8	14	90	8	2	●	2
MP2MBR0500	5	10	18	100	10	2	●	2
MP2MBR0600	6	12	22	110	12	2	●	2

* Number of Flutes

RE = Radius of ball nose
DC = Cutting dia.
APMX = Depth of cut max.
LF = Functional length
DCON = Connection dia.

● : USA Stock

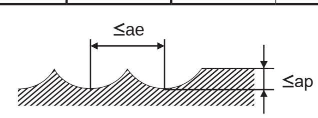
Ball nose, Short cut length, 2 flute, Short shank **MP2SSB**
Ball nose, Short cut length, 2 flute **MP2SB** Ball nose, Medium cut length, 2 flute **MP2MB**

Recommended Cutting Conditions

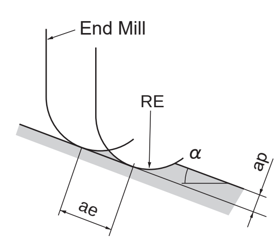
(inch)

Workpiece Material	Mild Steel,Carbon Steel (180−280HB), Alloy Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel (<450HB)						Austenitic Stainless Steels (≦200HB) Titanium Alloys					
RE (mm)	α≦15°		α>15°		Depth of Cut ap	Depth of Cut ae	α≦15°		α>15°		Depth of Cut ap	Depth of Cut ae
	Revolution (min^{-1})	Feed Rate (IPM)	Revolution (min^{-1})	Feed Rate (IPM)			Revolution (min^{-1})	Feed Rate (IPM)	Revolution (min^{-1})	Feed Rate (IPM)		
R0.1	40000	11.8	40000	9.8	.0001	.0008	40000	11.8	40000	9.8	.0001	.0008
R0.15	40000	19.7	40000	13.8	.0003	.0012	40000	19.7	40000	13.8	.0003	.0012
R0.2	40000	63.0	40000	47.2	.0008	.0016	40000	59.1	40000	39.4	.0006	.0016
R0.25	40000	94.5	40000	55.1	.0010	.0020	40000	82.7	40000	47.2	.0008	.0020
R0.3	40000	126.0	40000	63.0	.0012	.0024	40000	110.2	40000	55.1	.0012	.0024
R0.4	40000	189.0	40000	94.5	.002	.003	40000	181.1	40000	82.7	.002	.003
R0.5	40000	220.5	40000	126.0	.002	.004	40000	220.5	40000	133.9	.002	.004
R0.75	40000	255.9	40000	157.5	.004	.006	40000	255.9	36000	141.7	.003	.006
R1	40000	255.9	39000	185.0	.004	.008	40000	255.9	35000	157.5	.004	.008
R1.25	40000	275.6	33000	177.2	.005	.010	40000	291.3	29000	157.5	.005	.010
R1.5	40000	295.3	27000	169.3	.005	.012	36000	271.7	24000	153.5	.005	.012
R2	32000	295.3	20000	141.7	.006	.016	28000	271.7	18000	122.0	.006	.016
R2.5	25000	236.2	16000	114.2	.008	.020	22000	244.1	14000	102.4	.008	.020
R3	21000	228.3	13000	102.4	.010	.024	18000	212.6	11000	90.6	.010	.024
R4	16000	177.2	10000	78.7	.012	.031	14000	161.4	9000	66.9	.012	.031
R5	13000	141.7	8000	66.9	.020	.039	11000	129.9	7200	51.2	.020	.039
R6	9000	98.4	6000	51.2	.020	.047	8100	90.6	5400	43.3	.020	.047

Depth of Cut



(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.



ae = Pick Feed

MS plus End Mill Series

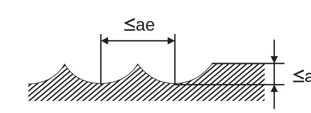
Ball nose, Short cut length, 2 flute, Short shank **MP2SSB**
Ball nose, Short cut length, 2 flute **MP2SB** Ball nose, Medium cut length, 2 flute **MP2MB**

Recommended Cutting Conditions

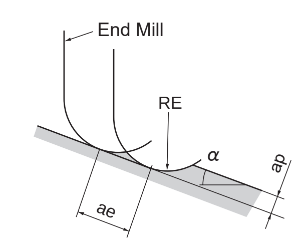
(inch)

Workpiece Material	Hardened Steel (45−55HRC)						Copper, Copper Alloys					
RE (mm)	α≦15°		α>15°		Depth of Cut ap	Depth of Cut ae	α≦15°		α>15°		Depth of Cut ap	Depth of Cut ae
	Revolution (min^{-1})	Feed Rate (IPM)	Revolution (min^{-1})	Feed Rate (IPM)			Revolution (min^{-1})	Feed Rate (IPM)	Revolution (min^{-1})	Feed Rate (IPM)		
R0.1	40000	11.8	40000	9.8	.0001	.0008	40000	11.8	40000	9.8	.0001	.0008
R0.15	40000	19.7	40000	13.8	.0003	.0012	40000	19.7	40000	13.8	.0003	.0012
R0.2	40000	51.2	40000	37.4	.0006	.0016	40000	51.2	40000	37.4	.0006	.0016
R0.25	40000	74.8	40000	43.3	.0008	.0020	40000	74.8	40000	43.3	.0008	.0020
R0.3	40000	98.4	40000	51.2	.0010	.0024	40000	98.4	40000	51.2	.0010	.0024
R0.4	40000	157.5	40000	74.8	.002	.003	40000	157.5	40000	74.8	.002	.003
R0.5	40000	220.5	40000	118.1	.002	.004	40000	220.5	40000	118.1	.002	.004
R0.75	40000	255.9	32000	126.0	.003	.006	40000	255.9	32000	126.0	.003	.006
R1	40000	255.9	31000	137.8	.004	.008	40000	255.9	31000	137.8	.004	.008
R1.25	36000	255.9	26000	137.8	.005	.010	36000	255.9	26000	137.8	.005	.010
R1.5	32000	236.2	22000	133.9	.005	.012	32000	236.2	22000	133.9	.005	.012
R2	25000	236.2	16000	106.3	.006	.016	25000	236.2	16000	106.3	.006	.024
R2.5	20000	212.6	13000	90.6	.008	.020	20000	212.6	13000	90.6	.008	.031
R3	17000	185.0	10000	78.7	.010	.024	17000	185.0	10000	78.7	.010	.035
R4	13000	141.7	8000	59.1	.012	.031	13000	141.7	8000	59.1	.012	.063
R5	10000	114.2	6400	47.2	.020	.039	10000	114.2	6400	47.2	.020	.079
R6	7200	78.7	4800	39.4	.020	.047	8500	90.6	5300	43.3	.020	.094

Depth of Cut



(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.



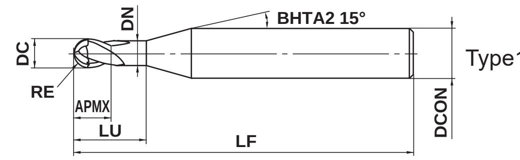
ae = Pick Feed

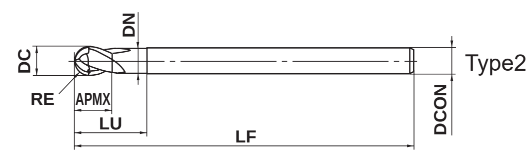
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

MP2SDB

Ball nose, Short cut length, 2 flute, High strength

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎					





0.5≤RE≤6	
±0.01	
4≤DCON≤6	DCON=8
0 / - 0.005	0 / - 0.006
DCON=10	DCON=12
0 / - 0.009	0 / - 0.011

● Excellent chipping resistance with a strong S curve cutting edge. Ideal for semi-finish machining of forging dies.

(mm)

Order Number	RE	DC	APMX	LU	DN	LF	DCON	* No.F	Stock	Type
MP2SDBR0050	0.5	1	1	2	0.96	50	4	2	●	1
MP2SDBR0075S06	0.75	1.5	1.5	3	1.46	50	6	2	●	1
MP2SDBR0100	1	2	2	4	1.90	50	4	2	●	1
MP2SDBR0100S06	1	2	2	4	1.90	60	6	2	●	1
MP2SDBR0150	1.5	3	3	6	2.90	70	6	2	●	1
MP2SDBR0200	2	4	4	8	3.90	60	4	2	●	2
MP2SDBR0200S06	2	4	4	8	3.90	70	6	2	●	1
MP2SDBR0250	2.5	5	5	10	4.90	80	6	2	●	1
MP2SDBR0300	3	6	12	18	5.85	80	6	2	●	2
MP2SDBR0300A120	3	6	12	18	5.85	120	6	2	●	2
MP2SDBR0400	4	8	14	24	7.85	90	8	2	●	2
MP2SDBR0400A130	4	8	14	24	7.85	130	8	2	●	2
MP2SDBR0500	5	10	18	30	9.70	100	10	2	●	2
MP2SDBR0500A140	5	10	18	30	9.70	140	10	2	●	2
MP2SDBR0600	6	12	22	36	11.70	110	12	2	●	2
MP2SDBR0600A140	6	12	22	36	11.70	140	12	2	●	2

* Number of Flutes

(Note 1) MS plus end mills series MP2SB and MP2MB are recommended for finish surface processing.

RE = Radius of ball nose
DC = Cutting dia.
APMX = Depth of cut max.
LU = Usable length
DN = Neck dia.
LF = Functional length
DCON = Connection dia.

● : USA Stock

MS plus End Mill Series

MP2SDB

Ball nose, Short cut length, 2 flute, High strength

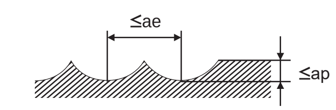
Recommended Cutting Conditions

Overhang Below DC x 5 (DC : Dia.)

(inch)

Workpiece Material	Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Tool Steel, Pre-hardened Steel						Hardened Steel (45−55HRC)					
RE (mm)	α≤15°		α>15°		Depth of Cut ap	Depth of Cut ae	α≤15°		α>15°		Depth of Cut ap	Depth of Cut ae
	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)			Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)		
R 0.5	40000	153.5	36000	82.7	.004	.010	40000	169.3	36000	86.6	.004	.010
R 0.75	40000	165.4	36000	102.4	.006	.014	40000	185.0	36000	106.3	.006	.014
R 1	40000	177.2	36000	122.0	.008	.020	40000	196.9	36000	129.9	.008	.020
R 1.5	37000	208.7	24000	106.3	.012	.030	37000	228.3	24000	110.2	.012	.030
R 2X4	24000	126.0	15000	78.7	.010	.028	19000	110.2	13000	63.0	.010	.028
R 2	30000	192.9	19000	98.4	.016	.039	28000	196.9	19000	94.5	.016	.039
R 2.5	25000	177.2	16000	90.6	.020	.051	22000	165.4	16000	86.6	.020	.049
R 3	22000	169.3	14000	86.6	.024	.071	18000	149.6	12000	70.9	.024	.059
R 4	19000	153.5	12000	78.7	.031	.094	15000	126.0	9500	63.0	.031	.079
R 5	15000	129.9	9500	70.9	.039	.118	11000	98.4	7000	55.1	.039	.098
R 6	12000	100.4	8000	63.0	.047	.142	9000	78.7	6000	51.2	.047	.118

Depth of Cut

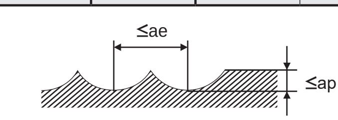


Overhang Below DC x 7 (DC : Dia.)

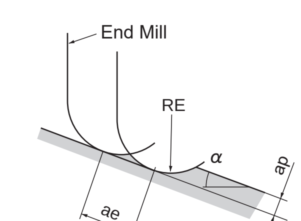
(inch)

Workpiece Material	Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Tool Steel, Pre-hardened Steel						Hardened Steel (45−55HRC)					
RE (mm)	α≤15°		α>15°		Depth of Cut ap	Depth of Cut ae	α≤15°		α>15°		Depth of Cut ap	Depth of Cut ae
	Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)			Revolution (min-1)	Feed Rate (IPM)	Revolution (min-1)	Feed Rate (IPM)		
R 3	10000	59.1	6900	39.4	.008	.039	8000	55.1	5300	30.3	.008	.031
R 4	8000	55.1	5600	35.4	.012	.059	6400	51.2	4000	25.6	.012	.047
R 5	6000	47.2	4100	29.1	.016	.079	4800	43.3	3200	22.8	.016	.063
R 6	5000	39.4	3400	23.6	.018	.094	4000	35.4	2700	19.3	.018	.079

Depth of Cut



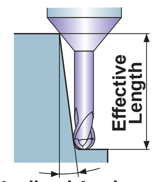
(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

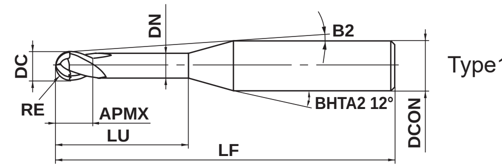


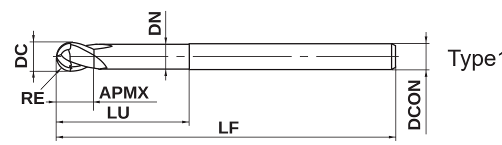
MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	







0.05≤RE≤3	±0.005
h5 4≤DCON≤6	0 / -0.005

- 2-flute long neck ball nose end mills. Excellent performance for a wide range of workpiece materials such as carbon steel, alloy steel and hardened steel.

(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle 0.5°	1°	2°	3°
MP2XLBR0005N003	0.05	0.1	0.08	0.3	0.085	11.6°	50	4	2	●	1	0.3	0.3	0.4	0.4
MP2XLBR0005N005	0.05	0.1	0.08	0.5	0.085	11.4°	50	4	2	●	1	0.5	0.5	0.6	0.7
MP2XLBR0010N005	0.1	0.2	0.15	0.5	0.18	11.5°	50	4	2	●	1	0.5	0.5	0.6	0.7
MP2XLBR0010N008	0.1	0.2	0.15	0.75	0.18	11.2°	50	4	2	●	1	0.8	0.8	0.9	1.0
MP2XLBR0010N010	0.1	0.2	0.15	1	0.18	10.9°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0010N013	0.1	0.2	0.15	1.25	0.18	10.6°	50	4	2	●	1	1.3	1.4	1.5	1.7
MP2XLBR0010N015	0.1	0.2	0.15	1.5	0.18	10.4°	50	4	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0010N018	0.1	0.2	0.15	1.75	0.18	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
MP2XLBR0010N020	0.1	0.2	0.15	2	0.18	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0010N025	0.1	0.2	0.15	2.5	0.18	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0015N005	0.15	0.3	0.24	0.5	0.28	11.5°	50	4	2	●	1	0.5	0.5	0.6	0.6
MP2XLBR0015N008	0.15	0.3	0.24	0.75	0.28	11.2°	50	4	2	●	1	0.8	0.8	0.9	1.0
MP2XLBR0015N010	0.15	0.3	0.24	1	0.28	10.9°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0015N010S06	0.15	0.3	0.24	1	0.28	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0015N013	0.15	0.3	0.24	1.25	0.28	10.7°	50	4	2	●	1	1.3	1.4	1.5	1.6
MP2XLBR0015N013S06	0.15	0.3	0.24	1.25	0.28	11.1°	50	6	2	●	1	1.3	1.4	1.5	1.6
MP2XLBR0015N015	0.15	0.3	0.24	1.5	0.28	10.4°	50	4	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0015N015S06	0.15	0.3	0.24	1.5	0.28	10.9°	50	6	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0015N018	0.15	0.3	0.24	1.75	0.28	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
MP2XLBR0015N020	0.15	0.3	0.24	2	0.28	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0015N025	0.15	0.3	0.24	2.5	0.28	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0015N030	0.15	0.3	0.24	3	0.28	9.1°	50	4	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0015N035	0.15	0.3	0.24	3.5	0.28	8.7°	50	4	2	●	1	3.7	3.8	4.2	4.6
MP2XLBR0015N040	0.15	0.3	0.24	4	0.28	8.4°	50	4	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0020N005	0.2	0.4	0.3	0.5	0.37	11.6°	50	4	2	●	1	0.5	0.5	0.5	0.6
MP2XLBR0020N008	0.2	0.4	0.3	0.75	0.37	11.3°	50	4	2	●	1	0.7	0.8	0.9	0.9
MP2XLBR0020N010	0.2	0.4	0.3	1	0.37	11°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0020N010S06	0.2	0.4	0.3	1	0.37	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0020N015	0.2	0.4	0.3	1.5	0.37	10.4°	50	4	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0020N020	0.2	0.4	0.3	2	0.37	9.9°	50	4	2	●	1	2.1	2.2	2.3	2.6

* Number of Flutes

● : USA Stock

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
SOLID END MILLS

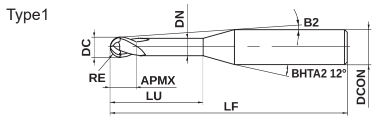
(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle 0.5°	1°	2°	3°
MP2XLBR0020N020S06	0.2	0.4	0.3	2	0.37	10.6°	50	6	2	●	1	2.1	2.2	2.3	2.6
MP2XLBR0020N025	0.2	0.4	0.3	2.5	0.37	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.3
MP2XLBR0020N030	0.2	0.4	0.3	3	0.37	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0020N035	0.2	0.4	0.3	3.5	0.37	8.7°	50	4	2	●	1	3.6	3.8	4.1	4.6
MP2XLBR0020N040	0.2	0.4	0.3	4	0.37	8.4°	50	4	2	●	1	4.2	4.3	4.7	5.2
MP2XLBR0020N045	0.2	0.4	0.3	4.5	0.37	8°	50	4	2	●	1	4.7	4.9	5.3	5.9
MP2XLBR0020N050	0.2	0.4	0.3	5	0.37	7.7°	50	4	2	●	1	5.2	5.4	5.9	6.6
MP2XLBR0020N055	0.2	0.4	0.3	5.5	0.37	7.5°	50	4	2	●	1	5.7	6.0	6.5	7.2
MP2XLBR0020N060	0.2	0.4	0.3	6	0.37	7.2°	50	4	2	●	1	6.2	6.5	7.1	7.9
MP2XLBR0025N010	0.25	0.5	0.37	1	0.47	11°	50	4	2	●	1	1.0	1.0	1.1	1.2
MP2XLBR0025N015	0.25	0.5	0.37	1.5	0.47	10.4°	50	4	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0025N015S06	0.25	0.5	0.37	1.5	0.47	11°	50	6	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0025N020	0.25	0.5	0.37	2	0.47	9.9°	50	4	2	●	1	2.1	2.1	2.3	2.6
MP2XLBR0025N020S06	0.25	0.5	0.37	2	0.47	10.6°	50	6	2	●	1	2.1	2.1	2.3	2.6
MP2XLBR0025N025	0.25	0.5	0.37	2.5	0.47	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.2
MP2XLBR0025N025S06	0.25	0.5	0.37	2.5	0.47	10.3°	50	6	2	●	1	2.6	2.7	2.9	3.2
MP2XLBR0025N030	0.25	0.5	0.37	3	0.47	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0025N030S06	0.25	0.5	0.37	3	0.47	10°	50	6	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0025N035	0.25	0.5	0.37	3.5	0.47	8.7°	50	4	2	●	1	3.6	3.8	4.1	4.6
MP2XLBR0025N040	0.25	0.5	0.37	4	0.47	8.3°	50	4	2	●	1	4.1	4.3	4.7	5.2
MP2XLBR0025N045	0.25	0.5	0.37	4.5	0.47	8°	50	4	2	●	1	4.7	4.9	5.3	5.9
MP2XLBR0025N050	0.25	0.5	0.37	5	0.47	7.7°	50	4	2	●	1	5.2	5.4	5.9	6.6
MP2XLBR0025N055	0.25	0.5	0.37	5.5	0.47	7.4°	50	4	2	●	1	5.7	6.0	6.5	7.2
MP2XLBR0025N060	0.25	0.5	0.37	6	0.47	7.2°	50	4	2	●	1	6.2	6.5	7.1	7.9
MP2XLBR0025N070	0.25	0.5	0.37	7	0.47	6.7°	50	4	2	●	1	7.3	7.6	8.3	9.2
MP2XLBR0025N080	0.25	0.5	0.37	8	0.47	6.3°	50	4	2	●	1	8.3	8.7	9.5	10.5
MP2XLBR0025N090	0.25	0.5	0.37	9	0.47	5.9°	50	4	2	●	1	9.4	9.8	10.7	11.9
MP2XLBR0025N100	0.25	0.5	0.37	10	0.47	5.6°	50	4	2	●	1	10.4	10.9	11.9	13.2
MP2XLBR0030N015	0.3	0.6	0.45	1.5	0.57	10.4°	50	4	2	●	1	1.5	1.6	1.8	2.0
MP2XLBR0030N015S06	0.3	0.6	0.45	1.5	0.57	11°	50	6	2	●	1	1.5	1.6	1.8	2.0
MP2XLBR0030N020	0.3	0.6	0.45	2	0.57	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0030N020S06	0.3	0.6	0.45	2	0.57	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0030N025	0.3	0.6	0.45	2.5	0.57	9.4°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0030N030	0.3	0.6	0.45	3	0.57	9°	50	4	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0030N030S06	0.3	0.6	0.45	3	0.57	9.9°	50	6	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0030N035	0.3	0.6	0.45	3.5	0.57	8.6°	50	4	2	●	1	3.7	3.8	4.2	4.6
MP2XLBR0030N040	0.3	0.6	0.45	4	0.57	8.2°	50	4	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0030N040S06	0.3	0.6	0.45	4	0.57	9.3°	50	6	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0030N045	0.3	0.6	0.45	4.5	0.57	7.9°	50	4	2	●	1	4.7	4.9	5.4	5.9
MP2XLBR0030N050	0.3	0.6	0.45	5	0.57	7.6°	50	4	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0030N050S06	0.3	0.6	0.45	5	0.57	8.8°	50	6	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0030N055	0.3	0.6	0.45	5.5	0.57	7.3°	50	4	2	●	1	5.8	6.0	6.6	7.3
MP2XLBR0030N060	0.3	0.6	0.45	6	0.57	7.1°	50	4	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0030N060S06	0.3	0.6	0.45	6	0.57	8.3°	50	6	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0030N065	0.3	0.6	0.45	6.5	0.57	6.8°	50	4	2	●	1	6.8	7.1	7.8	8.6
MP2XLBR0030N070	0.3	0.6	0.45	7	0.57	6.6°	50	4	2	●	1	7.3	7.6	8.4	9.3
MP2XLBR0030N080	0.3	0.6	0.45	8	0.57	6.2°	50	4	2	●	1	8.4	8.7	9.6	10.6
MP2XLBR0030N080S06	0.3	0.6	0.45	8	0.57	7.6°	50	6	2	●	1	8.4	8.7	9.6	10.6

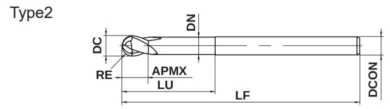
* Number of Flutes

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
SOLID END MILLS

Type1



Type2



(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle 0.5°	1°	2°	3°
MP2XLBR0030N085	0.3	0.6	0.45	8.5	0.57	6°	50	4	2	●	1	8.9	9.3	10.2	11.3
MP2XLBR0030N090	0.3	0.6	0.45	9	0.57	5.8°	50	4	2	●	1	9.4	9.8	10.8	11.9
MP2XLBR0030N095	0.3	0.6	0.45	9.5	0.57	5.7°	50	4	2	●	1	9.9	10.4	11.4	12.6
MP2XLBR0030N100	0.3	0.6	0.45	10	0.57	5.5°	50	4	2	●	1	10.5	10.9	12.0	13.2
MP2XLBR0030N110	0.3	0.6	0.45	11	0.57	5.2°	50	4	2	●	1	11.5	12.0	13.2	14.6
MP2XLBR0030N120	0.3	0.6	0.45	12	0.57	5°	50	4	2	●	1	12.5	13.1	14.4	15.9
MP2XLBR0040N020	0.4	0.8	0.6	2	0.77	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0040N020S06	0.4	0.8	0.6	2	0.77	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0040N024S06	0.4	0.8	0.6	2.4	0.77	10.3°	50	6	2	●	1	2.5	2.6	2.8	3.1
MP2XLBR0040N030	0.4	0.8	0.6	3	0.77	8.9°	50	4	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0040N030S06	0.4	0.8	0.6	3	0.77	9.9°	50	6	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0040N040	0.4	0.8	0.6	4	0.77	8.2°	50	4	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0040N040S06	0.4	0.8	0.6	4	0.77	9.3°	50	6	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0040N050	0.4	0.8	0.6	5	0.77	7.5°	50	4	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0040N060	0.4	0.8	0.6	6	0.77	6.9°	50	4	2	●	1	6.3	6.5	7.2	7.9
MP2XLBR0040N070	0.4	0.8	0.6	7	0.77	6.5°	50	4	2	●	1	7.3	7.6	8.4	9.2
MP2XLBR0040N080	0.4	0.8	0.6	8	0.77	6°	50	4	2	●	1	8.4	8.7	9.5	10.6
MP2XLBR0040N090	0.4	0.8	0.6	9	0.77	5.7°	50	4	2	●	1	9.4	9.8	10.7	11.9
MP2XLBR0040N100	0.4	0.8	0.6	10	0.77	5.4°	50	4	2	●	1	10.5	10.9	11.9	13.2
MP2XLBR0040N120	0.4	0.8	0.6	12	0.77	4.8°	50	4	2	●	1	12.5	13.1	14.3	15.9
MP2XLBR0050N030	0.5	1	0.75	3	0.96	8.7°	50	4	2	●	1	3.2	3.4	3.7	4.1
MP2XLBR0050N030S06	0.5	1	0.75	3	0.96	9.8°	50	6	2	●	1	3.2	3.4	3.7	4.1
MP2XLBR0050N040	0.5	1	0.75	4	0.96	7.9°	50	4	2	●	1	4.3	4.5	4.9	5.4
MP2XLBR0050N040S06	0.5	1	0.75	4	0.96	9.2°	50	6	2	●	1	4.3	4.5	4.9	5.4
MP2XLBR0050N050	0.5	1	0.75	5	0.96	7.3°	50	4	2	●	1	5.3	5.6	6.1	6.7
MP2XLBR0050N050S06	0.5	1	0.75	5	0.96	8.6°	50	6	2	●	1	5.3	5.6	6.1	6.7
MP2XLBR0050N060	0.5	1	0.75	6	0.96	6.7°	50	4	2	●	1	6.4	6.7	7.3	8.1
MP2XLBR0050N060S06	0.5	1	0.75	6	0.96	8.2°	50	6	2	●	1	6.4	6.7	7.3	8.1
MP2XLBR0050N070	0.5	1	0.75	7	0.96	6.2°	50	4	2	●	1	7.4	7.8	8.5	9.4
MP2XLBR0050N080	0.5	1	0.75	8	0.96	5.8°	50	4	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0050N080S06	0.5	1	0.75	8	0.96	7.3°	50	6	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0050N090	0.5	1	0.75	9	0.96	5.5°	50	4	2	●	1	9.5	10.0	10.9	12.0
MP2XLBR0050N100	0.5	1	0.75	10	0.96	5.1°	50	4	2	●	1	10.6	11.1	12.1	13.4
MP2XLBR0050N100S06	0.5	1	0.75	10	0.96	6.7°	60	6	2	●	1	10.6	11.1	12.1	13.4
MP2XLBR0050N120	0.5	1	0.75	12	0.96	4.6°	50	4	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0050N120S06	0.5	1	0.75	12	0.96	6.1°	60	6	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0050N140	0.5	1	0.75	14	0.96	4.2°	55	4	2	●	1	14.8	15.4	16.9	18.7
MP2XLBR0050N160	0.5	1	0.75	16	0.96	3.8°	55	4	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0050N160S06	0.5	1	0.75	16	0.96	5.2°	65	6	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0050N180	0.5	1	0.75	18	0.96	3.5°	55	4	2	●	1	18.9	19.8	21.7	24.0
MP2XLBR0050N200	0.5	1	0.75	20	0.96	3.3°	55	4	2	●	1	21.0	22.0	24.1	26.6
MP2XLBR0050N200S06	0.5	1	0.75	20	0.96	4.6°	65	6	2	●	1	21.0	22.0	24.1	26.6
MP2XLBR0060N060	0.6	1.2	0.9	6	1.16	6.6°	50	4	2	●	1	6.4	6.7	7.3	8.0
MP2XLBR0060N060S06	0.6	1.2	0.9	6	1.16	8.1°	55	6	2	●	1	6.4	6.7	7.3	8.0
MP2XLBR0060N080	0.6	1.2	0.9	8	1.16	5.7°	50	4	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0060N080S06	0.6	1.2	0.9	8	1.16	7.3°	55	6	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0060N100	0.6	1.2	0.9	10	1.16	5°	50	4	2	●	1	10.6	11.0	12.1	13.3
MP2XLBR0060N100S06	0.6	1.2	0.9	10	1.16	6.6°	55	6	2	●	1	10.6	11.0	12.1	13.3

* Number of Flutes
● : USA Stock

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

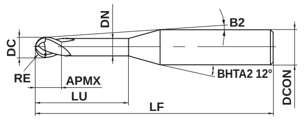
(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle 0.5°	1°	2°	3°
MP2XLBR0060N120	0.6	1.2	0.9	12	1.16	4.4°	50	4	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0060N120S06	0.6	1.2	0.9	12	1.16	6°	65	6	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0060N140	0.6	1.2	0.9	14	1.16	4°	55	4	2	●	1	14.8	15.4	16.9	18.7
MP2XLBR0060N160	0.6	1.2	0.9	16	1.16	3.7°	55	4	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0060N160S06	0.6	1.2	0.9	16	1.16	5.1°	65	6	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0060N180	0.6	1.2	0.9	18	1.16	3.4°	60	4	2	●	1	18.9	19.8	21.7	24.0
MP2XLBR0060N200	0.6	1.2	0.9	20	1.16	3.1°	60	4	2	●	1	21.0	21.9	24.0	26.6
MP2XLBR0060N240	0.6	1.2	0.9	24	1.16	2.7°	60	4	2	●	1	25.2	26.3	28.8	*
MP2XLBR0070N080	0.7	1.4	1.05	8	1.34	5.5°	50	4	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0070N120	0.7	1.4	1.05	12	1.34	4.3°	50	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0070N160	0.7	1.4	1.05	16	1.34	3.5°	50	4	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N030	0.75	1.5	1.1	3	1.44	8.6°	50	4	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0075N040	0.75	1.5	1.1	4	1.44	7.7°	50	4	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0075N060	0.75	1.5	1.1	6	1.44	6.3°	50	4	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0075N060S06	0.75	1.5	1.1	6	1.44	8°	50	6	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0075N080	0.75	1.5	1.1	8	1.44	5.4°	50	4	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0075N080S06	0.75	1.5	1.1	8	1.44	7.2°	60	6	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0075N100	0.75	1.5	1.1	10	1.44	4.7°	50	4	2	●	1	10.5	11.0	12.0	13.2
MP2XLBR0075N100S06	0.75	1.5	1.1	10	1.44	6.5°	60	6	2	●	1	10.5	11.0	12.0	13.2
MP2XLBR0075N120	0.75	1.5	1.1	12	1.44	4.2°	50	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0075N120S06	0.75	1.5	1.1	12	1.44	5.9°	60	6	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0075N140	0.75	1.5	1.1	14	1.44	3.8°	55	4	2	●	1	14.7	15.3	16.8	18.5
MP2XLBR0075N160	0.75	1.5	1.1	16	1.44	3.4°	55	4	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N160S06	0.75	1.5	1.1	16	1.44	5°	60	6	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N180	0.75	1.5	1.1	18	1.44	3.1°	60	4	2	●	1	18.9	19.7	21.6	23.8
MP2XLBR0075N200	0.75	1.5	1.1	20	1.44	2.9°	60	4	2	●	1	21.0	21.9	23.9	*
MP2XLBR0075N220	0.75	1.5	1.1	22	1.44	2.7°	60	4	2	●	1	23.0	24.0	26.3	*
MP2XLBR0080N080	0.8	1.6	1.2	8	1.54	5.3°	55	4	2	●	1	8.4	8.8	9.6	10.5
MP2XLBR0080N120	0.8	1.6	1.2	12	1.54	4.1°	55	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0080N160	0.8	1.6	1.2	16	1.54	3.3°	55	4	2	●	1	16.8	17.5	19.1	21.2
MP2XLBR0080N200	0.8	1.6	1.2	20	1.54	2.8°	55	4	2	●	1	21.0	21.9	23.9	*
MP2XLBR0090N080	0.9	1.8	1.4	8	1.74	5.1°	55	4	2	●	1	8.4	8.8	9.6	10.5
MP2XLBR0090N120	0.9	1.8	1.4	12	1.74	3.9°	55	4	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0090N160	0.9	1.8	1.4	16	1.74	3.1°	55	4	2	●	1	16.8	17.5	19.1	21.1
MP2XLBR0090N200	0.9	1.8	1.4	20	1.74	2.6°	55	4	2	●	1	20.9	21.8	23.9	*
MP2XLBR0100N040	1	2	1.5	4	1.94	7.2°	50	4	2	●	1	4.2	4.4	4.7	5.2
MP2XLBR0100N040S06	1	2	1.5	4	1.94	9°	50	6	2	●	1	4.2	4.4	4.7	5.2
MP2XLBR0100N060	1	2	1.5	6	1.94	5.8°	50	4	2	●	1	6.3	6.6	7.1	7.8
MP2XLBR0100N060S06	1	2	1.5	6	1.94	7.8°	50	6	2	●	1	6.3	6.6	7.1	7.8
MP2XLBR0100N080	1	2	1.5	8	1.94	4.8°	50	4	2	●	1	8.4	8.8	9.5	10.5
MP2XLBR0100N080S06	1	2	1.5	8	1.94	6.9°	50	6	2	●	1	8.4	8.8	9.5	10.5
MP2XLBR0100N100	1	2	1.5	10	1.94	4.2°	50	4	2	●	1	10.5	10.9	11.9	13.1
MP2XLBR0100N100S06	1	2	1.5	10	1.94	6.2°	50	6	2	●	1	10.5	10.9	11.9	13.1
MP2XLBR0100N120	1	2	1.5	12	1.94	3.6°	50	4	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0100N120S06	1	2	1.5	12	1.94	5.6°	60	6	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0100N140	1	2	1.5	14	1.94	3.2°	55	4	2	●	1	14.7	15.3	16.7	18.4
MP2XLBR0100N140S06	1	2	1.5	14	1.94	5.1°	60	6	2	●	1	14.7	15.3	16.7	18.4
MP2XLBR0100N160	1	2	1.5	16	1.94	2.9°	55	4	2	●	1	16.8	17.5	19.1	*

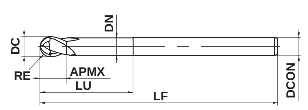
* Number of Flutes
● : USA Stock

* No Interference

Type1



Type2



(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F ⋆	Stock	Type	Effective Length for Inclined Angle			
												0.5°	1°	2°	3°
MP2XLBR0100N160S06	1	2	1.5	16	1.94	4.7°	65	6	2	●	1	16.8	17.5	19.1	21.1
MP2XLBR0100N180	1	2	1.5	18	1.94	2.7°	55	4	2	●	1	18.9	19.7	21.5	⋆
MP2XLBR0100N180S06	1	2	1.5	18	1.94	4.3°	65	6	2	●	1	18.9	19.7	21.5	23.8
MP2XLBR0100N200	1	2	1.5	20	1.94	2.4°	65	4	2	●	1	20.9	21.8	23.9	⋆
MP2XLBR0100N200S06	1	2	1.5	20	1.94	4°	65	6	2	●	1	20.9	21.8	23.9	26.4
MP2XLBR0100N220	1	2	1.5	22	1.94	2.3°	65	4	2	●	1	23.0	24.0	26.3	⋆
MP2XLBR0100N250	1	2	1.5	25	1.94	2°	65	4	2	●	1	26.2	27.3	⋆	⋆
MP2XLBR0100N250S06	1	2	1.5	25	1.94	3.5°	90	6	2	●	1	26.2	27.3	29.9	33
MP2XLBR0100N300	1	2	1.5	30	1.94	1.7°	80	4	2	●	1	31.4	32.7	⋆	⋆
MP2XLBR0100N300S06	1	2	1.5	30	1.94	3°	90	6	2	●	1	31.4	32.7	35.9	⋆
MP2XLBR0100N350	1	2	1.5	35	1.94	1.5°	80	4	2	●	1	36.6	38.2	⋆	⋆
MP2XLBR0100N350S06	1	2	1.5	35	1.94	2.7°	90	6	2	●	1	36.6	38.2	41.8	⋆
MP2XLBR0100N400	1	2	1.5	40	1.94	1.4°	80	4	2	●	1	41.8	43.6	⋆	⋆
MP2XLBR0100N400S06	1	2	1.5	40	1.94	2.4°	90	6	2	●	1	41.8	43.6	47.8	⋆
MP2XLBR0125N100	1.25	2.5	1.9	10	2.4	3.5°	55	4	2	●	1	10.4	10.8	11.8	12.9
MP2XLBR0125N150	1.25	2.5	1.9	15	2.4	2.5°	55	4	2	●	1	15.6	16.3	17.8	⋆
MP2XLBR0125N200	1.25	2.5	1.9	20	2.4	2°	55	4	2	●	1	20.8	21.7	⋆	⋆
MP2XLBR0125N250	1.25	2.5	1.9	25	2.4	1.6°	70	4	2	●	1	26.1	27.2	⋆	⋆
MP2XLBR0125N300	1.25	2.5	1.9	30	2.4	1.4°	70	4	2	●	1	31.3	32.6	⋆	⋆
MP2XLBR0125N350	1.25	2.5	1.9	35	2.4	1.2°	70	4	2	●	1	36.5	38.1	⋆	⋆
MP2XLBR0150N060S03	1.5	3	2.3	6	2.9	—	60	3	2	●	1	⋆	⋆	⋆	⋆
MP2XLBR0150N080	1.5	3	2.3	8	2.9	6.3°	60	6	2	●	1	8.3	8.6	9.3	10.2
MP2XLBR0150N100	1.5	3	2.3	10	2.9	5.5°	60	6	2	●	1	10.4	10.8	11.7	12.9
MP2XLBR0150N120	1.5	3	2.3	12	2.9	4.9°	60	6	2	●	1	12.5	13.0	14.1	15.5
MP2XLBR0150N140	1.5	3	2.3	14	2.9	4.4°	60	6	2	●	1	14.6	15.2	16.5	18.2
MP2XLBR0150N160	1.5	3	2.3	16	2.9	4°	70	6	2	●	1	16.7	17.3	18.9	20.8
MP2XLBR0150N200	1.5	3	2.3	20	2.9	3.4°	70	6	2	●	1	20.8	21.7	23.7	26.1
MP2XLBR0150N250	1.5	3	2.3	25	2.9	2.8°	70	6	2	●	1	26.1	27.2	29.7	⋆
MP2XLBR0150N300	1.5	3	2.3	30	2.9	2.5°	70	6	2	●	1	31.3	32.6	35.7	⋆
MP2XLBR0150N350	1.5	3	2.3	35	2.9	2.2°	90	6	2	●	1	36.5	38.0	41.7	⋆
MP2XLBR0150N400	1.5	3	2.3	40	2.9	1.9°	90	6	2	●	1	41.7	43.5	⋆	⋆
MP2XLBR0175N150	1.75	3.5	2.6	15	3.4	3.8°	65	6	2	●	1	15.6	16.2	17.7	19.4
MP2XLBR0175N250	1.75	3.5	2.6	25	3.4	2.5°	65	6	2	●	1	26.0	27.1	29.6	⋆
MP2XLBR0175N350	1.75	3.5	2.6	35	3.4	1.9°	90	6	2	●	1	36.5	38.0	⋆	⋆
MP2XLBR0175N450	1.75	3.5	2.6	45	3.4	1.5°	90	6	2	●	1	46.9	48.9	⋆	⋆
MP2XLBR0200N080S04	2	4	3	8	3.9	—	65	4	2	●	2	⋆	⋆	⋆	⋆
MP2XLBR0200N100	2	4	3	10	3.9	4.5°	65	6	2	●	1	10.4	10.8	11.6	12.7
MP2XLBR0200N120	2	4	3	12	3.9	3.9°	65	6	2	●	1	12.5	12.9	14.0	15.4
MP2XLBR0200N140	2	4	3	14	3.9	3.4°	65	6	2	●	1	14.6	15.1	16.4	18.0
MP2XLBR0200N160	2	4	3	16	3.9	3.1°	70	6	2	●	1	16.6	17.3	18.8	20.7
MP2XLBR0200N200	2	4	3	20	3.9	2.6°	70	6	2	●	1	20.8	21.7	23.6	⋆
MP2XLBR0200N250	2	4	3	25	3.9	2.1°	70	6	2	●	1	26.0	27.1	29.6	⋆
MP2XLBR0200N300	2	4	3	30	3.9	1.8°	80	6	2	●	1	31.2	32.6	⋆	⋆
MP2XLBR0200N350	2	4	3	35	3.9	1.6°	80	6	2	●	1	36.5	38.0	⋆	⋆
MP2XLBR0200N400	2	4	3	40	3.9	1.4°	90	6	2	●	1	41.7	43.5	⋆	⋆
MP2XLBR0200N450	2	4	3	45	3.9	1.2°	90	6	2	●	1	46.9	48.9	⋆	⋆
MP2XLBR0200N500	2	4	3	50	3.9	1.1°	100	6	2	●	1	52.1	54.3	⋆	⋆
MP2XLBR0250N150	2.5	5	3.8	15	4.9	2°	70	6	2	●	1	15.6	16.2	⋆	⋆

⋆ Number of Flutes

⋆ No Interference

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F ⋆	Stock	Type	Effective Length for Inclined Angle			
												0.5°	1°	2°	3°
MP2XLBR0250N200	2.5	5	3.8	20	4.9	1.5°	70	6	2	●	1	20.8	21.6	⋆	⋆
MP2XLBR0250N250	2.5	5	3.8	25	4.9	1.2°	70	6	2	●	1	26.0	27.1	⋆	⋆
MP2XLBR0250N300	2.5	5	3.8	30	4.9	1°	80	6	2	●	1	31.2	⋆	⋆	⋆
MP2XLBR0250N350	2.5	5	3.8	35	4.9	0.9°	80	6	2	●	1	36.4	⋆	⋆	⋆
MP2XLBR0250N400	2.5	5	3.8	40	4.9	0.8°	90	6	2	●	1	41.7	⋆	⋆	⋆
MP2XLBR0300N200	3	6	6	20	5.85	—	70	6	2	●	2	⋆	⋆	⋆	⋆
MP2XLBR0300N250	3	6	6	25	5.85	—	70	6	2	●	2	⋆	⋆	⋆	⋆
MP2XLBR0300N300	3	6	6	30	5.85	—	80	6	2	●	2	⋆	⋆	⋆	⋆
MP2XLBR0300N400	3	6	6	40	5.85	—	90	6	2	●	2	⋆	⋆	⋆	⋆
MP2XLBR0300N500	3	6	6	50	5.85	—	100	6	2	●	2	⋆	⋆	⋆	⋆

⋆ Number of Flutes

⋆ No Interference

RE = Radius of ball nose
DC = Cutting dia.
APMX = Depth of cut max.
LU = Usable length
DN = Neck dia.
LF = Functional length
DCON = Connection dia.

● : USA Stock

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

Recommended Cutting Conditions

(inch)

Workpiece Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45–55HRC)			Copper, Copper Alloys		
RE (mm)	LU (mm)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
0.05	0.3	50000	7.9	.00008	50000	7.9	.00008	50000	7.9	.00016
	0.5	50000	7.9	.00004	50000	7.9	.00008	50000	7.9	.00008
0.1	0.5	50000	15.7	.00012	50000	12.6	.00012	50000	12.6	.00024
	1	50000	15.7	.00008	50000	12.6	.00008	50000	12.6	.00016
	1.5	40000	11.8	.00004	40000	9.4	.00004	40000	9.4	.00008
	2	40000	7.9	.00004	40000	6.3	.00004	40000	6.3	.00008
	2.5	40000	3.9	.00004	40000	3.1	.00004	40000	3.1	.00008
0.15	1	50000	23.6	.00028	50000	18.9	.00028	50000	18.9	.00055
	1.5	50000	23.6	.00020	50000	18.9	.00020	50000	18.9	.00039
	2	50000	23.6	.00012	50000	18.9	.00012	50000	18.9	.00024
	2.5	40000	15.7	.00012	40000	12.6	.00012	40000	12.6	.00024
	3	40000	11.8	.00008	40000	9.4	.00008	40000	9.4	.00016
	3.5	30000	9.8	.00008	30000	7.9	.00008	30000	7.9	.00016
	4	30000	7.9	.00008	30000	6.3	.00008	30000	6.3	.00016
0.2	1	50000	70.9	.00059	50000	55.1	.00059	50000	55.1	.00118
	2	50000	51.2	.00039	50000	39.4	.00039	50000	39.4	.00079
	3	50000	35.4	.00020	50000	27.6	.00020	50000	27.6	.00039
	4	40000	23.6	.00016	40000	18.9	.00016	40000	18.9	.00031
	5	40000	15.7	.00012	40000	12.6	.00012	40000	12.6	.00024
	6	30000	7.9	.00008	30000	6.3	.00008	30000	6.3	.00016
0.25	2	50000	98.4	.00079	50000	78.7	.00079	50000	78.7	.00157
	3	50000	59.1	.00059	50000	47.2	.00059	50000	47.2	.00118
	4	45000	47.2	.00039	45000	37.4	.00039	45000	37.4	.00079
	5	45000	35.4	.00028	45000	27.6	.00028	45000	27.6	.00055
	6	36000	23.6	.00024	36000	18.9	.00024	36000	18.9	.00047
	7	32000	15.7	.00020	32000	12.6	.00020	32000	12.6	.00039
	8	32000	11.8	.00012	32000	9.4	.00012	32000	9.4	.00024
	10	26000	7.9	.00008	26000	6.3	.00008	26000	6.3	.00016
0.3	2	50000	137.8	.00118	50000	110.2	.00118	50000	110.2	.00236
	3	50000	137.8	.00118	50000	110.2	.00118	50000	110.2	.00236
	4	44000	98.4	.00079	44000	78.7	.00079	44000	78.7	.00157
	5	37000	47.2	.00039	37000	37.4	.00039	37000	37.4	.00079
	6	37000	39.4	.00031	37000	31.5	.00031	37000	31.5	.00063
	7	35000	29.5	.00031	35000	23.6	.00031	35000	23.6	.00063
	8	35000	23.6	.00024	35000	18.9	.00024	35000	18.9	.00047
	9	30000	19.7	.00016	30000	15.7	.00016	30000	15.7	.00031
	10	30000	19.7	.00012	30000	15.7	.00012	30000	15.7	.00024
	11	22000	11.8	.00008	22000	9.4	.00008	22000	9.4	.00016
	12	22000	7.9	.00008	22000	6.3	.00008	22000	6.3	.00016
0.4	2	50000	173.2	.00157	50000	137.8	.00157	50000	137.8	.00315
	3	50000	157.5	.00157	50000	126.0	.00157	50000	126.0	.00315
	4	50000	157.5	.00079	50000	126.0	.00079	50000	126.0	.00157
	5	35000	94.5	.00079	35000	74.8	.00079	35000	74.8	.00157
	6	35000	94.5	.00079	35000	74.8	.00079	35000	74.8	.00157
	7	30000	59.1	.00059	30000	47.2	.00059	30000	47.2	.00118
	8	30000	59.1	.00039	30000	47.2	.00039	30000	47.2	.00079
	10	30000	27.6	.00031	30000	22.0	.00031	30000	22.0	.00063
	12	22000	19.7	.00024	22000	15.7	.00024	22000	15.7	.00047

Depth of Cut

≤0.1RE (RE≤1)
≤0.2RE (RE>1)

RE : Radius

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

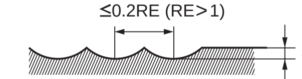
Recommended Cutting Conditions

(inch)

Workpiece Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45–55HRC)			Copper, Copper Alloys		
RE (mm)	LU (mm)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
0.5	3	40000	157.5	.00197	40000	126.0	.00197	40000	126.0	.00394
	4	40000	157.5	.00197	40000	126.0	.00197	40000	126.0	.00394
	6	35000	118.1	.00118	35000	94.5	.00118	35000	94.5	.00236
	8	30000	78.7	.00079	30000	63.0	.00079	30000	63.0	.00157
	10	20000	39.4	.00039	20000	31.5	.00039	20000	31.5	.00079
	12	20000	39.4	.00039	20000	31.5	.00039	20000	31.5	.00079
	14	18000	23.6	.00031	18000	18.9	.00031	18000	18.9	.00063
	16	18000	19.7	.00031	18000	15.7	.00031	18000	15.7	.00063
	18	13000	11.8	.00020	13000	9.4	.00020	13000	9.4	.00039
	20	13000	9.8	.00020	13000	7.9	.00020	13000	7.9	.00039
0.6	6	40000	173.2	.0016	40000	137.8	.0016	40000	137.8	.0031
	8	40000	157.5	.0016	40000	126.0	.0016	40000	126.0	.0031
	10	27000	74.8	.0008	27000	59.1	.0008	27000	59.1	.0016
	12	16000	55.1	.0008	16000	43.3	.0008	16000	43.3	.0016
	18	15000	27.6	.0003	15000	22.0	.0003	15000	22.0	.0006
	24	11000	11.8	.0002	11000	9.4	.0002	11000	9.4	.0005
0.7	8	40000	157.5	.0020	40000	126.0	.0020	40000	100.8	.0039
	12	26000	78.7	.0016	26000	63.0	.0016	26000	50.4	.0031
	16	17000	55.1	.0012	17000	44.1	.0012	17000	35.3	.0024
0.75	6	40000	236.2	.0028	36000	169.3	.0028	36000	169.3	.0055
	8	40000	236.2	.0028	36000	169.3	.0028	36000	169.3	.0055
	10	40000	196.9	.0024	36000	141.7	.0024	36000	141.7	.0047
	12	32000	133.9	.0016	29000	94.5	.0016	29000	94.5	.0031
	16	15000	55.1	.0012	15000	43.3	.0012	15000	43.3	.0024
	20	12000	35.4	.0008	12000	28.3	.0008	12000	28.3	.0016
	30	9000	15.7	.0004	9000	12.6	.0004	9000	12.6	.0008
0.8	8	40000	236.2	.0031	32000	149.6	.0031	32000	149.6	.0063
	12	36000	177.2	.0024	29000	110.2	.0024	29000	110.2	.0047
	16	14000	55.1	.0016	14000	43.3	.0016	14000	43.3	.0031
	20	12000	39.4	.0012	12000	31.5	.0012	12000	31.5	.0024
0.9	8	40000	259.8	.0035	32000	165.4	.0035	32000	165.4	.0071
	12	40000	196.9	.0028	32000	126.0	.0028	32000	126.0	.0055
	16	28000	110.2	.0016	22000	70.9	.0016	22000	70.9	.0031
	20	10000	31.5	.0012	10000	25.2	.0012	10000	25.2	.0024
1	4	40000	315.0	.0039	32000	196.9	.0039	32000	196.9	.0079
	6	40000	315.0	.0039	32000	196.9	.0039	32000	196.9	.0079
	8	40000	236.2	.0039	32000	149.6	.0039	32000	149.6	.0079
	10	40000	196.9	.0031	32000	126.0	.0031	32000	126.0	.0063
	12	40000	196.9	.0031	32000	126.0	.0031	32000	126.0	.0063
	16	32000	137.8	.0020	26000	86.6	.0020	26000	86.6	.0039
	20	10000	39.4	.0016	10000	31.5	.0016	10000	31.5	.0031
	25	10000	39.4	.0016	10000	31.5	.0016	10000	31.5	.0031
	30	10000	31.5	.0008	10000	25.2	.0008	10000	25.2	.0016
	35	10000	23.6	.0008	10000	18.9	.0008	10000	18.9	.0016
	40	8000	15.7	.0004	8000	12.6	.0004	8000	12.6	.0008

Depth of Cut

≤0.1RE (RE≤1)
≤0.2RE (RE>1)



RE : Radius

MP2XLB

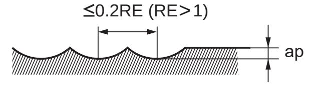
Ball nose, Short cut length, 2 flute, Long neck

(inch)

Workpiece Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45―55HRC)			Copper, Copper Alloys		
RE (mm)	LU (mm)	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed Rate (IPM)	Depth of Cut ap
1.25	10	36000	236.2	.0047	29000	149.6	.0047	29000	149.6	.0094
	15	32000	177.2	.0039	26000	114.2	.0039	26000	114.2	.0079
	20	26000	126.0	.0028	21000	78.7	.0028	21000	78.7	.0055
	25	12000	55.1	.0024	8000	28.3	.0024	8000	28.3	.0047
	30	8000	35.4	.0016	8000	27.6	.0016	8000	27.6	.0031
	35	8000	31.5	.0008	8000	25.2	.0008	8000	20.1	.0016
1.5	6	32000	275.6	.0059	26000	177.2	.0059	22000	149.6	.0118
	10	32000	275.6	.0059	26000	177.2	.0059	22000	149.6	.0118
	16	32000	196.9	.0039	26000	126.0	.0039	22000	106.3	.0079
	20	27000	149.6	.0039	22000	94.5	.0039	22000	94.5	.0079
	25	21000	106.3	.0031	17000	66.9	.0031	17000	66.9	.0063
	30	10000	27.6	.0031	6000	22.0	.0031	6000	22.0	.0063
	35	6000	27.6	.0024	6000	22.0	.0024	6000	22.0	.0047
	40	6000	23.6	.0016	6000	18.9	.0016	6000	18.9	.0031
1.75	15	27500	173.2	.0051	22000	110.2	.0051	18000	90.6	.0102
	25	23000	141.7	.0039	18000	86.6	.0039	18000	86.6	.0079
	35	10000	55.1	.0031	10000	43.3	.0031	10000	43.3	.0063
	45	7500	35.4	.0016	7500	28.3	.0016	7500	28.3	.0031
2	10	24000	236.2	.0079	19000	149.6	.0079	16000	126.0	.0157
	20	24000	149.6	.0059	19000	94.5	.0059	16000	78.7	.0118
	30	20000	118.1	.0039	16000	74.8	.0039	16000	74.8	.0079
	40	12000	66.9	.0039	12000	55.1	.0039	12000	55.1	.0079
	50	8000	39.4	.0020	8000	31.5	.0020	8000	31.5	.0039
2.5	20	22000	236.2	.0079	18000	149.6	.0079	13000	110.2	.0157
	25	22000	173.2	.0079	18000	110.2	.0079	13000	78.7	.0157
	30	22000	149.6	.0059	18000	94.5	.0059	13000	66.9	.0118
	40	22000	141.7	.0039	18000	90.6	.0039	13000	63.0	.0079
3	20	20000	236.2	.0079	16000	149.6	.0079	11000	102.4	.0157
	30	20000	236.2	.0079	16000	149.6	.0079	11000	102.4	.0157
	40	20000	177.2	.0059	16000	110.2	.0059	11000	78.7	.0118
	50	20000	118.1	.0059	16000	74.8	.0059	11000	51.2	.0118

Depth of Cut

≤0.1RE (RE≤1)
≤0.2RE (RE>1)



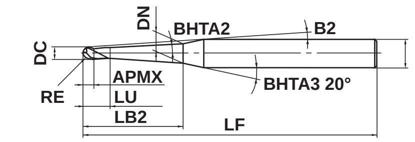
RE : Radius

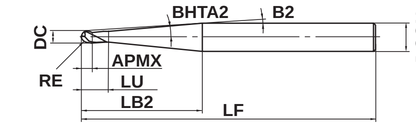
(Note 1) When the inclination angle of machined surface is high, or when machining at high loads; such as in corners, reduce the revolution and feed rate.
(Note 2) The use of oil mist is effective when machining with small diameter.
(Note 3) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 4) If the rigidity of the machine or the workpiece material installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
(Note 5) For hardened steel over 55 HRC, use VF2XLB.
(Note 6) For cutting conditions for austenitic stainless steel and titanium alloy, use the high hardness steel (45-55 HRC) table but reduce the spindle speed by 40% and the feed rate by 55%.

MP3XB

Ball nose, 3 flute, Taper neck

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎		○	○	○	





	RE≤3	RE≥4			
	±0.005	±0.010			
h5	DCON=6	DCON=8			
	0 - 0.005	0 - 0.006			
h6	DCON=10	DCON≥12			
	0 - 0.009	0 - 0.011			

- Ideal for rough milling of long overhang applications and semi-finishing of forging dies (40-52 HRC).
- Rigid, high helix, 3 flute design enables large depths of cut and high feed rates for increased machining efficiency.

(mm)

Order Number	RE	DC	APMX	LU	BD2	LB2	LF	DCON	No.F *	Stock	Type
MP3XBR0050N008T05	0.5	1	0.8	2.3	1.04	8	60	6	3	★	1
MP3XBR0050N010T10	0.5	1	0.8	2.3	1.2	10	60	6	3	★	1
MP3XBR0050N010T15	0.5	1	0.8	2.3	1.34	10	60	6	3	★	1
MP3XBR0050N010T30	0.5	1	0.8	2.3	1.74	10	60	6	3	★	1
MP3XBR0050N012T05	0.5	1	0.8	2.3	1.1	12	60	6	3	★	1
MP3XBR0050N016T05	0.5	1	0.8	2.3	1.18	16	60	6	3	★	1
MP3XBR0050N016T10	0.5	1	0.8	2.3	1.42	16	60	6	3	★	1
MP3XBR0050N016T15	0.5	1	0.8	2.3	1.66	16	60	6	3	★	1
MP3XBR0050N020T05	0.5	1	0.8	2.3	1.24	20	60	6	3	★	1
MP3XBR0050N020T10	0.5	1	0.8	2.3	1.56	20	60	6	3	★	1
MP3XBR0050N020T15	0.5	1	0.8	2.3	1.86	20	60	6	3	★	1
MP3XBR0050N020T30	0.5	1	0.8	2.3	2.8	20	60	6	3	★	1
MP3XBR0050N023T15	0.5	1	0.8	2.3	2.02	23	70	6	3	★	1
MP3XBR0050N025T05	0.5	1	0.8	2.3	1.34	25	70	6	3	★	1
MP3XBR0050N025T10	0.5	1	0.8	2.3	1.74	25	70	6	3	★	1
MP3XBR0050N025T15	0.5	1	0.8	2.3	2.12	25	70	6	3	★	1
MP3XBR0050N025T50	0.5	1	0.8	2.3	4.92	25	60	6	3	★	1
MP3XBR0050N030T05	0.5	1	0.8	2.3	1.42	30	70	6	3	★	1
MP3XBR0050N030T10	0.5	1	0.8	2.3	1.9	30	70	6	3	★	1
MP3XBR0050N030T30	0.5	1	0.8	2.3	3.84	30	70	6	3	★	1
MP3XBR0050N035T10	0.5	1	0.8	2.3	2.08	35	90	6	3	★	1
MP3XBR0050N042T30	0.5	1	0.8	2.3	5.1	42	90	6	3	★	1
MP3XBR0050N050T05	0.5	1	0.8	2.3	1.78	50	90	6	3	★	1
MP3XBR0050N050T10	0.5	1	0.8	2.3	2.6	50	90	6	3	★	1
MP3XBR0075N010T05	0.75	1.5	1.2	2.7	1.56	10	60	6	3	★	1
MP3XBR0075N010T10	0.75	1.5	1.2	2.7	1.7	10	60	6	3	★	1
MP3XBR0075N010T15	0.75	1.5	1.2	2.7	1.82	10	60	6	3	★	1
MP3XBR0075N016T05	0.75	1.5	1.2	2.7	1.68	16	60	6	3	★	1
MP3XBR0075N016T10	0.75	1.5	1.2	2.7	1.9	16	60	6	3	★	1
MP3XBR0075N016T15	0.75	1.5	1.2	2.7	2.14	16	60	6	3	★	1
MP3XBR0075N020T05	0.75	1.5	1.2	2.7	1.74	20	60	6	3	★	1
MP3XBR0075N020T10	0.75	1.5	1.2	2.7	2.04	20	60	6	3	★	1
MP3XBR0075N020T15	0.75	1.5	1.2	2.7	2.34	20	60	6	3	★	1
MP3XBR0075N025T15	0.75	1.5	1.2	2.7	2.6	25	80	6	3	★	1

* Number of Flutes
★ : Stocked in Japan

MP3XB

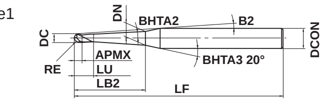
Ball nose, 3 flute, Taper neck

(mm)

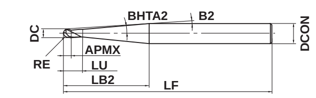
Order Number	RE	DC	APMX	LU	BD2	LB2	LF	DCON	No.F ∗	Stock	Type
MP3XBR0075N030T05	0.75	1.5	1.2	2.7	1.92	30	80	6	3	★	1
MP3XBR0075N030T10	0.75	1.5	1.2	2.7	2.4	30	80	6	3	★	1
MP3XBR0075N030T15	0.75	1.5	1.2	2.7	2.86	30	80	6	3	★	1
MP3XBR0075N046T30	0.75	1.5	1.2	2.7	—	46	80	6	3	★	2
MP3XBR0100N016T05	1	2	1.6	3.6	2.12	16	60	6	3	★	1
MP3XBR0100N016T10	1	2	1.6	3.6	2.34	16	60	6	3	★	1
MP3XBR0100N016T15	1	2	1.6	3.6	2.54	16	60	6	3	★	1
MP3XBR0100N020T05	1	2	1.6	3.6	2.18	20	60	6	3	★	1
MP3XBR0100N020T10	1	2	1.6	3.6	2.48	20	60	6	3	★	1
MP3XBR0100N020T15	1	2	1.6	3.6	2.76	20	60	6	3	★	1
MP3XBR0100N020T30	1	2	1.6	3.6	3.62	20	60	6	3	★	1
MP3XBR0100N025T10	1	2	1.6	3.6	2.64	25	70	6	3	★	1
MP3XBR0100N025T15	1	2	1.6	3.6	3.02	25	70	6	3	★	1
MP3XBR0100N027T50	1	2	1.6	3.6	—	27	60	6	3	★	2
MP3XBR0100N030T05	1	2	1.6	3.6	2.36	30	70	6	3	★	1
MP3XBR0100N030T10	1	2	1.6	3.6	2.82	30	70	6	3	★	1
MP3XBR0100N030T15	1	2	1.6	3.6	3.28	30	70	6	3	★	1
MP3XBR0100N030T30	1	2	1.6	3.6	4.66	30	70	6	3	★	1
MP3XBR0100N035T05	1	2	1.6	3.6	2.44	35	80	6	3	★	1
MP3XBR0100N035T10	1	2	1.6	3.6	3	35	80	6	3	★	1
MP3XBR0100N035T15	1	2	1.6	3.6	3.54	35	80	6	3	★	1
MP3XBR0100N040T05	1	2	1.6	3.6	2.54	40	80	6	3	★	1
MP3XBR0100N040T10	1	2	1.6	3.6	3.18	40	80	6	3	★	1
MP3XBR0100N040T15	1	2	1.6	3.6	3.8	40	80	6	3	★	1
MP3XBR0100N042T30	1	2	1.6	3.6	—	42	80	6	3	★	2
MP3XBR0100N050T10	1	2	1.6	3.6	3.52	50	110	6	3	★	1
MP3XBR0100N070T10	1	2	1.6	3.6	4.22	70	110	6	3	★	1
MP3XBR0150N010T05	1.5	3	2.4	5.4	2.98	10	60	6	3	★	1
MP3XBR0150N020T05	1.5	3	2.4	5.4	3.16	20	60	6	3	★	1
MP3XBR0150N020T10	1.5	3	2.4	5.4	3.4	20	60	6	3	★	1
MP3XBR0150N020T15	1.5	3	2.4	5.4	3.66	20	60	6	3	★	1
MP3XBR0150N025T30	1.5	3	2.4	5.4	4.96	25	60	6	3	★	1
MP3XBR0150N030T05	1.5	3	2.4	5.4	3.32	30	70	6	3	★	1
MP3XBR0150N030T10	1.5	3	2.4	5.4	3.76	30	70	6	3	★	1
MP3XBR0150N030T15	1.5	3	2.4	5.4	4.18	30	70	6	3	★	1
MP3XBR0150N034T30	1.5	3	2.4	5.4	—	34	70	6	3	★	2
MP3XBR0150N035T10	1.5	3	2.4	5.4	3.94	35	80	6	3	★	1
MP3XBR0150N035T15	1.5	3	2.4	5.4	4.46	35	70	6	3	★	1
MP3XBR0150N040T05	1.5	3	2.4	5.4	3.5	40	80	6	3	★	1
MP3XBR0150N040T10	1.5	3	2.4	5.4	4.1	40	80	6	3	★	1
MP3XBR0150N040T15	1.5	3	2.4	5.4	4.72	40	80	6	3	★	1
MP3XBR0150N045T15	1.5	3	2.4	5.4	4.98	45	80	6	3	★	1
MP3XBR0150N050T05	1.5	3	2.4	5.4	3.68	50	90	6	3	★	1
MP3XBR0150N050T10	1.5	3	2.4	5.4	4.46	50	90	6	3	★	1
MP3XBR0150N052T15	1.5	3	2.4	5.4	5.34	52	90	6	3	★	1
MP3XBR0150N060T10	1.5	3	2.4	5.4	4.8	60	110	6	3	★	1
MP3XBR0150N064T15	1.5	3	2.4	5.4	—	64	110	6	3	★	2
MP3XBR0150N070T10	1.5	3	2.4	5.4	5.16	70	110	6	3	★	1
MP3XBR0150N040T30	1.5	3	2.4	5.4	6.52	40	90	8	3	★	1
MP3XBR0150N054T30	1.5	3	2.4	5.4	—	54	90	8	3	★	2
MP3XBR0200N020T10	2	4	3.2	6.2	4.38	20	70	6	3	★	1
MP3XBR0200N030T05	2	4	3.2	6.2	4.32	30	70	6	3	★	1

∗ Number of Flutes ★ : Stocked in Japan

Type1



Type2



(mm)

Order Number	RE	DC	APMX	LU	BD2	LB2	LF	DCON	No.F ∗	Stock	Type
MP3XBR0200N030T10	2	4	3.2	6.2	4.74	30	70	6	3	★	1
MP3XBR0200N035T10	2	4	3.2	6.2	4.9	35	70	6	3	★	1
MP3XBR0200N040T05	2	4	3.2	6.2	4.48	40	80	6	3	★	1
MP3XBR0200N040T10	2	4	3.2	6.2	5.08	40	80	6	3	★	1
MP3XBR0200N045T10	2	4	3.2	6.2	5.26	45	80	6	3	★	1
MP3XBR0200N060T05	2	4	3.2	6.2	4.84	60	100	6	3	★	1
MP3XBR0200N066T10	2	4	3.2	6.2	—	66	100	6	3	★	2
MP3XBR0200N030T30	2	4	3.2	6.2	6.4	30	90	8	3	★	1
MP3XBR0200N045T30	2	4	3.2	6.2	—	45	90	8	3	★	2
MP3XBR0200N050T15	2	4	3.2	6.2	6.2	50	90	8	3	★	1
MP3XBR0200N084T15	2	4	3.2	6.2	—	84	120	8	3	★	2
MP3XBR0250N038T10	2.5	5	4	7	—	38	80	6	3	★	2
MP3XBR0250N036T30	2.5	5	4	7	—	36	90	8	3	★	2
MP3XBR0250N050T10	2.5	5	4	7	6.4	50	90	8	3	★	1
MP3XBR0250N065T10	2.5	5	4	7	6.92	65	110	8	3	★	1
MP3XBR0250N066T15	2.5	5	4	7	—	66	110	8	3	★	2
MP3XBR0300N032T30	3	6	9	12	—	32	80	8	3	★	2
MP3XBR0300N040T10	3	6	9	12	6.82	40	80	8	3	★	1
MP3XBR0300N050T10	3	6	9	12	7.18	50	90	8	3	★	1
MP3XBR0300N053T15	3	6	9	12	—	53	90	8	3	★	2
MP3XBR0300N073T10	3	6	9	12	—	73	110	8	3	★	2
MP3XBR0300N090T10	3	6	9	12	8.58	90	140	10	3	★	1
MP3XBR0400N035T30	4	8	12	15	—	35	90	10	3	★	2
MP3XBR0400N040T15	4	8	12	15	9.16	40	90	10	3	★	1
MP3XBR0400N050T10	4	8	12	15	9.08	50	110	10	3	★	1
MP3XBR0400N056T15	4	8	12	15	—	56	110	10	3	★	2
MP3XBR0400N065T10	4	8	12	15	9.6	65	130	10	3	★	1
MP3XBR0400N076T10	4	8	12	15	—	76	130	10	3	★	2
MP3XBR0400N090T10	4	8	12	15	10.46	90	150	12	3	★	1
MP3XBR0500N046T30	5	10	15	25	—	46	100	12	3	★	2
MP3XBR0500N050T15	5	10	15	25	11	50	100	12	3	★	1
MP3XBR0500N060T10	5	10	15	25	10.92	60	120	12	3	★	1
MP3XBR0500N068T15	5	10	15	25	—	68	120	12	3	★	2
MP3XBR0500N070T10	5	10	15	25	11.28	70	120	12	3	★	1
MP3XBR0500N100T10	5	10	15	25	12.32	100	160	16	3	★	1
MP3XBR0600N069T30	6	12	18	28	—	69	130	16	3	★	2
MP3XBR0600N070T10	6	12	18	28	13.16	70	130	16	3	★	1
MP3XBR0600N080T15	6	12	18	28	14.42	80	130	16	3	★	1
MP3XBR0600N100T10	6	12	18	28	14.22	100	160	16	3	★	1

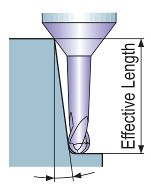
∗ Number of Flutes

★ : Stocked in Japan

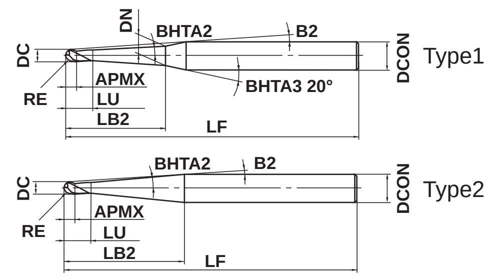
MP3XB

Ball nose, 3 flute, Taper neck

Effective Length for Inclined Angle



Inclined Angle



(mm)

Order Number	RE	BHTA2	B2	0.5°	1°	2°	3°	Type
MP3XBR0050N008T05	0.5	0.5°	9.3°	8.5	8.8	9.3	9.8	1
MP3XBR0050N010T10	0.5	1°	8.4°	—	10.6	11.2	11.8	1
MP3XBR0050N010T15	0.5	1.5°	8.5°	—	—	11	11.6	1
MP3XBR0050N010T30	0.5	3°	8.8°	—	—	—	10.8	1
MP3XBR0050N012T05	0.5	0.5°	7.5°	12.6	13	13.6	14.4	1
MP3XBR0050N016T05	0.5	0.5°	6.3°	16.6	17.1	18	18.9	1
MP3XBR0050N016T10	0.5	1°	6.4°	—	16.7	17.6	18.5	1
MP3XBR0050N016T15	0.5	1.5°	6.5°	—	—	17.2	18.1	1
MP3XBR0050N020T05	0.5	0.5°	5.4°	20.6	21.2	22.3	23.5	1
MP3XBR0050N020T10	0.5	1°	5.5°	—	20.7	21.8	23	1
MP3XBR0050N020T15	0.5	1.5°	5.6°	—	—	21.3	22.5	1
MP3XBR0050N020T30	0.5	3°	5.9°	—	—	—	20.9	1
MP3XBR0050N023T15	0.5	1.5°	5°	—	—	24.4	25.7	1
MP3XBR0050N025T05	0.5	0.5°	4.6°	25.7	26.3	27.7	29.3	1
MP3XBR0050N025T10	0.5	1°	4.7°	—	25.7	27.1	28.6	1
MP3XBR0050N025T15	0.5	1.5°	4.7°	—	—	26.5	27.9	1
MP3XBR0050N025T50	0.5	5°	5.4°	—	—	—	—	1
MP3XBR0050N030T05	0.5	0.5°	4°	30.7	31.5	33.1	35	1
MP3XBR0050N030T10	0.5	1°	4.1°	—	30.8	32.4	34.2	1
MP3XBR0050N030T30	0.5	3°	4.4°	—	—	—	31	1
MP3XBR0050N035T10	0.5	1°	3.6°	—	35.8	37.7	39.8	1
MP3XBR0050N042T30	0.5	3°	3.4°	—	—	—	43	1
MP3XBR0050N050T05	0.5	0.5°	2.6°	50.8	52.1	54.8	*	1
MP3XBR0050N050T10	0.5	1°	2.7°	—	50.9	53.6	*	1
MP3XBR0075N010T05	0.75	0.5°	7.8°	10.6	10.9	11.4	12	1
MP3XBR0075N010T10	0.75	1°	7.9°	—	10.6	11.2	11.8	1
MP3XBR0075N010T15	0.75	1.5°	8°	—	—	11	11.6	1
MP3XBR0075N016T05	0.75	0.5°	5.8°	16.6	17.1	17.9	18.9	1
MP3XBR0075N016T10	0.75	1°	5.9°	—	16.7	17.6	18.5	1
MP3XBR0075N016T15	0.75	1.5°	6°	—	—	17.2	18.1	1
MP3XBR0075N020T05	0.75	0.5°	5°	20.6	21.2	22.3	23.5	1
MP3XBR0075N020T10	0.75	1°	5.1°	—	20.7	21.8	23	1
MP3XBR0075N020T15	0.75	1.5°	5.1°	—	—	21.3	22.5	1
MP3XBR0075N025T15	0.75	1.5°	4.4°	—	—	26.5	27.9	1
MP3XBR0075N030T05	0.75	0.5°	3.7°	30.7	31.5	33.1	35	1
MP3XBR0075N030T10	0.75	1°	3.7°	—	30.8	32.4	34.2	1
MP3XBR0075N030T15	0.75	1.5°	3.8°	—	—	31.6	33.4	1
MP3XBR0075N046T30	0.75	3°	2.9°	—	—	—	*	2
MP3XBR0100N016T05	1	0.5°	5.2°	17	17.6	18.6	19.5	1
MP3XBR0100N016T10	1	1°	5.3°	—	17.1	18.2	19.1	1
MP3XBR0100N016T15	1	1.5°	5.4°	—	—	22.8	18.7	1

* No Interference

MS plus End Mill Series

(mm)

Order Number	RE	BHTA2	B2	0.5°	1°	2°	3°	Type
MP3XBR0100N020T05	1	0.5°	4.5°	21.1	21.8	22.9	24.1	1
MP3XBR0100N020T10	1	1°	4.5°	—	21.2	22.4	23.6	1
MP3XBR0100N020T15	1	1.5°	4.6°	—	—	21.9	23.1	1
MP3XBR0100N020T30	1	3°	4.8°	—	—	—	20.5	1
MP3XBR0100N025T10	1	1°	3.8°	—	26.2	27.7	29.2	1
MP3XBR0100N025T15	1	1.5°	3.9°	—	—	27.1	28.5	1
MP3XBR0100N027T50	1	5°	4.3°	—	—	—	—	2
MP3XBR0100N030T05	1	0.5°	3.3°	31.1	32.1	33.7	35.6	1
MP3XBR0100N030T10	1	1°	3.3°	—	31.3	33	34.8	1
MP3XBR0100N030T15	1	1.5°	3.4°	—	—	32.2	34	1
MP3XBR0100N030T30	1	3°	3.6°	—	—	—	30.6	1
MP3XBR0100N035T05	1	0.5°	2.9°	36.2	37.2	39.2	*	1
MP3XBR0100N035T10	1	1°	3°	—	36.3	38.3	40.4	1
MP3XBR0100N035T15	1	1.5°	3°	—	—	37.4	39.4	1
MP3XBR0100N040T05	1	0.5°	2.6°	41.2	42.4	44.6	*	1
MP3XBR0100N040T10	1	1°	2.7°	—	41.3	43.6	*	1
MP3XBR0100N040T15	1	1.5°	2.7°	—	—	42.6	*	1
MP3XBR0100N042T30	1	3°	2.8°	—	—	—	*	2
MP3XBR0100N050T10	1	1°	2.2°	—	51.4	54.2	*	1
MP3XBR0100N070T10	1	1°	1.7°	—	71.5	*	*	1
MP3XBR0150N010T05	1.5	0.5°	5.7°	11	11.4	12	12.6	1
MP3XBR0150N020T05	1.5	0.5°	3.5°	21.1	21.8	22.9	24.1	1
MP3XBR0150N020T10	1.5	1°	3.6°	—	21.3	22.4	23.6	1
MP3XBR0150N020T15	1.5	1.5°	3.7°	—	—	22	23.2	1
MP3XBR0150N025T30	1.5	3°	3.3°	—	—	—	26.8	1
MP3XBR0150N030T05	1.5	0.5°	2.6°	31.2	32.1	33.7	*	1
MP3XBR0150N030T10	1.5	1°	2.6°	—	31.3	33	*	1
MP3XBR0150N030T15	1.5	1.5°	2.7°	—	—	32.3	*	1
MP3XBR0150N034T30	1.5	3°	2.6°	—	—	—	*	2
MP3XBR0150N035T10	1.5	1°	2.3°	—	36.4	38.3	*	1
MP3XBR0150N035T15	1.5	1.5°	2.4°	—	—	37.5	*	1
MP3XBR0150N040T05	1.5	0.5°	2°	41.3	42.4	44.6	*	1
MP3XBR0150N040T10	1.5	1°	2.1°	—	41.4	43.6	*	1
MP3XBR0150N040T15	1.5	1.5°	2.1°	—	—	42.6	*	1
MP3XBR0150N045T15	1.5	1.5°	1.9°	—	—	*	*	1
MP3XBR0150N050T05	1.5	0.5°	1.7°	51.3	52.7	*	*	1
MP3XBR0150N050T10	1.5	1°	1.7°	—	51.5	*	*	1
MP3XBR0150N052T15	1.5	1.5°	1.7°	—	—	*	*	1
MP3XBR0150N060T10	1.5	1°	1.5°	—	61.5	*	*	1
MP3XBR0150N064T15	1.5	1.5°	1.4°	—	—	*	*	2
MP3XBR0150N070T10	1.5	1°	1.3°	—	71.6	*	*	1
MP3XBR0150N040T30	1.5	3°	3.4°	—	—	—	41.9	1
MP3XBR0150N054T30	1.5	3°	2.7°	—	—	—	*	2
MP3XBR0200N020T10	2	1°	2.6°	—	21.3	22.4	*	1
MP3XBR0200N030T05	2	0.5°	1.8°	31.2	32.1	*	*	1
MP3XBR0200N030T10	2	1°	1.8°	—	31.4	*	*	1
MP3XBR0200N035T10	2	1°	1.6°	—	36.4	*	*	1
MP3XBR0200N040T05	2	0.5°	1.4°	41.3	42.4	*	*	1
MP3XBR0200N040T10	2	1°	1.5°	—	41.4	*	*	1
MP3XBR0200N045T10	2	1°	1.3°	—	46.5	*	*	1
MP3XBR0200N060T05	2	0.5°	1°	61.4	63	*	*	1
MP3XBR0200N066T10	2	1°	1°	—	*	*	*	2

* No Interference

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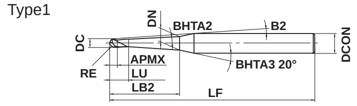
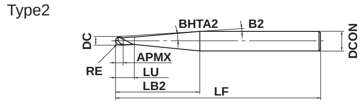
MP3XB

Ball nose, 3 flute, Taper neck

Type1



Type2



(mm)

Order Number	RE	BHTA2	B2	0.5°	1°	2°	3°	Type
MP3XBR0200N030T30	2	3°	3.6°	—	—	—	31.9	1
MP3XBR0200N045T30	2	3°	2.6°	—	—	—	*	2
MP3XBR0200N050T15	2	1.5°	2.2°	—	—	53	*	1
MP3XBR0200N084T15	2	1.5°	1.5°	—	—	*	*	2
MP3XBR0250N038T10	2.5	1°	0.8°	—	*	*	*	2
MP3XBR0250N036T30	2.5	3°	2.4°	—	—	—	*	2
MP3XBR0250N050T10	2.5	1°	1.7°	—	51.5	*	*	1
MP3XBR0250N065T10	2.5	1°	1.4°	—	66.6	*	*	1
MP3XBR0250N066T15	2.5	1.5°	1.4°	—	—	*	*	2
MP3XBR0300N032T30	3	3°	1.9°	—	—	—	*	2
MP3XBR0300N040T10	3	1°	1.4°	—	41.8	*	*	1
MP3XBR0300N050T10	3	1°	1.2°	—	51.8	*	*	1
MP3XBR0300N053T15	3	1.5°	1.2°	—	—	*	*	2
MP3XBR0300N073T10	3	1°	0.9°	—	*	*	*	2
MP3XBR0300N090T10	3	1°	1.3°	—	92	*	*	1
MP3XBR0400N035T30	4	3°	1.7°	—	—	—	*	2
MP3XBR0400N040T15	4	1.5°	1.5°	—	—	*	*	1
MP3XBR0400N050T10	4	1°	1.2°	—	51.9	*	*	1
MP3XBR0400N056T15	4	1.5°	1.1°	—	—	*	*	2
MP3XBR0400N065T10	4	1°	1°	—	67	*	*	1
MP3XBR0400N076T10	4	1°	0.8°	—	*	*	*	2
MP3XBR0400N090T10	4	1°	1.3°	—	92.1	*	*	1
MP3XBR0500N046T30	5	3°	1.3°	—	—	—	*	2
MP3XBR0500N050T15	5	1.5°	1.2°	—	—	*	*	1
MP3XBR0500N060T10	5	1°	1°	—	62.6	*	*	1
MP3XBR0500N068T15	5	1.5°	0.9°	—	—	*	*	2
MP3XBR0500N070T10	5	1°	0.9°	—	*	*	*	1
MP3XBR0500N100T10	5	1°	1.7°	—	102.8	*	*	1
MP3XBR0600N069T30	6	3°	1.8°	—	—	—	*	2
MP3XBR0600N070T10	6	1°	1.6°	—	72.7	*	*	1
MP3XBR0600N080T15	6	1.5°	1.5°	—	—	*	*	1
MP3XBR0600N100T10	6	1°	1.2°	—	102.9	*	*	1

* No Interference

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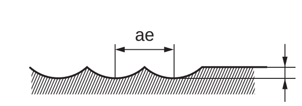
MS plus End Mill Series

Recommended Cutting Conditions

(mm)

Workpiece Material			Carbon steel, Alloy steel (180–280HB) Alloy tool steel (≤350HB) Pre-hardened steel (35–45HRC)				Hardened steel (45–55HRC)				Copper, Copper alloys			
RE	BHTA2	LB2	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
R0.5	0.5°	8	40000	1200	0.07	0.22	39000	1200	0.06	0.19	39000	1200	0.12	0.38
		12	40000	1200	0.06	0.19	39000	1200	0.05	0.16	39000	1200	0.1	0.32
		16	35000	1100	0.06	0.18	33000	900	0.04	0.14	33000	900	0.09	0.29
		20	32000	960	0.05	0.14	29000	800	0.04	0.11	29000	800	0.07	0.22
		25	28000	830	0.03	0.11	24000	600	0.02	0.07	24000	600	0.05	0.15
		30	24000	720	0.03	0.1	21000	450	0.02	0.06	21000	450	0.04	0.13
		50	10000	300	0.003	0.015	11000	150	0.003	0.015	11000	150	0.006	0.019
	1°	10	40000	1200	0.07	0.22	39000	1300	0.06	0.19	39000	1300	0.12	0.38
		16	35000	1100	0.06	0.18	33000	1000	0.05	0.14	33000	1000	0.09	0.29
		20	32000	960	0.05	0.14	29000	900	0.04	0.11	29000	900	0.07	0.22
		25	28000	830	0.04	0.11	24000	700	0.03	0.08	24000	700	0.05	0.16
		30	24000	720	0.03	0.1	21000	550	0.02	0.06	21000	550	0.04	0.13
		35	17000	500	0.03	0.08	13000	350	0.02	0.05	13000	350	0.03	0.1
		50	10000	300	0.003	0.015	11000	250	0.003	0.015	11000	250	0.006	0.019
	1.5°	10	40000	1200	0.07	0.22	39000	1400	0.06	0.19	39000	1400	0.12	0.38
		16	35000	1100	0.06	0.18	33000	1100	0.05	0.14	33000	1100	0.09	0.29
		20	32000	960	0.05	0.14	29000	1000	0.04	0.11	29000	1000	0.07	0.22
		23	27000	830	0.04	0.11	24000	800	0.03	0.08	24000	800	0.05	0.16
		25	27000	830	0.04	0.12	24000	800	0.03	0.09	24000	800	0.05	0.17
	3°	10	40000	1200	0.07	0.22	39000	1500	0.06	0.19	39000	1500	0.12	0.38
		20	32000	960	0.05	0.14	29000	1100	0.04	0.11	29000	1100	0.07	0.22
		30	22000	660	0.03	0.1	19000	700	0.02	0.06	19000	700	0.04	0.13
		42	13000	390	0.005	0.02	11000	390	0.005	0.02	11000	390	0.01	0.03
	5°	25	32000	960	0.04	0.11	29000	1000	0.03	0.08	29000	1000	0.05	0.16
R0.75	0.5°	10	30000	1800	0.11	0.34	28000	1500	0.1	0.3	28000	1500	0.19	0.61
		16	27000	1600	0.09	0.27	24000	1100	0.08	0.24	24000	1100	0.15	0.48
		20	26000	1500	0.08	0.24	24000	1100	0.07	0.21	24000	1100	0.13	0.42
		30	25000	1400	0.07	0.21	22000	1000	0.06	0.18	22000	1000	0.11	0.35
	1°	10	30000	1900	0.11	0.34	28000	1600	0.1	0.3	28000	1600	0.19	0.61
		16	26000	1600	0.09	0.27	24000	1200	0.08	0.24	24000	1200	0.15	0.48
		20	27000	1700	0.08	0.24	24000	1200	0.07	0.21	24000	1200	0.13	0.42
		30	25000	1500	0.07	0.21	22000	1100	0.06	0.18	22000	1100	0.11	0.35
	1.5°	10	30000	1900	0.11	0.34	28000	1700	0.1	0.3	28000	1700	0.19	0.61
		16	27500	1700	0.09	0.27	24000	1300	0.08	0.24	24000	1300	0.15	0.48
		20	26500	1700	0.08	0.24	24000	1300	0.07	0.21	24000	1300	0.13	0.42
		25	26000	1600	0.07	0.22	23000	1200	0.06	0.19	23000	1200	0.12	0.38
		30	25000	1500	0.07	0.21	22000	1100	0.06	0.18	22000	1100	0.11	0.35
	3°	46	15000	450	0.05	0.16	14000	800	0.04	0.13	14000	800	0.08	0.26

Depth of cut



Note 1) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 2) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

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MP3XB

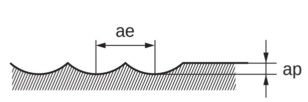
Ball nose, 3 flute, Taper neck

Recommended Cutting Conditions

(mm)

Workpiece Material			Carbon steel, Alloy steel (180–280HB) Alloy tool steel (≦350HB) Pre-hardened steel (35–45HRC)				Hardened steel (45–55HRC)				Copper, Copper alloys			
RE	BHTA2	LB2	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
R1.0	0.5°	16	25000	1500	0.14	0.45	22000	1600	0.13	0.42	22000	1600	0.26	0.83
		20	23000	1400	0.1	0.3	20000	1400	0.09	0.27	20000	1400	0.17	0.54
		30	20000	1200	0.05	0.17	18000	1100	0.06	0.18	18000	1100	0.13	0.42
		35	19000	1100	0.05	0.15	17000	1000	0.05	0.16	17000	1000	0.12	0.38
		40	19000	1100	0.04	0.14	16000	900	0.05	0.14	16000	900	0.11	0.35
	1°	16	25000	2300	0.14	0.45	22000	1700	0.13	0.42	22000	1700	0.26	0.83
		20	23000	2100	0.1	0.3	20000	1500	0.09	0.27	20000	1500	0.17	0.54
		25	23000	1400	0.06	0.19	20000	1300	0.07	0.21	20000	1300	0.16	0.5
		30	20000	1200	0.05	0.17	18000	1200	0.06	0.18	18000	1200	0.13	0.42
		35	19000	1100	0.05	0.15	17000	1100	0.05	0.15	17000	1100	0.12	0.37
		40	19000	1100	0.04	0.14	16000	1000	0.05	0.14	16000	1000	0.11	0.35
		50	17000	900	0.03	0.09	15000	900	0.03	0.08	15000	900	0.06	0.19
		70	13000	700	0.02	0.06	11000	650	0.02	0.05	11000	650	0.04	0.12
	1.5°	16	25000	2300	0.14	0.45	22000	1800	0.13	0.42	22000	1800	0.26	0.83
		20	23000	2100	0.1	0.3	20000	1600	0.09	0.27	20000	1600	0.17	0.54
		25	23000	1600	0.06	0.19	20000	1400	0.07	0.21	20000	1400	0.16	0.5
		30	20000	1200	0.05	0.17	18000	1300	0.06	0.18	18000	1300	0.13	0.42
		35	19000	1100	0.05	0.15	16000	1100	0.05	0.16	17000	1100	0.12	0.38
		40	19000	1100	0.04	0.14	16000	1000	0.05	0.14	16000	1000	0.11	0.35
	3°	20	23000	2100	0.1	0.3	20000	1700	0.09	0.27	20000	1700	0.17	0.54
		30	18000	1600	0.08	0.26	16000	1300	0.07	0.22	16500	1300	0.14	0.45
		42	16000	1400	0.07	0.21	13000	1000	0.06	0.18	13000	1000	0.11	0.35
	5°	27	18000	2200	0.09	0.29	17000	1900	0.08	0.26	17000	1900	0.16	0.51
R1.5	0.5°	10	20000	2400	0.22	0.7	17000	1900	0.21	0.67	17000	1900	0.42	1.34
		20	17000	2000	0.2	0.64	15000	1600	0.19	0.61	15000	1600	0.38	1.22
		30	16000	1700	0.14	0.45	13000	1400	0.13	0.42	13000	1400	0.26	0.83
		40	16000	1400	0.08	0.24	12000	1200	0.09	0.27	12000	1200	0.2	0.65
		50	13000	1100	0.06	0.2	11000	1100	0.07	0.22	11000	1100	0.17	0.54
	1°	20	17000	2000	0.2	0.64	15000	1800	0.19	0.61	15000	1800	0.38	1.22
		30	17000	1900	0.14	0.45	13000	1500	0.13	0.42	13000	1500	0.26	0.83
		35	16000	1700	0.08	0.26	13000	1500	0.09	0.29	13000	1500	0.22	0.69
		40	16000	1500	0.08	0.24	13000	1300	0.09	0.27	13000	1300	0.2	0.65
		50	13000	1200	0.06	0.2	11000	1100	0.07	0.22	11000	1100	0.17	0.54
		60	13000	1100	0.06	0.19	11000	1000	0.07	0.21	11000	1000	0.16	0.5
		70	10000	800	0.05	0.17	9000	700	0.06	0.18	9000	700	0.13	0.42
	1.5°	20	17000	2000	0.2	0.64	15000	1900	0.19	0.61	15000	1900	0.38	1.22
		30	16000	1800	0.14	0.45	13000	1600	0.13	0.42	13000	1600	0.26	0.83
		35	15000	1700	0.08	0.26	12000	1400	0.09	0.29	12000	1400	0.22	0.69
		40	15000	1600	0.08	0.24	12000	1300	0.09	0.27	12000	1300	0.2	0.65
		45	13000	1400	0.07	0.22	11000	1300	0.08	0.24	11000	1300	0.18	0.58
		52	13000	1300	0.06	0.2	11000	1100	0.07	0.22	11000	1100	0.17	0.54
		64	10000	900	0.06	0.18	9000	900	0.06	0.19	9000	900	0.14	0.46
	3°	25	16000	2400	0.16	0.51	13000	1900	0.15	0.48	13000	1900	0.3	0.96
		34	14000	2100	0.13	0.4	11000	1600	0.12	0.37	11000	1600	0.23	0.74
		40	14000	1700	0.12	0.37	11000	1400	0.11	0.34	11000	1400	0.21	0.67
		54	12000	1400	0.1	0.3	10000	1200	0.09	0.27	10000	1200	0.17	0.54

Depth of cut



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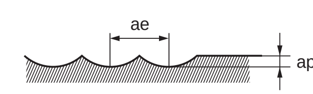
(mm)

Workpiece Material			Carbon steel, Alloy steel (180–280HB) Alloy tool steel (≦350HB) Pre-hardened steel (35–45HRC)				Hardened steel (45–55HRC)				Copper, Copper alloys			
RE	BHTA2	LB2	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae	n (min-1)	vf (mm/min)	ap	ae
R2.0	0.5°	30	14000	2100	0.23	0.74	11000	1800	0.22	0.7	11000	1800	0.44	1.41
		40	12000	1800	0.19	0.61	10000	1600	0.18	0.58	10000	1600	0.36	1.15
		60	9000	1300	0.06	0.19	8500	1400	0.07	0.21	8500	1400	0.16	0.5
	1°	20	15000	2700	0.31	0.99	12000	2200	0.3	0.96	12000	2200	0.72	2.3
		30	14000	2100	0.23	0.74	11000	1800	0.22	0.7	11000	1800	0.53	1.69
		35	12000	1800	0.21	0.67	10000	1700	0.2	0.64	10000	1700	0.48	1.54
		40	12000	1700	0.19	0.61	10000	1600	0.18	0.58	10000	1600	0.43	1.38
		45	12000	1500	0.13	0.42	10000	1600	0.12	0.38	10000	1600	0.29	0.92
		66	9000	1100	0.08	0.24	8500	1300	0.07	0.21	8500	1300	0.16	0.5
	1.5°	50	12000	2200	0.11	0.35	10000	1700	0.1	0.32	10000	1700	0.24	0.77
		84	8000	1400	0.04	0.13	6500	900	0.03	0.1	6500	900	0.07	0.23
	3°	30	14000	2500	0.23	0.74	11000	2000	0.22	0.7	11000	2000	0.53	1.69
		45	11000	1900	0.16	0.51	9000	1600	0.15	0.48	9000	1600	0.36	1.15
R2.5	1°	38	10000	2200	0.28	0.9	8500	2000	0.27	0.86	8500	2000	0.65	2.07
		50	9000	1900	0.24	0.77	8000	1800	0.23	0.74	8000	1800	0.55	1.77
		65	8000	1600	0.16	0.51	6500	1400	0.15	0.48	6500	1400	0.36	1.15
	1.5°	66	8000	1600	0.16	0.51	6500	1500	0.15	0.48	6500	1500	0.36	1.15
	3°	36	10000	2700	0.31	0.99	8500	2300	0.3	0.96	8500	2300	0.72	2.3
R3.0	1°	40	8000	2200	0.28	0.9	7500	2100	0.27	0.86	7500	2100	0.65	2.07
		50	8000	2000	0.23	0.74	6500	1800	0.22	0.7	6500	1800	0.53	1.69
		73	7000	1700	0.15	0.48	6500	1700	0.14	0.45	6500	1700	0.34	1.07
		90	6500	1500	0.09	0.29	6000	1300	0.08	0.26	6000	1300	0.19	0.61
	1.5°	53	7000	2100	0.22	0.7	6500	1900	0.21	0.67	6500	1900	0.5	1.61
	3°	32	9000	2400	0.35	1.12	8000	2200	0.34	1.09	8000	2200	0.82	2.61
R4.0	1°	50	6000	2200	0.41	1.31	5500	2000	0.4	1.28	5500	2000	0.96	3.07
		65	6000	2000	0.36	1.15	5200	1700	0.35	1.12	5200	1700	0.84	2.69
		76	6000	1800	0.29	0.93	5000	1500	0.28	0.9	5000	1500	0.67	2.15
		90	5000	1400	0.19	0.61	4700	1200	0.18	0.58	4700	1200	0.43	1.38
	1.5°	40	6000	2300	0.46	1.47	5800	2200	0.45	1.44	5800	2200	1.08	3.46
		56	6000	2200	0.38	1.22	5500	2000	0.37	1.18	5500	2000	0.9	2.84
	3°	35	7000	2700	0.49	1.57	6000	2400	0.48	1.54	6000	2400	1.15	3.69
R5.0	1°	60	5500	2600	0.51	1.63	4500	2300	0.5	1.6	4500	2300	1.2	3.84
		70	5500	2600	0.46	1.47	4500	2200	0.45	1.44	4500	2200	1.08	3.46
		100	5000	2400	0.36	1.15	4000	1900	0.35	1.12	4000	1900	0.84	2.69
	1.5°	50	5000	2400	0.56	1.79	4600	2400	0.55	1.76	4600	2400	1.32	4.22
		68	5000	2400	0.49	1.57	4600	2300	0.48	1.54	4600	2300	1.15	3.69
	3°	46	5000	2400	0.69	2.21	4800	2500	0.68	2.18	4800	2500	1.63	5.22
R6.0	1°	70	4500	2600	0.81	2.59	4000	2100	0.8	2.56	4000	2100	1.92	6.14
		100	4000	2200	0.61	1.95	3500	1800	0.6	1.92	3500	1800	1.44	4.61
	1.5°	80	5000	2300	0.71	2.27	4000	2000	0.7	2.24	4000	2000	1.68	5.38
	3°	69	5000	2700	0.81	2.59	4000	2200	0.8	2.56	4000	2200	1.92	6.14

Depth of cut



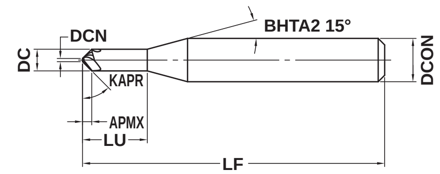
Note 1) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 2) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

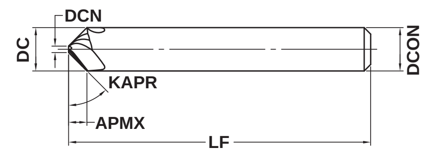
MP3C NEW

Chamfer cutter, 3 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		◎	◎		



Type1



Type2

DCN				
±0.03				
DCON=6	8≤DCON≤10	DCON=12		
0 - 0.008	0 - 0.009	0 - 0.011		

●The optimum helix flutes provides great sharpness and suppresses the occurrence of burrs.

(mm)

Order Number	DC	DCN	APMX	KAPR	LU	LF	DCON	* No.F	Stock	Type
MP3CD0200	2	0.3	0.85	45°	6	50	6	3	●	1
MP3CD0400	4	0.3	1.85	45°	12	50	6	3	●	1
MP3CD0600	6	0.3	2.85	45°	—	50	6	3	●	2
MP3CD0800	8	0.4	3.8	45°	—	60	8	3	●	2
MP3CD1000	10	0.5	4.75	45°	—	70	10	3	★	2
MP3CD1200	12	0.5	5.75	45°	—	75	12	3	●	2

* Number of Flutes

DC = Cutting dia.
DCN = Cutting dia. min.
APMX = Depth of cut max.
KAPR = Tool cutting edge angle
LU = Usable length
LF = Functional length
DCON = Connection dia.

● : USA Stock ★ : Stocked in Japan

MP3C

Chamfer cutter, 3 flute

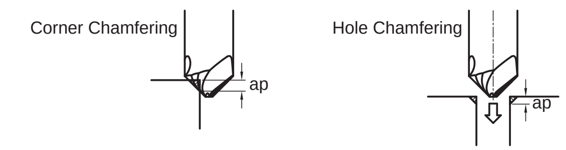
Recommended Cutting Conditions

Corner and Hole Chamfering

(inch)

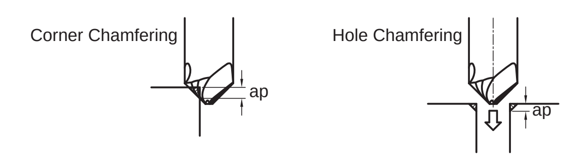
Workpiece Material		Carbon Steel, Ductile Cast Iron, Non-alloy Steel (C≥0.55%)				Alloy Steel (325HB) (38—45HRC)			
Dia. DC		Revolution n	Feed Rate vf	Corner Chamfering ap	Hole Chamfering ap	Revolution n	Feed Rate vf	Corner Chamfering ap	Hole Chamfering ap
(mm)	(inch)	(min⁻¹)	(IPM)			(min⁻¹)	(IPM)		
2	.079	16000	55.1	≤.024	≤.016	11000	35.0	≤.024	≤.016
4	.157	8000	28.3	≤.047	≤.031	5600	17.7	≤.047	≤.031
6	.236	5300	18.9	≤.071	≤.047	3700	11.8	≤.071	≤.047
8	.315	4000	14.2	≤.094	≤.063	2800	9.1	≤.094	≤.063
10	.394	3200	11.4	≤.098	≤.079	2200	7.1	≤.098	≤.079
12	.472	2700	9.4	≤.098	≤.094	1900	5.9	≤.098	≤.094

Depth of Cut



Workpiece Material		Austenitic Stainless, Titanium Alloys				Hardened Steel (45—55HRC)			
Dia. DC		Revolution n	Feed Rate vf	Corner Chamfering ap	Hole Chamfering ap	Revolution n	Feed Rate vf	Corner Chamfering ap	Hole Chamfering ap
(mm)	(inch)	(min⁻¹)	(IPM)			(min⁻¹)	(IPM)		
2	.079	9500	26.8	≤.024	≤.016	8000	18.9	≤.024	≤.016
4	.157	4800	13.8	≤.047	≤.031	4000	9.4	≤.047	≤.031
6	.236	3200	9.1	≤.071	≤.047	2700	6.3	≤.071	≤.047
8	.315	2400	6.7	≤.094	≤.063	2000	4.7	≤.094	≤.063
10	.394	1900	5.5	≤.098	≤.079	1600	3.8	≤.098	≤.079
12	.472	1600	4.7	≤.098	≤.094	1300	3.1	≤.098	≤.094

Depth of Cut



(Note 1) For austenitic stainless steel the use of water-soluble coolant is effective.
(Note 2) The revolution and feed rate can be increased with a smaller depth of cut.
(Note 3) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

CARBIDE
CHAMFER
SQUARE
BALL
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I
SOLID END MILLS

MP3C

Chamfer cutter, 3 flute

Recommended Cutting Conditions

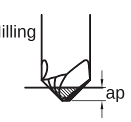
■V-Grooving

(inch)

Workpiece Material		Carbon Steel, Ductile Cast Iron, Non-alloy Steel (C≥0.55%)			Alloy Steel (325HB) (38−45HRC)			Austenitic Stainless, Titanium Alloys			Hardened Steel (45−55HRC)		
DC		Revolution n	Feed Rate vf	Depth of Cut	Revolution n	Feed Rate vf	Depth of Cut	Revolution n	Feed Rate vf	Depth of Cut	Revolution n	Feed Rate vf	Depth of Cut
(mm)	(inch)	(min^{-1})	(IPM)	ap	(min^{-1})	(IPM)	ap	(min^{-1})	(IPM)	ap	(min^{-1})	(IPM)	ap
2	.079	13000	37.0	≤.055	9500	24.4	≤.055	8000	18.1	≤.055	6400	12.2	≤.055
4	.157	6400	18.1	≤.110	4800	12.2	≤.110	4000	9.1	≤.110	3200	5.9	≤.110
6	.236	4200	11.8	≤.165	3200	8.3	≤.165	2700	6.3	≤.165	2100	3.9	≤.165
8	.315	3200	9.1	≤.220	2400	6.3	≤.220	2000	4.7	≤.220	1600	3.0	≤.220
10	.394	2500	7.1	≤.276	1900	4.7	≤.276	1600	3.6	≤.276	1300	2.4	≤.276
12	.472	2100	5.9	≤.331	1600	3.9	≤.331	1300	3.0	≤.331	1100	2.1	≤.331

Depth of Cut

V-Grooving Milling



(Note 1) For austenitic stainless steel the use of water-soluble coolant is effective.
(Note 2) The revolution and feed rate can be increased with a smaller depth of cut.
(Note 3) Vibration may occur if the rigidity of machine or workpiece material is low. In this case, please reduce the revolution and feed rate proportionately.

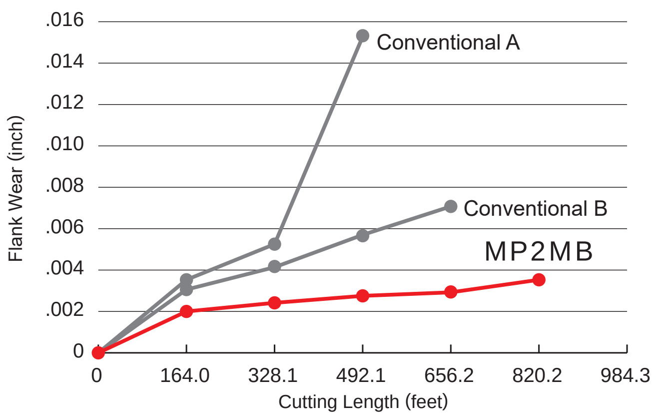
Memo

MS plus Provides Superior Cost Performance

Cutting Performance

Carbon Steel AISI 1050

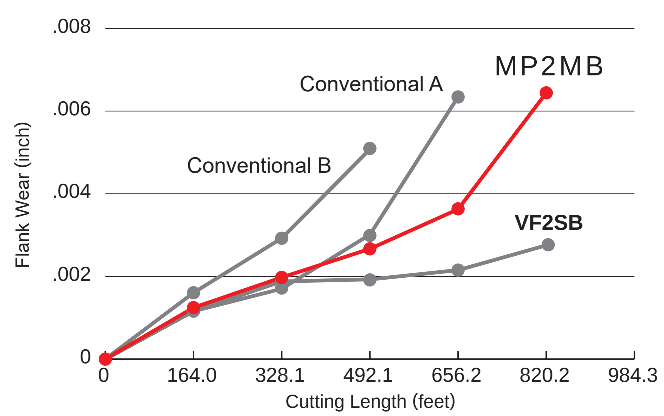
MS plus gives excellent wear resistance and significantly longer tool life compared to conventional products when machining carbon steel.



<Cutting Conditions>
Workpiece Material : AISI 1050 (220 HB)
Tool : 2 flute ball nose end mill R3
Revolution : 16000 min^{-1}
Cutting Speed : 930 SFM
Table Feed : 78.4 IPM
Feed per Tooth : .0024 IPT
Depth of Cut : ap .079 inch, ae .012 inch
Overhang Length : .787 inch
Cutting Mode : Air Bow
Machine : Horizontal MC (BT40)

Alloy Steel, Tool Steel AISI H13 (52 HRC)

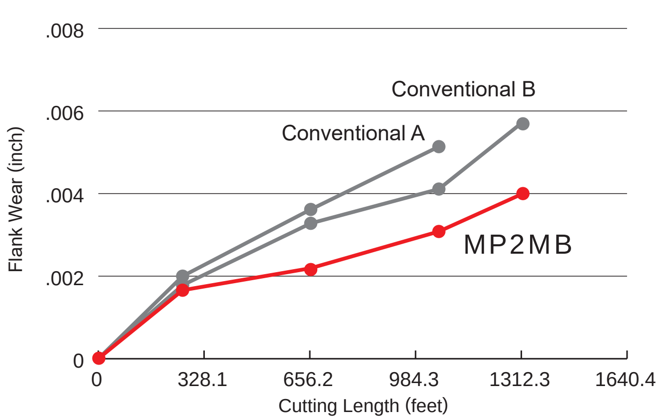
MS plus shows higher wear resistance than conventional products when machining AISI H13(52 HRC).
IMPACT MIRACLE is suitable when even longer tool life is required.



<Cutting Conditions>
Workpiece Material : AISI H13 (52 HRC)
Tool : 2 flute ball nose end mill R3
Revolution : 17000 min^{-1}
Cutting Speed : 985 SFM
Table Feed : 66.9 IPM
Feed per Tooth : .0020 IPT
Depth of Cut : ap .079 inch, ae .012 inch
Overhang Length : .787 inch
Cutting Mode : Air Blow
Machine : Horizontal MC (BT40)

Stainless Steel STAVAX (52 HRC)

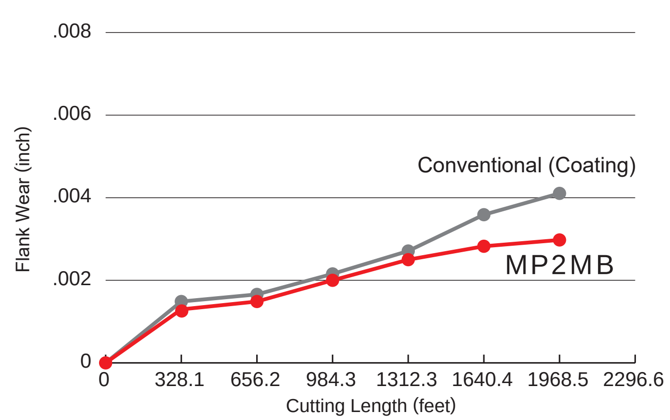
MS plus shows higher wear resistance compared to conventional products when machining stainless steel.



<Cutting Conditions>
Workpiece Material : STAVAX (52 HRC)
Tool : 2 flute ball nose end mill R3
Revolution : 18000 min^{-1}
Cutting Speed : 555 SFM
Table Feed : 141.7 IPM
Feed per Tooth : .0039 IPT
Depth of Cut : ap .016 inch, ae .039 inch
Overhang Length : .787 inch
Cutting Mode : Air Blow
Machine : Horizontal MC (BT40)

Copper

MS plus shows excellent wear resistance and provides a significantly longer tool life compared to conventional products when machining copper.

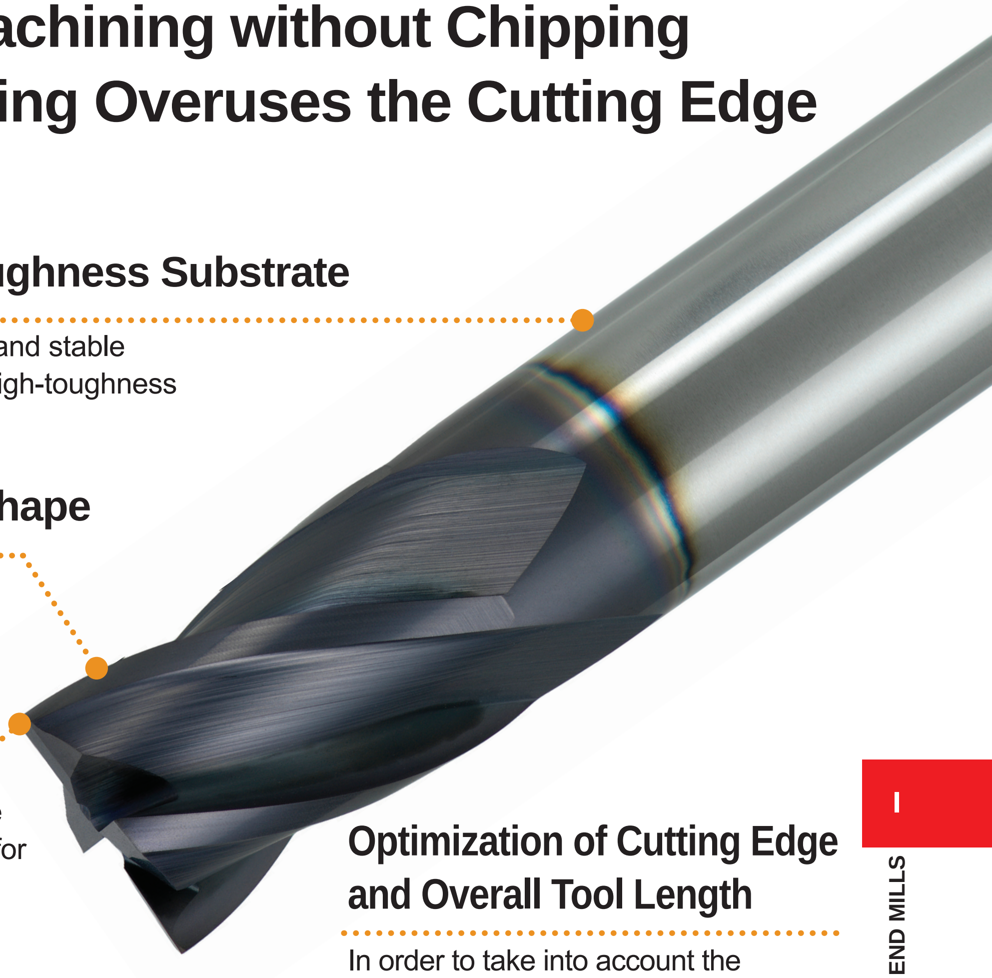


<Cutting Conditions>
Workpiece Material : Copper
Tool : 2 flute ball nose end mill R3
Revolution : 15000 min^{-1}
Cutting Speed : 875 SFM
Table Feed : 59.1 IPM
Feed per Tooth : .0020 IPT
Depth of Cut : ap .079 inch, ae .008 inch
Overhang Length : .787 inch
Cutting Mode : Emulsion
Machine : Vertical MC (BT40)

For Swiss-Type Automatic Lathes
MS plus End Mill Series

MP2ES/3ES/4EC

Achieves Stable Machining without Chipping Even when Machining Overuses the Cutting Edge



Adoption of New High-Toughness Substrate

Fracture resistance is greatly improved and stable machining is accomplished by using a high-toughness carbide substrate.

Optimized Cutting Edge Shape

The optimized rake angle suppresses burrs.

Improved Cutting Edge Machining

To improve the fracture resistance of the cutting edge, a small gash land is used for Ø6mm or greater.

Optimization of Cutting Edge and Overall Tool Length

In order to take into account the protrusion of the small Swiss-Type Automatic Lathes, the cutting edge and overall tool length have been optimized.

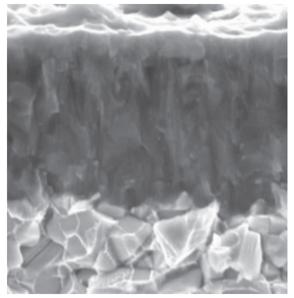
(Al, Ti, Cr)N Multilayer Coating (MS plus)

Suitable coating for a broad range of workpiece materials such as carbon steels and stainless steels.

Our original coating technology incorporates a multilayer of (Al, Ti)N and (Al, Cr)N.
It allows machining of a wide range of workpiece materials.

Properties of MS plus coating

	(Al,Ti,Cr)N multilayer	(Al,Ti)N	(Al,Cr)N
Hardness (HV)	**3200**	2800	3100
Oxidation Temperature (F°)	**2.012**	1.472	2.012
Adhesion (N)	**100**	80	80



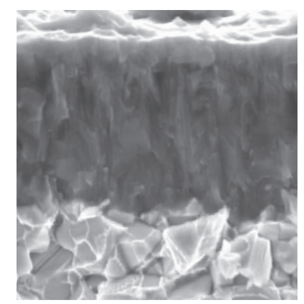
Carbide End Mills

MS plus

General purpose end mill optimized "plus" performance.

(Al,Ti,Cr)N Multilayer Coating (MS plus)

Our original coating technology enables a multilayer of (Al,Ti)N and (Al,Cr)N.
It allows machining of a wide range of workpiece materials.

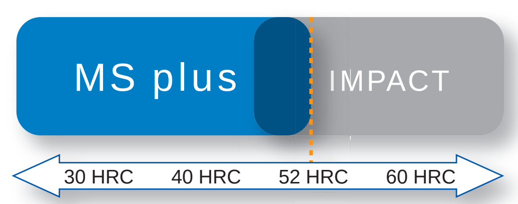


Properties of (Al,Ti,Cr)N Multilayer Coating (MS plus)

	(Al,Ti,Cr)N Multilayer	(Al,Ti)N	(Al,Cr)N
Hardness (HV)	**3200**	2800	3100
Oxidation Temperature (°F)	**2.012**	1.472	2.012
Adhesion (N)	**100**	80	80

MS plus provides long tool life on materials up to 52 HRC.

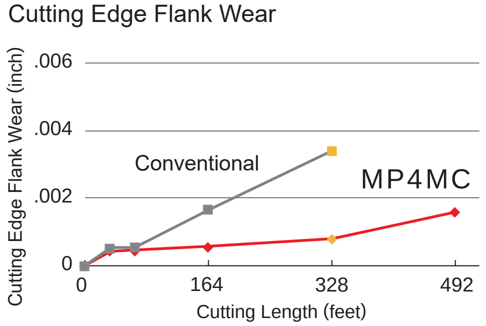
For steels harder than 52 HRC, IMPACT MIRACLE end mills are recommended.
(TOOL NEWS B075)

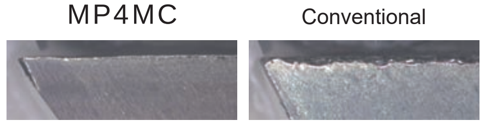


Cutting Performance

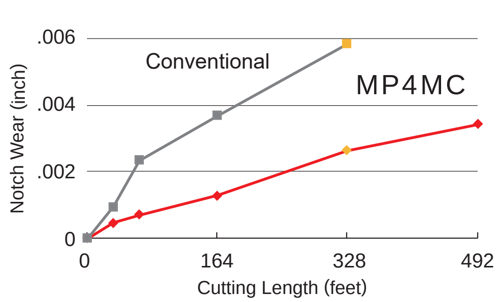
Carbon Steel AISI 1050

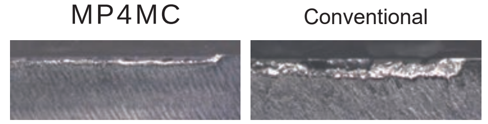
Cutting Edge Flank Wear

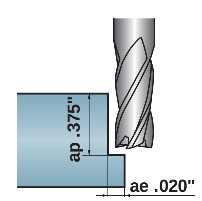




Notch Wear







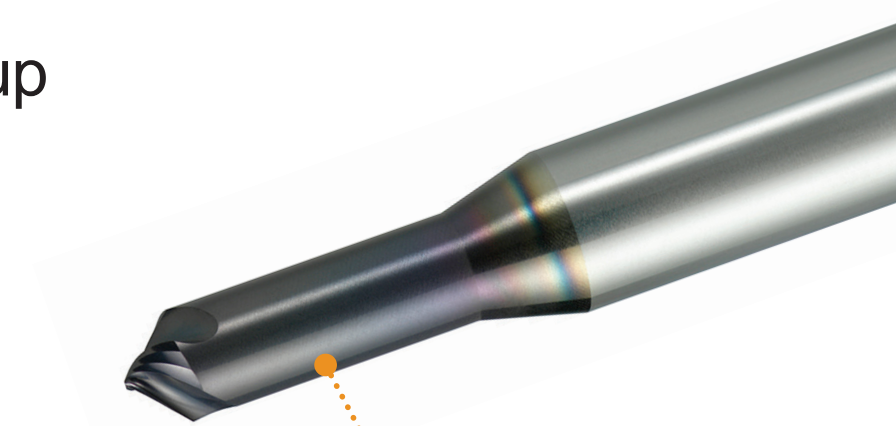
<Cutting Conditions>

Workpiece Material	: AISI 1050(240 HB)
Tool	: 4 flute end mill medium cut length DC= .3750"
Revolution	: 3200min^{-1}
Cutting Speed	: 315 SFM
Table Feed	: 25.2 IPM
Depth of Cut	: ae .020", ap .375"
Cutting Length	: 1.181"
Cutting Mode	: Down(Climb) Cut Air Blow
Machine	: Horizontal MC (BT40)

MS plus New Line-up

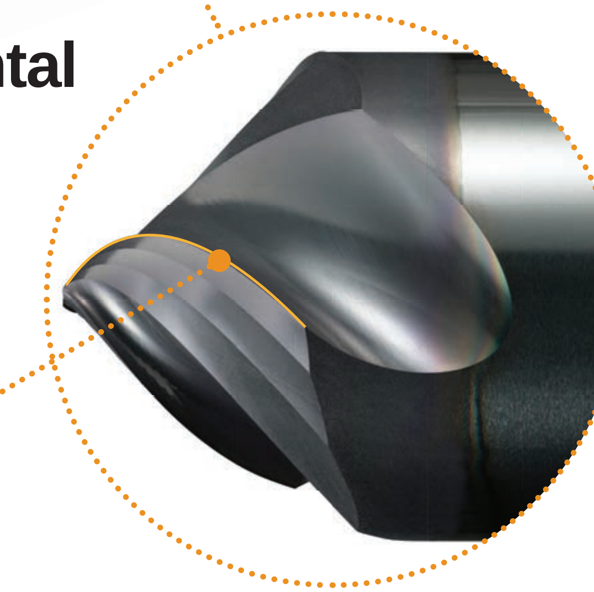
Chamfer Cutter

MP3C



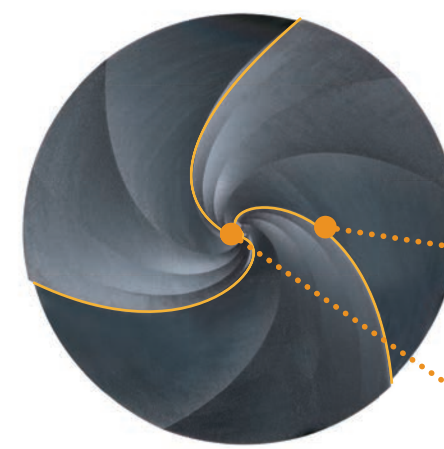
Chamfer cutter with excellent efficiency and great tool life with horizontal chamfering

MS plus enables machining of a wide range of workpiece materials.



Sharp Helix Flute

The optimum helix angle provides great sharpness and suppresses the occurrence of burrs.
The chamfer angle is 45°

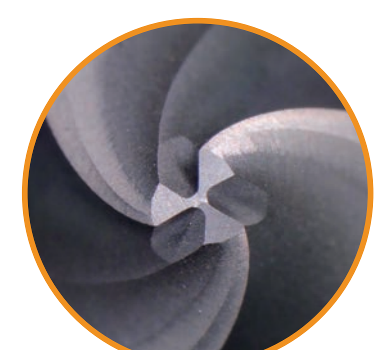


Specifications of 3-Flutes

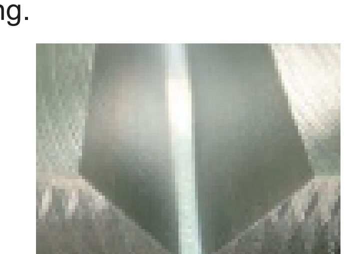
High feed machining with an excellent balance between versatility and chip evacuation is achieved by adopting the 3-flute design.
High efficiency machining is realized.

End Cutting Edge

End cutting edge can also be used for V-groove machining.



End Cutting Edge

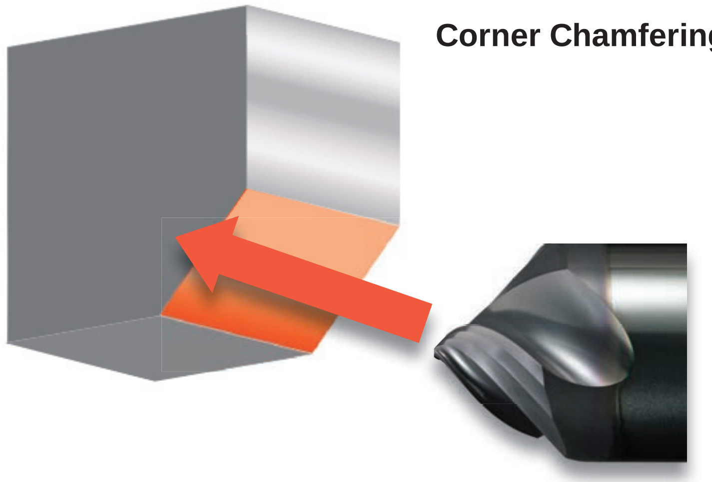


V-groove machining

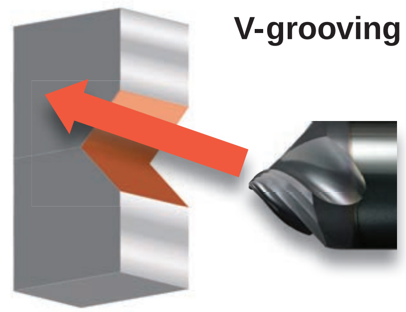
Greatly Effective for Feed Chamfering

The 3-flute geometry achieves high feed and extended tool life, and the effects of the twisted, helical flute suppress the occurrence of burrs when horizontal feed chamfering.

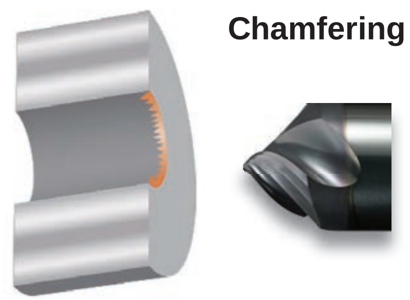
Corner Chamfering



V-grooving



Chamfering



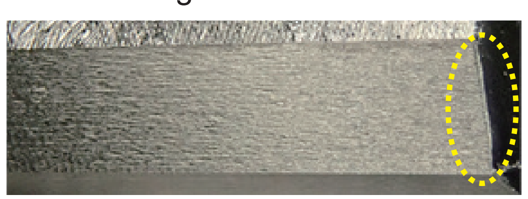
The leading drill series DLE, GKCD are recommended for centering.

S55C Comparison of Burrs After Chamfering

MP3C 3-helical flutes

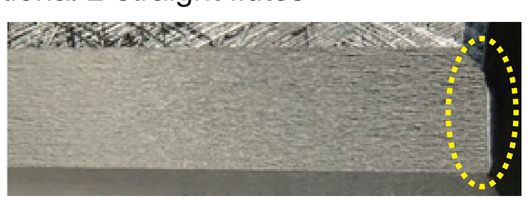
Good finish surface

Conventional 4-straight flutes



Burrs occur

Conventional 2-straight flutes



Burrs occur

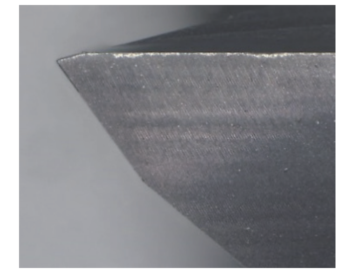
<Cutting Conditions>

Workpiece Material	: JIS S55C
Tool	: DC=ø6mm
Cutting Speed	: vc=100 m/min
Revolution	: n=5300 min^{-1}
Feed per Tooth	: fz=0.03 mm/t.
Depth of Cut	: ap=1.2 mm
Overhang Length	: 18 mm
Cutting Mode	: Air Blow

Cutting Performance

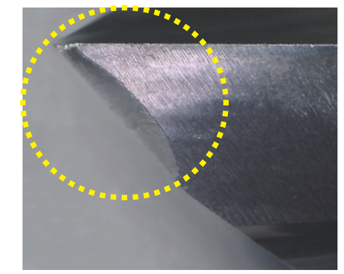
Machining 304 - Comparison of Fracture Resistance

The round, stainless steel bar is machined using a D-cut. The adoption of the high toughness cemented carbide and gash land provides highly improved fracture resistance.



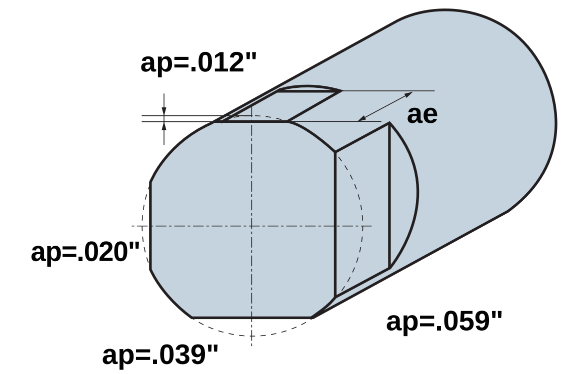
MP3ES

After machining of 2 pieces



Conventional

After machining 1 piece
Fracture of the tip of the tool.



<Cutting Conditions>

Workpiece Material	: AISI 304
Tool	: MP3ESD0800S08
Cutting Speed	: vc = 165 SFM
Feed Rate	: f = 5.9 IPM
Feed per Tooth	: fr = .0010 inch
Depth of Cut	: ap = .012-.059 inch ae = .236
Cutting Mode	: Wet Cutting (Oil)
Machine	: Swiss-Type Lathe
Tool Post	: Gang Type Tool Post

Machined 304 - Comparison of Burr Generation

The optimized cutting edge shape suppresses the occurrence of burrs.

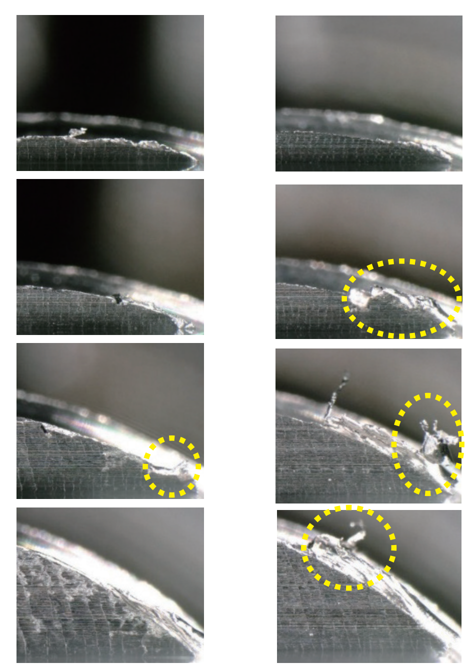
Depth of Cut ap | MP3ES | Conventional

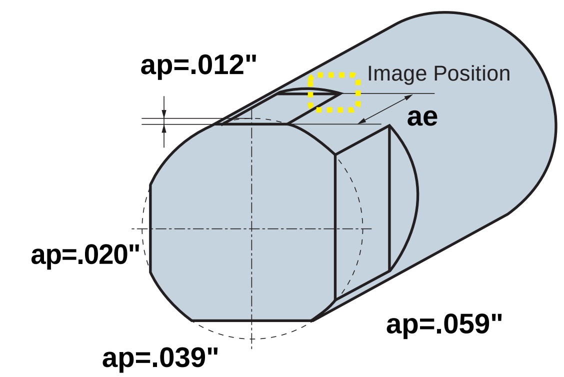
.012 inch

.020 inch

.039 inch

.059 inch





<Cutting Conditions>

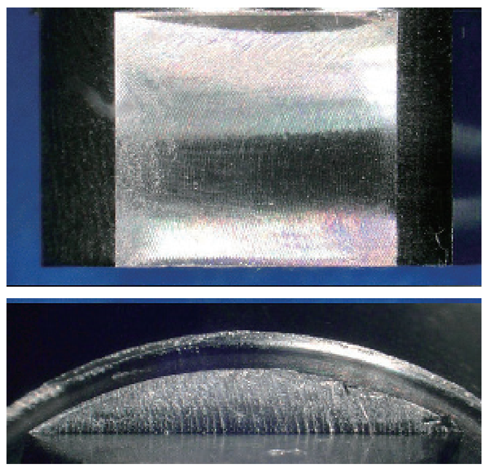
Workpiece Material	: AISI 304
Tool	: MP3ESD0800S08
Cutting Speed	: vc = 165 SFM
Feed Rate	: f = 5.9 IPM
Feed per Tooth	: fr = .0010 inch
Depth of Cut	: ap = .012-.059 inch ae = .236
Cutting Mode	: Wet Cutting (Oil)
Machine	: Swiss-Type Lathe
Tool Post	: Gang Type Tool Post

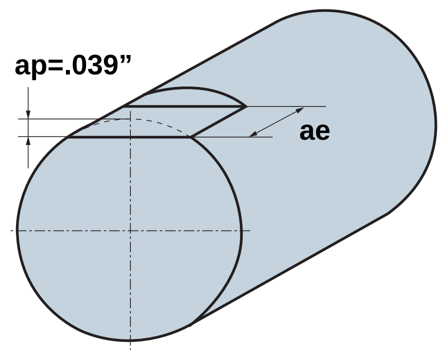
Cutting Performance

Machined 304 - Comparison of Surface Finishes

The surface finish is greatly improved due to the improved chatter resistance.

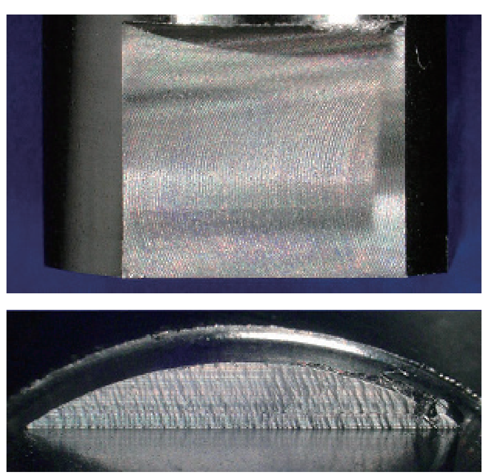
MP3ES
Ra .008 μ-inch



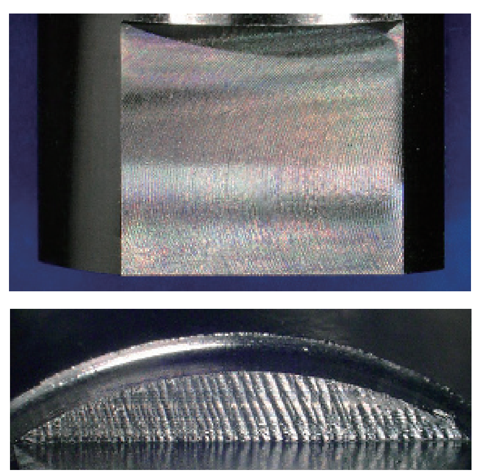


<Cutting Conditions>
Workpiece Material : JIS SUS304
Tool : MP3ESD0800S08
Cutting Speed : vc = 165 SFM
Feed Rate : f = 5.9 IPM
Feed per Tooth : fr = .0010 inch
Depth of Cut : ap = .039 inch
ae = .236
Cutting Mode : Wet Cutting (Oil)
Machine : Swiss-Type Lathe
Tool Post : Gang Type Tool Post

Conventional A
Ra .024 μ-inch



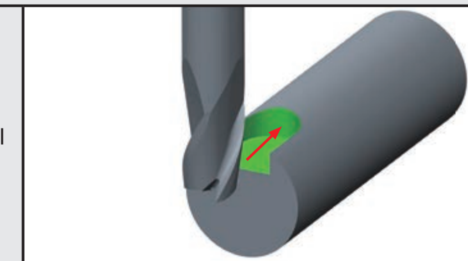
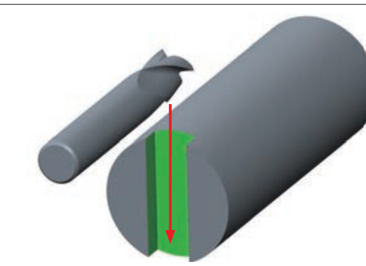
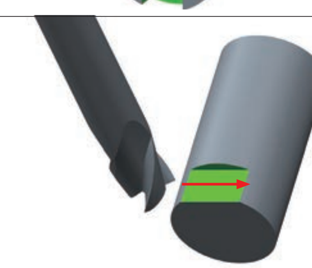
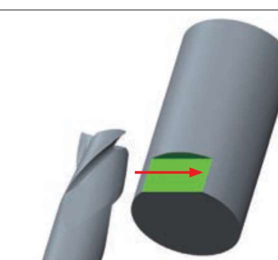
Conventional B
Ra .030 μ-inch



MS plus End Mill Series

Selection of End Mill for Swiss-Type Lathe

① The number of Flutes must be selected according to the type of machining.

Cuttig Mode		Type	MP2ES	MP3ES	MP4EC
		Flutes	2 Flute	3 Flute	4 Flute
Slotting of External			◎	○	×
Slotting of Facing			◎	○	×
Face Milling			△	◎	○
Shoulder Milling			△	○	◎

② Selecting Tools Other Than Small Swiss-Type Automatic Lathe End Mills

End Mills with an overall tool length of LF=50 mm or less can be used even with small Swiss-Type automatic lathe end mills. Select the necessary tools according to the workpiece material and machining method (such as every 0.1 or radius).

I
SOLID END MILLS

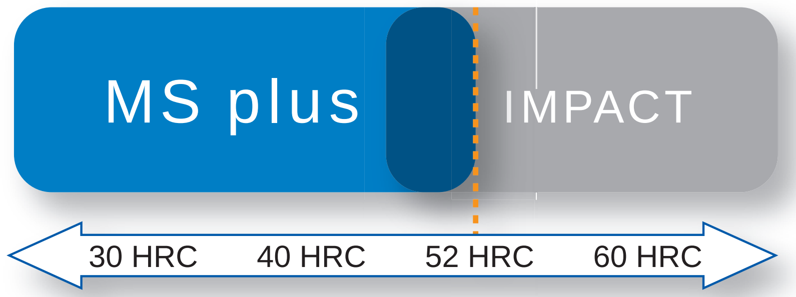
I
SOLID END MILLS

MP2SSB/MP2SB/MP2MB/MP2XLB

Greatly improved wear resistance even when machining hardened materials.

MS plus provides long tool life on materials up to 52 HRC.

For steels harder than 52 HRC, IMPACT MIRACLE end mills are recommended. (TOOLS NEWS B075)



Workpiece material Hardness

End Cutting Edge Geometry

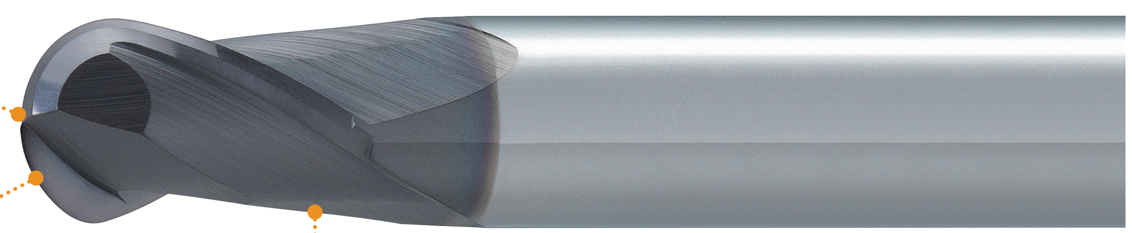
MS plus

Sharp but strong cutting edge enables good surface finishes.

Sharp edges leave a uniform finish.

Conventional

A dull edge leaves an undefined finish.



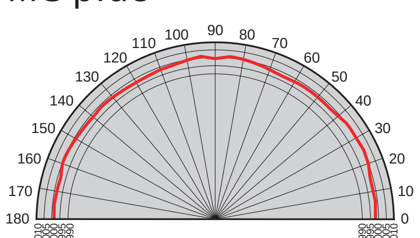
Seamless Cutting Edge

Radius tolerance R ±196.9 μ-inch.

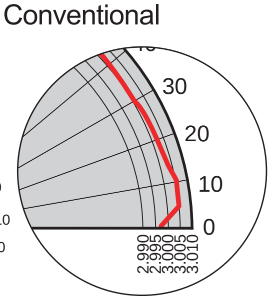
Micro-grain Cemented Carbide Substrate

Higher wear resistance than conventional products.

MS plus



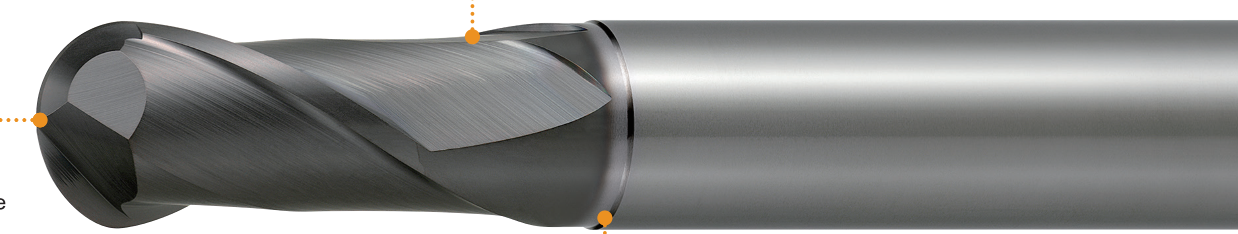
Conventional



Good surface finishes possible even when simultaneously cutting with end and side edges; for example on drafts of dies and molds.

MP2SDB

Tough carbide substrate with high chipping resistance.
Ideal for semi-finishing of forging dies.



Tough Carbide

Tough carbide substrate with high resistance to chipping.

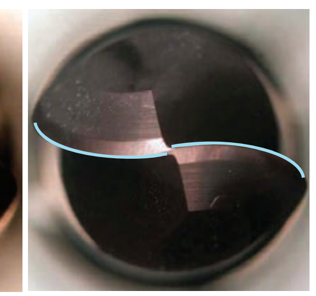
Strong S Curve

Strong S curve with negative rake enables high efficiency machining.

Neck Recess

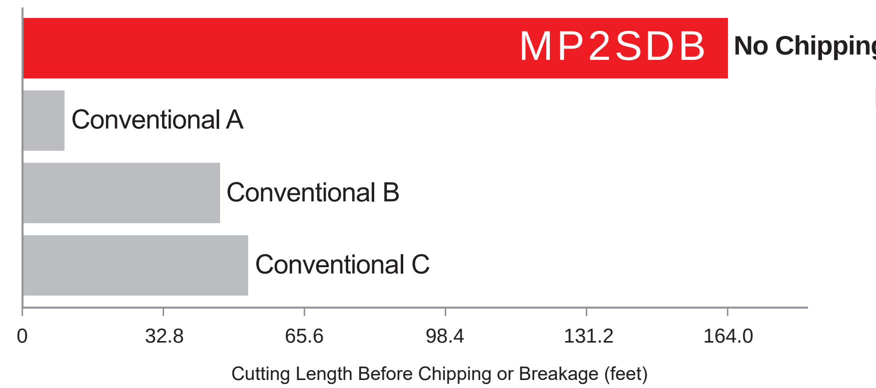
Conventional

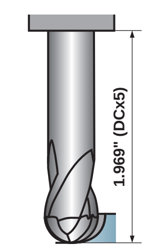
MP2SDB



Resistance to Chipping

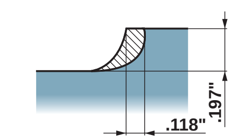
MP2SDB shows excellent chipping resistance even at large depths of cut, high feed rates and long overhang applications.





<Cutting Conditions>

Workpiece Material	: AISI H13 (52 HRC)
Tool	: MP2SDBR0500
Revolution	: 5000 min^{-1}
Cutting Speed	: 515 SFM
Table Feed	: 39.4 IPM
Feed per Tooth	: .0039 IPT
Depth of Cut	: ap .197 inch, ae .118 inch
Overhang Length	: 1.969 inch
Cutting Mode	: Down (Climb) Cut Air Blow
Machine	: Vertical MC (BT50)



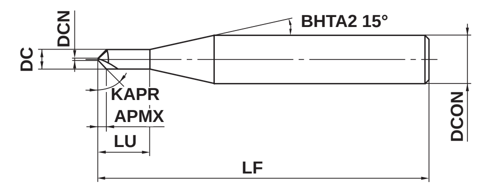
I SOLID END MILLS

I SOLID END MILLS

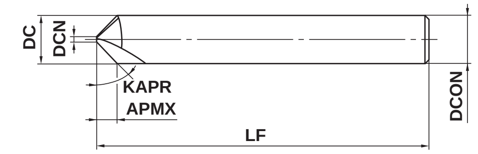
VC2C
Chamfer cutter, 2 flute

UWC VC 5°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		◎	◎	○	○



Type 1



Type 2

DCN				
±0.02				
DCON=6	8≤DCON≤10	DCON=12		
0 / - 0.008	0 / - 0.009	0 / - 0.011		

● Chamfering cutters for machining of hardened steel and difficult-to-cut materials.

(mm)

Order Number	DC	DCN	APMX	KAPR	LU	LF	DCON	No. of Flutes	Stock	Type
VC2CD0200	2	0.3	0.85	45°	6	50	6	2	★	1
VC2CD0400	4	0.3	1.85	45°	12	50	6	2	★	1
VC2CD0600	6	0.3	2.85	45°	—	50	6	2	★	2
VC2CD0800	8	0.4	3.8	45°	—	60	8	2	★	2
VC2CD1000	10	0.5	4.75	45°	—	70	10	2	★	2
VC2CD1200	12	0.5	5.75	45°	—	75	12	2	★	2

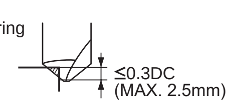
● : USA Stock ★ : Stocked in Japan

RECOMMENDED CUTTING CONDITIONS

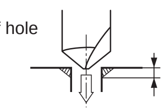
Work Material	Carbon steel, Cast iron, Alloy steel (−30HRC) AISI 1050, AISI 35, AISI P20 etc.			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21 etc.			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V etc.			Hardened steel (45−55HRC) AISI H13 etc.		
DC (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)
2	16000	960	37.8	11000	590	23.2	9500	460	18.1	8000	320	12.6
4	8000	480	18.9	5600	300	11.8	4800	230	9.1	4000	160	6.3
6	5300	320	12.6	3700	200	7.9	3200	150	5.9	2700	110	4.3
8	4000	240	9.4	2800	150	5.9	2400	120	4.7	2000	80	3.1
10	3200	190	7.5	2200	120	4.7	1900	90	3.5	1600	60	2.4
12	2700	160	6.3	1900	100	3.9	1600	80	3.1	1300	50	2.0

Depth of cut

Chamfering



Chamfering of hole



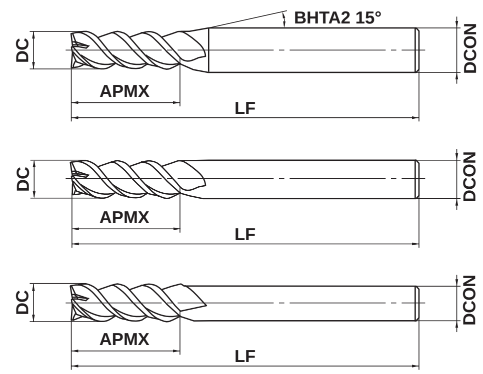
DC : Dia.

Note 1) When cutting austenitic stainless steel, the use of water-soluble cutting fluid is especially effective.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.

VQMHZV

End mill, Medium cutting length, 3 flute for drilling and slotting

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1

Type2

Type3

DC≤12	DC>12
0 / - 0.02	0 / - 0.03

4≤DCON≤6	8≤DCON≤10	12≤DCON≤16	DCON=20
0 / - 0.008	0 / - 0.009	0 / - 0.011	0 / - 0.013

- A single end mill for both plunging and slotting.
- Irregular helical geometry controls the vibration.

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHZVD0100	1	2	45	4	3	●	1
VQMHZVD0110	1.1	2.2	45	4	3	●	1
VQMHZVD0120	1.2	2.4	45	4	3	●	1
VQMHZVD0130	1.3	2.6	45	4	3	●	1
VQMHZVD0140	1.4	2.8	45	4	3	●	1
VQMHZVD0150	1.5	3	45	4	3	●	1
VQMHZVD0160	1.6	3.2	45	4	3	●	1
VQMHZVD0170	1.7	3.4	45	4	3	●	1
VQMHZVD0180	1.8	3.6	45	4	3	●	1
VQMHZVD0190	1.9	3.8	45	4	3	●	1
VQMHZVD0200	2	4	50	6	3	●	1
VQMHZVD0210	2.1	4.2	50	6	3	●	1
VQMHZVD0220	2.2	4.4	50	6	3	●	1
VQMHZVD0230	2.3	4.6	50	6	3	●	1
VQMHZVD0240	2.4	4.8	50	6	3	●	1
VQMHZVD0250	2.5	5	50	6	3	●	1
VQMHZVD0260	2.6	5.2	50	6	3	●	1
VQMHZVD0270	2.7	5.4	50	6	3	●	1
VQMHZVD0280	2.8	5.6	50	6	3	●	1
VQMHZVD0290	2.9	5.8	50	6	3	●	1
VQMHZVD0300	3	6	50	6	3	●	1
VQMHZVD0310	3.1	7	50	6	3	●	1
VQMHZVD0320	3.2	7	50	6	3	●	1
VQMHZVD0330	3.3	7	50	6	3	●	1
VQMHZVD0340	3.4	7	50	6	3	●	1
VQMHZVD0350	3.5	8	50	6	3	●	1
VQMHZVD0360	3.6	8	50	6	3	●	1
VQMHZVD0370	3.7	8	50	6	3	●	1
VQMHZVD0380	3.8	8	50	6	3	●	1
VQMHZVD0390	3.9	8	50	6	3	●	1

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

SMART MIRACLE END MILLS

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHZVD0400	4	8	50	6	3	●	1
VQMHZVD0450	4.5	10	50	6	3	●	1
VQMHZVD0500	5	10	50	6	3	●	1
VQMHZVD0550	5.5	13	50	6	3	●	1
VQMHZVD0600	6	13	60	6	3	●	2
VQMHZVD0650	6.5	16	60	8	3	●	1
VQMHZVD0700	7	16	60	8	3	●	1
VQMHZVD0750	7.5	16	60	8	3	●	1
VQMHZVD0800	8	19	70	8	3	●	2
VQMHZVD0850	8.5	19	70	10	3	●	1
VQMHZVD0900	9	19	70	10	3	●	1
VQMHZVD0950	9.5	19	70	10	3	●	1
VQMHZVD1000	10	22	80	10	3	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

VQMHZV

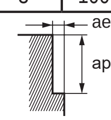
End mill, Medium cutting length, 3 flute for drilling and slotting

RECOMMENDED CUTTING CONDITIONS

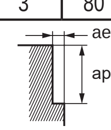
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	100	32000	720	1.5	0.2	80	25000	530	1.5	0.2	60	19000	430	1.5	0.2	50	16000	340	1.5	0.1
1.5	130	28000	1300	2.25	0.3	100	21000	630	2.25	0.3	85	18000	540	2.25	0.3	65	14000	420	2.25	0.15
2	150	24000	1800	3	0.6	120	19000	860	3	0.6	100	16000	620	3	0.6	75	12000	540	3	0.4
3	150	16000	1900	4.5	0.9	120	13000	940	4.5	0.9	100	11000	660	4.5	0.9	75	8000	580	4.5	0.6
4	150	12000	2000	6	1.2	120	9500	940	6	1.2	100	8000	670	6	1.2	75	6000	590	6	0.8
5	150	9500	1900	7.5	1.5	120	7600	960	7.5	1.5	100	6400	670	7.5	1.5	75	4800	600	7.5	1
6	150	8000	1900	9	1.8	120	6400	960	9	1.8	100	5300	830	9	1.8	75	4000	600	9	1.2
8	150	6000	1900	12	2.4	120	4800	1000	12	2.4	100	4000	900	12	2.4	75	3000	630	12	1.6
10	150	4800	1700	15	3	120	3800	910	15	3	100	3200	960	15	3	75	2400	580	15	2
Depth of cut																				

General purpose cutting conditions

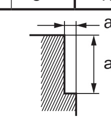
Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	100	32000	480	1.5	0.2	80	25000	350	1.5	0.2	60	19000	280	1.5	0.2	50	16000	220	1.5	0.1
1.5	120	25000	740	2.25	0.3	100	21000	420	2.25	0.3	80	17000	340	2.25	0.3	65	14000	280	2.25	0.15
2	120	19000	940	3	0.6	100	16000	480	3	0.6	80	13000	340	3	0.6	70	11000	330	3	0.4
3	120	13000	1000	4.5	0.9	100	11000	520	4.5	0.9	80	8500	340	4.5	0.9	70	7400	350	4.5	0.6
4	120	9500	1000	6	1.2	100	8000	520	6	1.2	80	6400	350	6	1.2	70	5600	370	6	0.8
5	120	7600	980	7.5	1.5	100	6400	530	7.5	1.5	80	5100	350	7.5	1.5	70	4500	370	7.5	1
6	120	6400	1000	9	1.8	100	5300	540	9	1.8	80	4200	400	9	1.8	70	3700	370	9	1.2
8	120	4800	1000	12	2.4	100	4000	550	12	2.4	80	3200	430	12	2.4	70	2800	390	12	1.6
10	120	3800	900	15	3	100	3200	510	15	3	80	2500	450	15	3	70	2200	350	15	2
Depth of cut																				

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the feed rate can be increased.

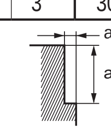
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency cutting conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	120	38000	860	1.5	0.2	40	13000	160	1.5	0.05
1.5	150	32000	1400	2.25	0.3	40	8500	170	2.25	0.08
2	180	29000	2200	3	0.6	40	6400	170	3	0.2
3	180	19000	2300	4.5	0.9	40	4200	180	4.5	0.3
4	180	14000	2300	6	1.2	40	3200	180	6	0.4
5	180	11000	2300	7.5	1.5	40	2500	180	7.5	0.5
6	180	9500	2300	9	1.8	40	2100	190	9	0.6
8	180	7200	2300	12	2.4	40	1600	190	12	0.8
10	180	5700	2100	15	3	40	1300	220	15	1
Depth of cut										

General purpose cutting conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	120	38000	560	1.5	0.2	30	9500	75	1.5	0.05
1.5	140	30000	890	2.25	0.3	30	6400	82	2.25	0.07
2	140	22000	1100	3	0.6	30	4800	86	3	0.2
3	140	15000	1200	4.5	0.9	30	3200	89	4.5	0.3
4	140	11000	1200	6	1.2	30	2400	90	6	0.4
5	140	8900	1200	7.5	1.5	30	1900	90	7.5	0.5
6	140	7400	1200	9	1.8	30	1600	95	9	0.6
8	140	5600	1200	12	2.4	30	1200	95	12	0.8
10	140	4500	1100	15	3	30	950	110	15	1
Depth of cut										

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

VQMHZV

End mill, Medium cutting length, 3 flute for drilling and slotting

RECOMMENDED CUTTING CONDITIONS

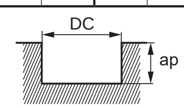
■Slotting

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy				Hardened stainless steel, Cobaly chromium alloy				Copper, Copper alloy				Heat resistant alloy			
	AISI 1045, AISI 4140, ASTM A36, AISI 1010				AISI P21, AISI P20, AISI 4340, SKD, SKT				AISI 304, AISI 316, Ti-6Al-4V				AISI 630, AISI 631 15-5PH, 17-4PH								Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
1	100	32000	380	0.5	80	25000	150	0.5	60	19000	100	0.5	45	14000	80	0.3	120	38000	460	0.5	30	9500	60	0.2
1.5	130	28000	590	0.75	100	21000	250	0.75	85	18000	220	0.75	60	12000	140	0.4	150	32000	670	0.75	30	6400	80	0.3
2	150	24000	940	2	120	19000	460	2	100	16000	480	2	60	9500	230	1	180	29000	1100	2	30	4800	100	0.6
3	150	16000	1100	3	120	13000	550	3	100	11000	500	3	60	6400	270	1.5	180	19000	1300	3	30	3200	120	0.9
4	150	12000	1400	4	120	9500	680	4	100	8000	530	4	60	4800	350	2	180	14000	1700	4	30	2400	130	1.2
5	150	9500	1400	5	120	7600	680	5	100	6400	540	5	60	3800	350	2.5	180	11000	1700	5	30	1900	130	1.5
6	150	8000	1400	6	120	6400	770	6	100	5300	560	6	60	3200	380	3	180	9500	1700	6	30	1600	130	1.8
8	150	6000	1300	8	120	4800	720	8	100	4000	600	8	60	2400	360	4	180	7200	1500	8	30	1200	140	2.4
10	150	4800	1200	10	120	3800	630	10	100	3200	670	10	60	1900	310	5	180	5700	1400	10	30	950	160	3

Depth of cut

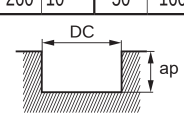


DC:Dia.

General purpose cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy				Hardened stainless steel, Cobaly chromium alloy				Copper, Copper alloy				Heat resistant alloy			
	AISI 1045, AISI 4140, ASTM A36, AISI 1010				AISI P21, AISI P20, AISI 4340, SKD, SKT				AISI 304, AISI 316, Ti-6Al-4V				AISI 630, AISI 631 15-5PH, 17-4PH								Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
1	100	32000	250	0.5	80	25000	99	0.5	60	19000	80	0.5	45	14000	60	0.3	120	38000	300	0.5	25	8000	30	0.2
1.5	100	21000	290	0.75	80	17000	130	0.75	60	13000	100	0.75	50	11000	87	0.4	120	25000	350	0.75	25	5300	40	0.3
2	100	16000	410	2	80	13000	210	2	60	9500	190	2	50	8000	130	1	120	19000	490	2	25	4000	55	0.6
3	100	11000	500	3	80	8500	240	3	60	6400	190	3	50	5300	150	1.5	120	13000	590	3	25	2700	64	0.9
4	100	8000	630	4	80	6400	300	4	60	4800	210	4	50	4000	190	2	120	9500	750	4	25	2000	70	1.2
5	100	6400	630	5	80	5100	300	5	60	3800	210	5	50	3200	190	2.5	120	7600	750	5	25	1600	71	1.5
6	100	5300	630	6	80	4200	330	6	60	3200	220	6	50	2700	210	3	120	6400	760	6	25	1300	72	1.8
8	100	4000	550	8	80	3200	320	8	60	2400	240	8	50	2000	200	4	120	4800	670	8	25	990	78	2.4
10	100	3200	510	10	80	2500	270	10	60	1900	260	10	50	1600	170	5	120	3800	600	10	25	800	89	3

Depth of cut



DC:Dia.

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the feed rate can be increased.

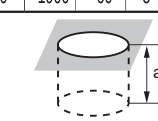
■Plunging

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy					Hardened stainless steel, Cobaly chromium alloy					Copper, Copper alloy				
	AISI 1045, AISI 4140, ASTM A36, AISI 1010					AISI P21, AISI P20, AISI 4340, SKD, SKT					AISI 304, AISI 316, Ti-6Al-4V					AISI 630, AISI 631 15-5PH, 17-4PH									
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)
1	65	20000	160	0.5	0.1	50	16000	100	0.5	0.1	50	16000	50	0.5	0.05	30	9500	30	0.5	0.05	75	24000	190	0.5	0.1
1.5	85	18000	270	0.75	0.3	60	13000	120	0.75	0.3	60	13000	80	0.75	0.1	35	7400	40	0.75	0.1	100	21000	320	0.75	0.3
2	100	16000	480	2	0.5	70	11000	200	2	0.4	60	9500	90	1	0.15	40	6400	60	1	0.1	120	19000	570	2	0.5
3	100	11000	660	3	1	70	7400	270	3	0.6	60	6400	100	1.5	0.2	40	4200	60	1.5	0.2	120	13000	780	3	1.0
4	100	8000	800	4	2	70	5600	340	4	0.8	60	4800	100	2	0.4	40	3200	60	2	0.4	120	9500	950	4	2
5	100	6400	960	5	2.5	70	4500	410	5	1	60	3800	100	2.5	0.5	40	2500	60	2.5	0.5	120	7600	1100	5	2.5
6	100	5300	950	6	3	70	3700	440	6	1.2	60	3200	100	3	0.6	40	2100	60	3	0.6	120	6400	1200	6	3
8	100	4000	720	8	4	70	2800	340	8	1.6	60	2400	70	4	0.6	40	1600	50	4	0.6	120	4800	860	8	4
10	100	3200	580	10	5	70	2200	260	10	2.5	60	1900	60	5	0.6	40	1300	40	5	0.6	120	3800	680	10	5

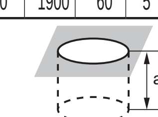
Depth of cut



General purpose cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy					Hardened stainless steel, Cobaly chromium alloy					Copper, Copper alloy				
	AISI 1045, AISI 4140, ASTM A36, AISI 1010					AISI P21, AISI P20, AISI 4340, SKD, SKT					AISI 304, AISI 316, Ti-6Al-4V					AISI 630, AISI 631 15-5PH, 17-4PH									
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Hole Depth ap (mm)	Step (mm)
1	65	20000	160	0.5	0.05	50	16000	100	0.5	0.05	50	16000	50	0.5	0.05	30	9500	30	0.5	0.05	75	24000	190	0.5	0.05
1.5	85	18000	270	0.75	0.15	60	13000	120	0.75	0.1	60	13000	80	0.75	0.05	35	7400	40	0.75	0.05	100	21000	320	0.75	0.15
2	100	16000	480	2	0.25	70	11000	200	2	0.2	60	9500	90	1	0.05	40	6400	60	1	0.05	120	19000	570	2	0.25
3	100	11000	660	3	0.3	70	7400	270	3	0.3	60	6400	100	1.5	0.1	40	4200	60	1.5	0.1	120	13000	780	3	0.3
4	100	8000	800	4	0.4	70	5600	340	4	0.4	60	4800	100	2	0.2	40	3200	60	2	0.2	120	9500	950	4	0.4
5	100	6400	960	5	0.5	70	4500	410	5	0.5	60	3800	100	2.5	0.25	40	2500	60	2.5	0.25	120	7600	1100	5	0.5
6	100	5300	950	6	0.6	70	3700	440	6	0.6	60	3200	100	3	0.3	40	2100	60	3	0.3	120	6400	1200	6	0.6
8	100	4000	720	8	0.7	70	2800	340	8	0.7	60	2400	70	4	0.3	40	1600	50	4	0.3	120	4800	860	8	0.7
10	100	3200	580	10	0.75	70	2200	260	10	0.75	60	1900	60	5	0.3	40	1300	40	5	0.3	120	3800	680	10	0.75

Depth of cut

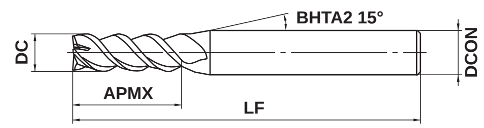


Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.

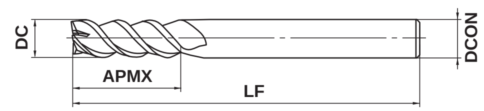
VQMHZV - Inch sizes

End mill, Medium cutting length, 3 flute for drilling and slotting

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

DC<.5000"	DC=.5000"			
0 - .0008"	0 - .0012"			
.2500"≤DCON≤.3750"	DCON=.5000"			
0 - .00035"	0 - .00043"			

- A single end mill for both plunging and slotting.
- Irregular helical geometry controls the vibration.

(inch)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHZVD1/16	.0625	.1250	2.0	.2500	3	●	1
VQMHZVD5/64	.0781	.1560	2.0	.2500	3	●	1
VQMHZVD3/32	.0938	.1880	2.0	.2500	3	●	1
VQMHZVD7/64	.1094	.2500	2.0	.2500	3	●	1
VQMHZVD1/8	.1250	.3130	2.0	.2500	3	●	1
VQMHZVD5/32	.1563	.3750	2.0	.2500	3	●	1
VQMHZVD3/16	.1875	.4375	2.0	.2500	3	●	1
VQMHZVD1/4	.2500	.6250	2.5	.2500	3	●	2
VQMHZVD5/16	.3125	.7500	2.75	.3125	3	●	2
VQMHZVD11/32	.3438	.7500	3.0	.3750	3	●	1
VQMHZVD3/8	.3750	.8750	3.0	.3750	3	●	2
VQMHZVD1/2	.5000	1.1250	3.5	.5000	3	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

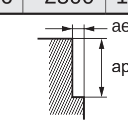
● : USA Stock

RECOMMENDED CUTTING CONDITIONS

Shoulder milling

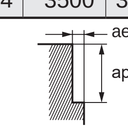
Work Material	Carbon steel (—30HRC) AISI 1035, AISI 1050, ASTM 283						Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21						Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)			Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)			Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		
1/16	26000	55.3	24000	33.9	.094	.013	20000	26.0	20000	17.3	.094	.013	18000	23.4	16000	13.8	.094	.013
5/64	24000	70.9	19000	37.0	.12	.023	19000	33.7	16000	18.9	.12	.023	16000	24.6	13000	13.0	.12	.023
3/32	20000	70.9	16000	37.4	.14	.028	16000	34.0	13000	18.1	.14	.028	13000	24.6	11000	13.8	.14	.028
7/64	17000	72.3	14000	39.4	.16	.033	14000	34.7	11000	18.1	.16	.033	11000	24.7	9200	13.8	.16	.033
1/8	15000	76.2	12000	39.4	.19	.038	12000	36.9	10000	20.1	.19	.038	10000	26.0	8000	13.8	.19	.038
5/32	12000	78.0	9600	39.4	.23	.047	9600	37.4	8000	20.5	.23	.047	8000	26.5	6400	13.8	.23	.047
3/16	10000	74.4	8000	39.4	.28	.056	8000	37.8	6700	20.9	.28	.056	6700	26.5	5300	13.8	.28	.056
1/4	7500	74.4	6000	39.4	.38	.075	6000	39.0	5000	21.3	.38	.075	5000	35.4	4000	18.9	.38	.075
5/16	6000	74.4	4800	39.4	.47	.094	4800	39.7	4000	21.7	.47	.094	4000	35.4	3200	18.9	.47	.094
11/32	5500	71.5	4400	37.8	.52	.10	4400	37.9	3600	20.5	.52	.10	3600	36.1	2900	19.3	.52	.10
3/8	5000	67.9	4000	35.8	.56	.11	4000	36.9	3300	20.1	.56	.11	3300	37.0	2700	20.1	.56	.11
1/2	3800	56.1	3000	29.1	.75	.15	3000	32.6	2500	18.1	.75	.15	2500	32.5	2000	17.3	.75	.15

Depth of cut



Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.						Copper, Copper alloy						Heat resistant alloy Inconel718 etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)			Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)			Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		
1/16	13000	16.9	13000	11.0	.094	.0063	30000	63.8	28000	39.4	.094	.013	8000	3.3	6000	13.8	.094	.0031
5/64	12000	21.3	11000	13.0	.12	.016	29000	85.6	22000	43.3	.12	.023	6400	3.4	4800	13.0	.12	.0078
3/32	10000	21.3	9400	13.4	.14	.019	24000	85.0	19000	43.3	.14	.028	5300	3.4	4000	13.8	.14	.0094
7/64	8600	21.3	8000	13.0	.16	.022	21000	89.3	16000	43.3	.16	.033	4600	3.5	3400	13.8	.16	.011
1/8	7500	23.0	7000	14.2	.19	.025	18000	91.4	14000	47.2	.19	.038	4000	3.5	3000	13.8	.19	.013
5/32	6000	23.4	5600	14.6	.23	.031	14000	90.9	11000	47.2	.23	.047	3200	3.5	2400	13.8	.23	.016
3/16	5000	23.6	4700	14.6	.28	.038	12000	89.3	9400	47.2	.28	.056	2700	3.6	2000	13.8	.28	.019
1/4	3800	24.7	3500	15.0	.38	.050	9000	89.3	7000	47.2	.38	.075	2000	3.7	1500	18.9	.38	.025
5/16	3000	24.8	2800	15.4	.47	.063	7200	89.3	5600	47.2	.47	.094	1600	3.7	1200	18.9	.47	.031
11/32	2700	23.3	2600	15.0	.52	.069	6600	85.7	5100	43.3	.52	.10	1500	3.9	1100	19.3	.52	.034
3/8	2500	23.0	2300	14.2	.56	.075	6000	81.5	4700	43.3	.56	.11	1300	3.9	1000	20.1	.56	.038
1/2	1900	20.6	1800	13.0	.75	.10	4500	66.4	3500	34.3	.75	.15	1000	3.7	750	17.3	.75	.050

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, and titanium alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

VQMHZV – Inch sizes

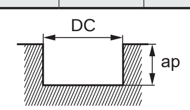
End mill, Medium cutting length, 3 flute for drilling and slotting

RECOMMENDED CUTTING CONDITIONS

■Slotting

Work Material	Carbon steel (—30HRC) AISI 1035, AISI 1050, ASTM 283					Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21					Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)	
1/16	26000	27.6	20000	14.2	.031	20000	11.8	16000	6.3	.031	18000	10.6	12000	4.7	.031
5/64	24000	36.9	16000	16.1	.078	19000	18.0	13000	8.3	.078	16000	18.9	9600	7.5	.078
3/32	20000	37.8	13000	16.1	.094	16000	18.9	11000	8.7	.094	13000	19.2	8000	7.9	.094
7/64	17000	40.2	11000	17.3	.11	14000	19.8	9200	8.7	.11	11000	19.5	6900	7.9	.11
1/8	15000	44.3	10000	19.7	.13	12000	22.7	8000	9.8	.13	10000	20.1	6000	7.9	.13
5/32	12000	56.7	8000	24.8	.16	9600	26.1	6400	11.4	.16	8000	20.8	4800	8.3	.16
3/16	10000	56.7	6700	25.2	.19	8000	26.9	5300	11.8	.19	6700	21.4	4000	8.3	.19
1/4	7500	55.8	5000	24.4	.25	6000	29.8	4000	13.0	.25	5000	21.9	3000	8.7	.25
5/16	6000	49.6	4000	21.7	.31	4800	28.3	3200	12.6	.31	4000	23.6	2400	9.4	.31
11/32	5500	48.7	3600	20.9	.34	4400	27.0	2900	11.8	.34	3600	24.2	2200	9.8	.34
3/8	5000	46.1	3300	20.1	.38	4000	25.5	2700	11.4	.38	3300	25.3	2000	10.2	.38
1/2	3800	35.9	2500	15.7	.50	3000	22.3	2000	9.8	.50	2500	23.6	1500	9.4	.50

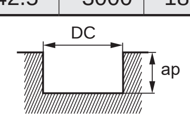
Depth of cut



DC : Dia.

Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.					Copper, Copper alloy					Heat resistant alloy Inconel718 etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)		Revolution (min-1)	Table feed (IPM)	Revolution (min-1)	Table feed (IPM)	
1/16	11000	6.5	10000	3.9	.019	30000	31.9	24000	16.9	.031	6000	3.5	5000	2.0	.013
5/64	9600	9.1	8000	5.1	.039	29000	44.5	19000	19.3	.078	4800	4.0	4000	2.2	.023
3/32	8000	9.5	6700	5.1	.047	24000	45.4	16000	20.1	.094	4000	4.3	3300	2.3	.028
7/64	6900	9.8	5700	5.5	.055	21000	49.6	14000	21.7	.11	3400	4.4	2900	2.5	.033
1/8	6000	11.3	5000	6.3	.063	18000	53.1	12000	23.2	.13	3000	4.6	2500	2.5	.038
5/32	4800	13.0	4000	7.1	.078	14000	66.1	9600	29.9	.16	2400	5.0	2000	2.8	.047
3/16	4000	13.7	3300	7.5	.094	12000	68.0	8000	29.9	.19	2000	5.1	1700	2.9	.056
1/4	3000	14.9	2500	8.3	.13	9000	67.0	6000	29.5	.25	1500	5.3	1300	3.0	.075
5/16	2400	14.2	2000	7.9	.16	7200	59.5	4800	26.4	.31	1200	5.7	1000	3.1	.094
11/32	2200	13.5	1800	7.5	.17	6600	58.5	4400	25.6	.34	1100	5.9	910	3.2	.10
3/8	2000	12.8	1700	7.1	.19	6000	55.3	4000	24.4	.38	1000	6.1	840	3.4	.11
1/2	1500	11.2	1300	6.3	.25	4500	42.5	3000	18.9	.50	750	5.7	630	3.1	.15

Depth of cut



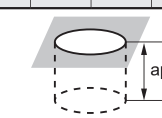
DC : Dia.

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy, and heat-resistant alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

■Drilling

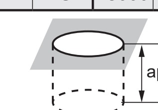
Work Material	Carbon steel (—30HRC) AISI 1035, AISI 1050, ASTM 283							Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21							Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.						
DC (inch)	High speed cutting			General purpose cutting			Hole Depth ap (inch)	High speed cutting			General purpose cutting			Hole Depth ap (inch)	High speed cutting			General purpose cutting			Hole Depth ap (inch)
	Revolution (min-1)	Table feed (IPM)	Step (inch)	Revolution (min-1)	Table feed (IPM)	Step (inch)		Revolution (min-1)	Table feed (IPM)	Step (inch)	Revolution (min-1)	Table feed (IPM)	Step (inch)		Revolution (min-1)	Table feed (IPM)	Step (inch)	Revolution (min-1)	Table feed (IPM)	Step (inch)	
1/16	18000	12.8	.013	18000	12.6	.006	.031	12000	5.2	.013	12000	5.2	.006	.031	12000	3.3	.004	12000	3.3	.002	.031
5/64	16000	18.9	.020	16000	18.9	.006	.078	11000	7.8	.016	11000	7.8	.006	.078	9600	3.5	.004	9600	3.5	.002	.039
3/32	13000	20.5	.023	13000	20.5	.010	.094	9400	8.8	.019	9400	8.8	.010	.094	8000	3.5	.006	8000	3.5	.002	.047
7/64	11000	21.7	.033	11000	21.7	.010	.11	8000	9.4	.022	8000	9.4	.010	.11	6900	3.5	.008	6900	3.5	.002	.055
1/8	10000	27.6	.044	10000	27.6	.012	.13	7000	11.0	.025	7000	11.0	.012	.13	6000	4.0	.008	6000	4.0	.004	.063
5/32	8000	31.5	.078	8000	31.5	.012	.16	5600	13.2	.031	5600	13.2	.012	.16	4800	3.8	.016	4800	3.8	.004	.078
3/16	6700	34.3	.094	6700	34.3	.016	.19	4700	15.0	.038	4700	15.0	.016	.19	4000	3.8	.020	4000	3.8	.008	.094
1/4	5000	35.4	.13	5000	35.4	.024	.25	3500	16.5	.050	3500	16.5	.024	.25	3000	3.5	.024	3000	3.5	.012	.13
5/16	4000	28.3	.16	4000	28.3	.028	.31	2800	13.2	.063	2800	13.2	.028	.31	2400	2.8	.024	2400	2.8	.012	.16
11/32	3600	25.5	.17	3600	25.5	.028	.34	2600	12.3	.069	2600	12.3	.028	.34	2200	2.6	.024	2200	2.6	.012	.17
3/8	3300	23.4	.19	3300	23.4	.030	.38	2300	11.0	.094	2300	11.0	.030	.38	2000	2.3	.024	2000	2.3	.012	.19
1/2	2500	17.7	.20	2500	17.7	.030	.50	1800	8.5	.13	1800	8.5	.030	.50	1500	2.0	.024	1500	2.0	.012	.25

Hole depth



Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.							Copper, Copper alloy						
DC (inch)	High speed cutting			General purpose cutting			Hole Depth ap (inch)	High speed cutting			General purpose cutting			Hole Depth ap (inch)
	Revolution (min-1)	Table feed (IPM)	Step (inch)	Revolution (min-1)	Table feed (IPM)	Step (inch)		Revolution (min-1)	Table feed (IPM)	Step (inch)	Revolution (min-1)	Table feed (IPM)	Step (inch)	
1/16	7000	2.0	.004	7000	2.0	.002	.031	22000	15.6	.013	22000	15.6	.006	.031
5/64	6400	2.4	.004	6400	2.4	.002	.039	19000	22.4	.020	19000	22.4	.006	.039
3/32	5300	2.4	.006	5300	2.4	.002	.047	16000	25.2	.023	16000	25.2	.010	.047
7/64	4600	2.4	.008	4600	2.4	.002	.055	14000	27.6	.033	14000	27.6	.010	.055
1/8	4000	2.8	.008	4000	2.8	.004	.063	12000	33.1	.044	12000	33.1	.012	.063
5/32	3200	2.4	.016	3200	2.4	.004	.078	9600	37.8	.078	9600	37.8	.012	.078
3/16	2700	2.4	.020	2700	2.4	.008	.094	8000	39.4	.094	8000	39.4	.016	.094
1/4	2000	2.4	.024	2000	2.4	.012	.13	6000	43.3	.130	6000	43.3	.024	.13
5/16	1600	2.0	.024	1600	2.0	.012	.16	4800	33.9	.160	4800	33.9	.028	.16
11/32	1500	1.8	.024	1500	1.8	.012	.17	4400	31.1	.17	4400	31.1	.028	.17
3/8	1300	1.5	.024	1300	1.5	.012	.19	4000	28.3	.19	4000	28.3	.030	.19
1/2	1000	1.2	.024	1000	1.2	.012	.25	3000	21.3	.20	3000	21.3	.030	.25

Hole depth



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Note 2) Effective cutting of stainless steel, and titanium alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

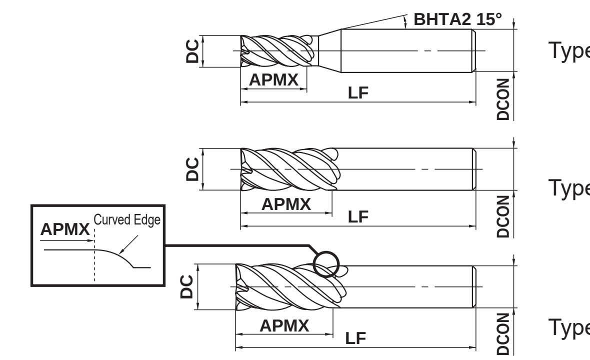
Memo

VQMHV

End mill, Medium cutting length, 4 flute, Irregular helix flutes

37°
40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



DC≤12	DC>12		
0 / - 0.020	0 / - 0.030		
4≤DCON≤6	8≤DCON≤10	12≤DCON≤16	20≤DCON≤25
0 / - 0.008	0 / - 0.009	0 / - 0.011	0 / - 0.013

● Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(mm)

	Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
NEW	**VQMHVD0100**	1	2	45	4	4	●	1
NEW	**VQMHVD0150**	1.5	3	45	4	4	●	1
	VQMHVD0200	2	4	45	4	4	●	1
	VQMHVD0250	2.5	5	45	4	4	●	1
	VQMHVD0300	3	8	45	6	4	●	1
	VQMHVD0350	3.5	8	45	6	4	●	1
	VQMHVD0400	4	11	45	6	4	●	1
	VQMHVD0500	5	13	50	6	4	●	1
	VQMHVD0600	6	13	50	6	4	●	2
	VQMHVD0700	7	19	60	8	4	●	1
	VQMHVD0800	8	19	60	8	4	●	2
	VQMHVD0900	9	22	70	10	4	●	1
	VQMHVD0900S08	9	22	75	8	4	●	3
	VQMHVD1000	10	22	70	10	4	●	2
	VQMHVD1000S08	10	22	100	8	4	●	3
	VQMHVD1100	11	26	75	12	4	●	1
	VQMHVD1100S10	11	26	100	10	4	●	3
	VQMHVD1200	12	26	75	12	4	●	2
	VQMHVD1200S10	12	26	110	10	4	●	3

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

VQMHV

End mill, Medium cutting length, 4 flute, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

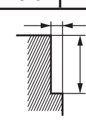
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH,17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	130	40000	1800	1.5	0.3	120	38000	910	1.5	0.3	80	25000	500	1.5	0.2	75	24000	580	1.5	0.2
2	150	24000	2400	3	0.6	120	19000	1100	3	0.6	100	16000	830	3	0.6	75	12000	720	3	0.4
3	150	16000	2600	4.5	0.9	120	13000	1200	4.5	0.9	100	11000	880	4.5	0.9	75	8000	770	4.5	0.6
4	150	12000	2600	6	1.2	120	9500	1300	6	1.2	100	8000	900	6	1.2	75	6000	790	6	0.8
5	150	9500	2600	7.5	1.5	120	7600	1300	7.5	1.5	100	6400	900	7.5	1.5	75	4800	810	7.5	1
6	150	8000	2600	9	1.8	120	6400	1300	9	1.8	100	5300	1100	9	1.8	75	4000	810	9	1.2
8	150	6000	2500	12	2.4	120	4800	1300	12	2.4	100	4000	1200	12	2.4	75	3000	840	12	1.6
10	150	4800	2300	15	3	120	3800	1200	15	3	100	3200	1300	15	3	75	2400	770	15	2
12	150	4000	1900	18	3.6	120	3200	1200	18	3.6	100	2700	1200	18	3.6	75	2000	720	18	2.4

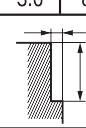
Depth of cut



General-purpose conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH,17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	120	38000	1000	1.5	0.3	100	32000	560	1.5	0.3	80	25000	400	0.75	0.1	70	22000	390	1.5	0.2
2	120	19000	1300	3	0.6	100	16000	630	3	0.6	80	13000	450	1.5	0.2	70	11000	440	3	0.4
3	120	13000	1400	4.5	0.9	100	11000	700	4.5	0.9	80	8500	450	2.2	0.3	70	7400	470	4.5	0.6
4	120	9500	1400	6	1.2	100	8000	700	6	1.2	80	6400	470	3	0.6	70	5600	490	6	0.8
5	120	7600	1400	7.5	1.5	100	6400	710	7.5	1.5	80	5100	470	4.5	0.9	70	4500	500	7.5	1
6	120	6400	1400	9	1.8	100	5300	710	9	1.8	80	4200	580	6	1.2	70	3700	500	9	1.2
8	120	4800	1300	12	2.4	100	4000	740	12	2.4	80	3200	630	7.5	1.5	70	2800	520	12	1.6
10	120	3800	1200	15	3	100	3200	680	15	3	80	2500	660	9	1.8	70	2200	460	15	2
12	120	3200	1000	18	3.6	100	2700	640	18	3.6	80	2100	610	12	2.4	70	1900	450	18	2.4

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

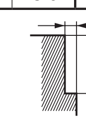
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	130	40000	1800	1.5	0.3	40	13000	210	1.5	0.1
2	180	29000	2900	3	0.6	40	6400	230	3	0.2
3	180	19000	3000	4.5	0.9	40	4200	240	4.5	0.3
4	180	14000	3000	6	1.2	40	3200	240	6	0.4
5	180	11000	3000	7.5	1.5	40	2500	240	7.5	0.5
6	180	9500	3000	9	1.8	40	2100	250	9	0.6
8	180	7200	3000	12	2.4	40	1600	260	12	0.8
10	180	5700	2700	15	3	40	1300	290	15	1
12	180	4800	2300	18	3.6	40	1100	280	18	1.2

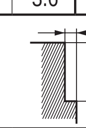
Depth of cut



General-purpose conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	130	40000	1300	1.5	0.3	30	9600	92	1.5	0.1
2	140	22000	1500	3	0.6	30	4800	110	3	0.2
3	140	15000	1600	4.5	0.9	30	3200	120	4.5	0.3
4	140	11000	1600	6	1.2	30	2400	120	6	0.4
5	140	8900	1600	7.5	1.5	30	1900	120	7.5	0.5
6	140	7400	1600	9	1.8	30	1600	130	9	0.6
8	140	5600	1600	12	2.4	30	1200	130	12	0.8
10	140	4500	1400	15	3	30	950	140	15	1
12	140	3700	1200	18	3.6	30	800	140	18	1.2

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

VQMHV

End mill, Medium cutting length, 4 flute, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

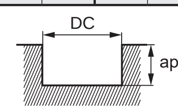
■Slotting

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V				Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				Copper, Copper alloy				Heat resistant alloy Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
2	150	24000	1200	2	120	19000	610	2	100	16000	640	2	60	9500	300	1	180	29000	1500	2	30	4800	130	0.6
3	150	16000	1500	3	120	13000	730	3	100	11000	660	3	60	6400	360	1.5	180	19000	1700	3	30	3200	150	0.9
4	150	12000	1900	4	120	9500	910	4	100	8000	700	4	60	4800	460	2	180	14000	2200	4	30	2400	170	1.2
5	150	9500	1900	5	120	7600	910	5	100	6400	720	5	60	3800	460	2.5	180	11000	2200	5	30	1900	170	1.5
6	150	8000	1900	6	120	6400	1000	6	100	5300	740	6	60	3200	510	3	180	9500	2300	6	30	1600	180	1.8
8	150	6000	1700	8	120	4800	960	8	100	4000	800	8	60	2400	480	4	180	7200	2000	8	30	1200	190	2.4
10	150	4800	1500	10	120	3800	840	10	100	3200	900	10	60	1900	420	5	180	5700	1800	10	30	950	210	3
12	150	4000	1300	12	120	3200	770	12	100	2700	860	12	60	1600	380	6	180	4800	1500	12	30	800	200	3.6

Depth of cut

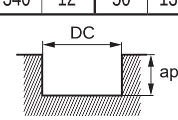


DC : Dia.

General-purpose conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V				Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				Copper, Copper alloy				Heat resistant alloy Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
1	100	32000	500	1	80	25000	250	1	80	25000	300	1	50	16000	150	0.5	120	38000	590	1	25	8000	67	0.3
2	100	16000	550	2	80	13000	270	2	60	9500	250	2	50	8000	170	1	120	19000	650	2	25	4000	74	0.6
3	100	11000	670	3	80	8500	310	3	60	6400	250	3	50	5300	200	1.5	120	13000	790	3	25	2700	86	0.9
4	100	8000	840	4	80	6400	410	4	60	4800	280	4	50	4000	250	2	120	9500	1000	4	25	2000	93	1.2
5	100	6400	840	5	80	5100	410	5	60	3800	280	5	50	3200	250	2.5	120	7600	1000	5	25	1600	95	1.5
6	100	5300	840	6	80	4200	440	6	60	3200	300	6	50	2700	290	3	120	6400	1000	6	25	1300	96	1.8
8	100	4000	740	8	80	3200	420	8	60	2400	320	8	50	2000	260	4	120	4800	890	8	25	990	100	2.4
10	100	3200	680	10	80	2500	360	10	60	1900	350	10	50	1600	230	5	120	3800	800	10	25	800	120	3
12	100	2700	570	12	80	2100	330	12	60	1600	340	12	50	1300	210	6	120	3200	680	12	25	660	110	3.6

Depth of cut



DC : Dia.

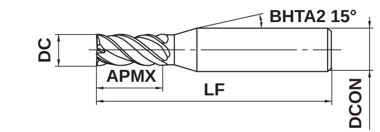
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the feed rate can be increased.

VQMHV - Inch sizes

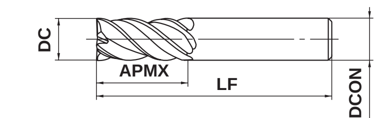
End mill, Medium cutting length, 4 flute, Irregular helix flutes

UWC VQ 37° 40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

DC<.5000"	DC=.5000"			
0 - .0008"	0 - .0012"			
.2500"≤DCON≤.3750"	DCON=.5000"			
0 - .00035"	0 - .00043"			

h6

● Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(inch)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHVD1/8	.1250	.3130	2.0	.2500	4	●	1
VQMHVD3/16	.1875	.4375	2.0	.2500	4	●	1
VQMHVD1/4	.2500	.6250	2.5	.2500	4	●	2
VQMHVD5/16	.3125	.7500	2.75	.3125	4	●	2
VQMHVD3/8	.3750	.8750	3.0	.3750	4	●	2
VQMHVD1/2	.5000	1.1250	3.5	.5000	4	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

● : USA Stock

VQMHV - Inch sizes

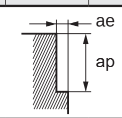
End mill, Medium cutting length, 4 flute, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

■Shoulder milling

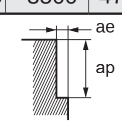
Work Material	Carbon steel (—30HRC) AISI 1035, AISI 1050, ASTM 283						Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21						Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
1/8	15000	102.0	12000	55.1	.19	.038	12000	49.1	10000	27.2	.19	.038	10000	34.6	8000	18.1	.19	.038
3/16	10000	99.2	8000	51.2	.28	.056	8000	50.4	6700	28.0	.28	.056	6700	35.3	5300	18.5	.28	.056
1/4	7500	99.2	6000	51.2	.38	.075	6000	52.0	5000	28.7	.38	.075	5000	47.2	4000	24.8	.38	.075
5/16	6000	99.2	4800	51.2	.47	.094	4800	52.9	4000	29.1	.47	.094	4000	47.2	3200	24.8	.47	.094
3/8	5000	90.6	4000	47.2	.56	.11	4000	49.1	3300	26.8	.56	.11	3300	49.4	2700	26.8	.56	.11
1/2	3800	74.8	3000	39.0	.75	.15	3000	43.5	2500	24.0	.75	.15	2500	43.3	2000	22.8	.75	.15

Depth of cut



Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.						Copper, Copper alloy						Heat resistant alloy Inconel718 etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
1/8	7500	30.7	7000	18.9	.19	.025	18000	122.0	14000	63.0	.19	.038	4000	9.5	3000	4.7	.19	.013
3/16	5000	31.5	4700	19.7	.28	.038	12000	119.0	9400	63.0	.28	.056	2700	9.8	2000	4.7	.28	.019
1/4	3800	32.9	3500	20.1	.38	.050	9000	119.0	7000	63.0	.38	.075	2000	10.1	1500	5.1	.38	.025
5/16	3000	33.1	2800	20.5	.47	.063	7200	119.0	5600	63.0	.47	.094	1600	10.1	1200	5.1	.47	.031
3/8	2500	30.7	2300	18.5	.56	.075	6000	109.0	4700	55.1	.56	.11	1300	10.6	1000	5.5	.56	.038
1/2	1900	27.5	1800	17.3	.75	.10	4500	88.6	3500	47.2	.75	.15	1000	10.1	750	5.1	.75	.050

Depth of cut

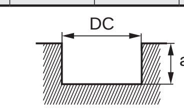


Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

■Slotting

Work Material	Carbon steel (—30HRC) AISI 1035, AISI 1050, ASTM 283					Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21					Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)	
1/8	15000	59.1	10000	26.0	.13	12000	30.2	8000	13.4	.13	10000	26.8	6000	10.6	.13
3/16	10000	75.6	6700	33.5	.19	8000	35.9	5300	15.7	.19	6700	28.5	4000	11.4	.19
1/4	7500	74.4	5000	32.7	.25	6000	39.7	4000	17.3	.25	5000	29.1	3000	11.4	.25
5/16	6000	66.1	4000	29.1	.31	4800	37.8	3200	16.5	.31	4000	31.5	2400	12.6	.31
3/8	5000	61.4	3300	26.8	.38	4000	34.0	2700	15.0	.38	3300	33.8	2000	13.4	.38
1/2	3800	47.9	2500	20.9	.50	3000	29.8	2000	13.0	.50	2500	31.5	1500	12.6	.50

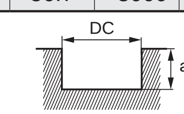
Depth of cut



DC : Dia.

Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.					Copper, Copper alloy					Heat resistant alloy Inconel718 etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)	
1/8	6000	15.1	5000	8.3	.063	18000	70.9	12000	31.1	.13	3000	6.14	2500	3.4	.038
3/16	4000	18.3	3300	9.8	.094	12000	90.7	8000	39.4	.19	2000	6.80	1700	3.8	.056
1/4	3000	19.8	2500	11.0	.13	9000	89.3	6000	39.4	.25	1500	7.09	1300	3.9	.075
5/16	2400	18.9	2000	10.2	.16	7200	79.4	4800	35.0	.31	1200	7.56	1000	4.3	.094
3/8	2000	17.0	1700	9.4	.19	6000	73.7	4000	32.3	.38	1000	8.19	840	4.7	.11
1/2	1500	14.9	1300	8.7	.25	4500	56.7	3000	24.8	.50	750	7.56	630	4.3	.15

Depth of cut



DC : Dia.

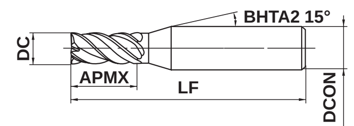
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

VQJHV

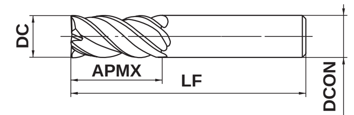
End mill, Semi long cut length, 4 flute, Irregular helix flutes

UWC VQ 38° 40° DC≤6 37.5° 40° DC>6

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

	DC≤12	DC>12			
	0 - 0.020	0 - 0.030			
h6	DCON=6	8≤DCON≤10	12≤DCON≤16	DCON=20	
	0 - 0.008	0 - 0.009	0 - 0.011	0 - 0.013	

● Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(mm)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
NEW VQJHVD0100	1	4	45	4	4	●	1
NEW VQJHVD0150	1.5	6	45	4	4	●	1
VQJHVD0200	2	8	60	6	4	●	1
VQJHVD0250	2.5	10	60	6	4	●	1
VQJHVD0300	3	12	60	6	4	●	1
VQJHVD0350	3.5	14	60	6	4	●	1
VQJHVD0400	4	16	60	6	4	●	1
VQJHVD0450	4.5	18	60	6	4	●	1
VQJHVD0500	5	20	60	6	4	●	1
VQJHVD0600	6	24	60	6	4	●	2
VQJHVD0700	7	25	80	8	4	●	1
VQJHVD0800	8	28	80	8	4	●	2
VQJHVD0900	9	32	90	10	4	●	1
VQJHVD1000	10	35	90	10	4	●	2
VQJHVD1200	12	40	100	12	4	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

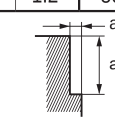
● : USA Stock ★ : Stocked in Japan

SMART MIRACLE END MILLS

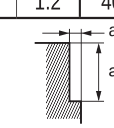
RECOMMENDED CUTTING CONDITIONS

Shoulder milling

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy SUS630, SUS631, 15-5PH, 17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	130	40000	530	2.5	0.1	100	32000	410	2.5	0.1	80	25000	300	2.5	0.05	75	24000	290	2.5	0.05
2	130	21000	700	5	0.2	100	16000	510	5	0.2	80	13000	390	5	0.1	75	12000	360	5	0.1
3	130	14000	960	7.5	0.3	100	11000	680	7.5	0.3	80	8500	490	7.5	0.15	75	8000	460	7.5	0.15
4	130	10000	1000	10	0.4	100	8000	690	10	0.4	80	6400	540	10	0.2	75	6000	510	10	0.2
5	130	8300	1100	12.5	0.5	100	6400	730	12.5	0.5	80	5100	570	12.5	0.25	75	4800	540	12.5	0.25
6	130	6900	1200	15	0.6	100	5300	810	15	0.6	80	4200	630	15	0.3	75	4000	600	15	0.3
8	130	5200	1200	20	0.8	100	4000	840	20	0.8	80	3200	640	20	0.4	75	3000	600	20	0.4
10	130	4100	1100	25	1	100	3200	810	25	1	80	2500	590	25	0.5	75	2400	570	25	0.5
12	130	3400	1100	30	1.2	100	2700	780	30	1.2	80	2100	550	30	0.6	75	2000	520	30	0.6
Depth of cut																				



Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
1	130	40000	530	2.5	0.1	40	13000	73	2.5	0.02
2	160	25000	830	5	0.2	40	6400	90	5	0.04
3	160	17000	1200	7.5	0.3	40	4200	130	7.5	0.06
4	160	13000	1300	10	0.4	40	3200	190	10	0.08
5	160	10000	1300	12.5	0.5	40	2500	180	12.5	0.1
6	160	8500	1500	15	0.6	40	2100	180	15	0.12
8	160	6400	1500	20	0.8	40	1600	170	20	0.16
10	160	5100	1300	25	1	40	1300	170	25	0.2
12	160	4200	1300	30	1.2	40	1100	140	30	0.24
Depth of cut										



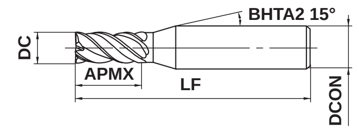
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

VQJHV - Inch sizes

End mill, Semi long cut length, 4 flute, Irregular helix flutes

38° 40° DC≤1/4 | 37.5° 40° DC>1/4

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1

Type2

DC<.5000"	DC=.5000"			
0 - .0008"	0 - .0012"			
.2500"≤DCON≤.3750"	DCON=.5000"			
0 - .00035"	0 - .00043"			

● Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(inch)

Order Number	DC	APMX	LF	DCON	No. of Flutes	Stock	Type
VQJHVD1/8	.1250	.5000	2.5	.2500	4	●	1
VQJHVD3/16	.1875	.7500	2.5	.2500	4	●	1
VQJHVD1/4	.2500	1.0000	2.5	.2500	4	●	2
VQJHVD5/16	.3125	1.0900	3.25	.3125	4	●	2
VQJHVD3/8	.3750	1.3100	3.5	.3750	4	●	2
VQJHVD1/2	.5000	1.6500	4.0	.5000	4	●	2

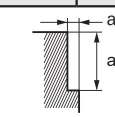
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

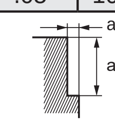
● : USA Stock

SMART MIRACLE END MILLS

RECOMMENDED CUTTING CONDITIONS

■ Shoulder milling

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1035, AISI 1050, ASTM 283				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI H13, AISI 4140, AISI P21				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.				Hardened stainless steel, Cobaly chromium alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.			
DC (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)
1/8	13000	39	.313	.013	10000	26.8	.313	.013	8000	2.1	.313	.006	7500	18.9	.313	.006
3/16	8700	39.4	.469	.019	6700	27.6	.469	.019	5300	21.7	.469	.009	5000	20.5	.469	.009
1/4	6500	47.2	.625	.025	5000	32.3	.625	.025	4000	25.2	.625	.013	3800	24	.625	.013
5/16	5200	47.2	.781	.031	4000	33.5	.781	.031	3200	25.2	.781	.016	3000	23.6	.781	.016
3/8	4300	43.3	.938	.038	3300	31.9	.938	.038	2700	23.2	.938	.019	2500	22.4	.938	.019
1/2	3300	43.3	1.25	.05	2500	29.1	1.25	.05	2000	2.9	1.25	.025	1900	20.1	1.25	.025
Depth of cut																

Work Material	Copper, Copper alloy				Heat resistant alloy Inconel718 etc.			
DC (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)	Revolution (min^{-1})	Table feed (IPM)	Depth of cut ap (inch)	Depth of cut ae (inch)
1/8	16000	48	.013	.013	4000	5.1	.313	.003
3/16	11000	51.9	.019	.019	2700	7.1	.469	.004
1/4	8000	57.9	.025	.025	2000	6.7	.625	.005
5/16	6400	59.4	.031	.031	1600	6.7	.781	.006
3/8	5300	51.7	.038	.038	1300	6.7	.938	.008
1/2	4000	50.4	.05	.05	1000	5.1	1.25	.01
Depth of cut								

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

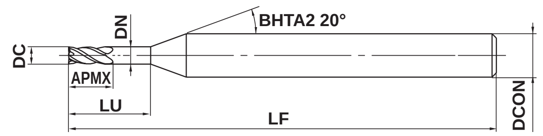
VQXL

End mill, Short cut length, 3—4 flute, Long neck

35°

DC≤0.3 DC≥0.4

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1

DC≤1				
0 - 0.010				
DCON=4				
0 - 0.005				

- The use of SMART MIRACLE Coating improves chip discharge dramatically.
- Multi-cutters at a small diameter of ϕ1 is realized.

(mm)

Order Number	DC	APMX	LU	DN	LF	DCON	No. of Flutes	Stock	Type
VQXLD0020N006	0.2	0.3	0.6	0.18	40	4	3	●	1
VQXLD0030N009	0.3	0.5	0.9	0.28	40	4	3	●	1
VQXLD0030N015	0.3	0.5	1.5	0.28	40	4	3	●	1
VQXLD0040N010	0.4	0.6	1	0.37	40	4	4	●	1
VQXLD0040N018	0.4	0.6	1.8	0.37	40	4	4	●	1
VQXLD0050N015	0.5	0.7	1.5	0.46	40	4	4	●	1
VQXLD0050N025	0.5	0.7	2.5	0.46	40	4	4	●	1
VQXLD0050N030	0.5	0.7	3	0.46	40	4	4	●	1
VQXLD0060N030	0.6	0.9	3	0.57	40	4	4	●	1
VQXLD0070N035	0.7	1	3.5	0.67	40	4	4	●	1
VQXLD0080N024	0.8	1.2	2.4	0.77	40	4	4	●	1
VQXLD0080N030	0.8	1.2	3	0.77	40	4	4	●	1
VQXLD0080N040	0.8	1.2	4	0.77	40	4	4	●	1
VQXLD0100N050	1	1.5	5	0.96	40	4	4	●	1

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

TORX Chart

Order Number	ISO 10664 TORX Type
VQXLD0020N006	T4
VQXLD0030N009	T6
VQXLD0030N015	
VQXLD0040N010	T8
VQXLD0040N018	
VQXLD0050N015	T15
VQXLD0050N025	
VQXLD0050N030	
VQXLD0080N024	T25
VQXLD0080N040	
VQXLD0100N050	T40

● : USA Stock

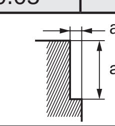
SMART MIRACLE END MILLS

RECOMMENDED CUTTING CONDITIONS

Shoulder milling

Work Material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steel, Titanium alloy Cobaly chromium alloy, Copper, Copper alloy AISI 1045, AISI 4140, AISI 4340, AISI 304, AISI 316, AISI 304LN, AISI 316LN, Ti-6Al-4V					Heat resistant alloy, Pre-hardened steel, Hardened steel Inconel718, AISI P21, AISI P20, AISI H13, AISI L6, AISI 431, AISI 420				
DC (mm)	LU (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
0.2	0.6	25	40000	360	0.03	0.01	20	32000	290	0.03	0.01
0.3	0.9	40	40000	480	0.045	0.015	20	21000	250	0.045	0.015
0.3	1.5	40	40000	360	0.045	0.015	20	21000	190	0.045	0.015
0.4	1	50	40000	800	0.06	0.02	20	16000	320	0.06	0.02
0.4	1.8	50	40000	560	0.06	0.02	20	16000	220	0.06	0.025
0.5	1.5	60	38000	910	0.075	0.025	20	13000	310	0.075	0.025
0.5	2.5	60	38000	610	0.075	0.025	20	13000	210	0.075	0.025
0.5	3	60	38000	550	0.075	0.025	20	13000	180	0.075	0.025
0.6	3	60	32000	640	0.09	0.03	20	10500	210	0.09	0.03
0.7	3.5	60	27000	650	0.11	0.035	20	9100	200	0.11	0.035
0.8	2.4	60	24000	960	0.12	0.04	20	8000	260	0.12	0.04
0.8	3	60	24000	860	0.12	0.04	20	8000	230	0.12	0.04
0.8	4	60	24000	670	0.12	0.04	20	8000	190	0.12	0.04
1	5	60	20000	800	0.15	0.05	20	6500	210	0.15	0.05

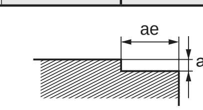
Depth of cut



Bottom face milling

Work Material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steel, Titanium alloy Cobaly chromium alloy, Copper, Copper alloy AISI 1045, AISI 4140, AISI 4340, AISI 304, AISI 316, AISI 304LN, AISI 316LN, Ti-6Al-4V					Heat resistant alloy, Pre-hardened steel, Hardened steel Inconel718, AISI P21, AISI P20, AISI H13, AISI L6, AISI 431, AISI 420				
DC (mm)	LU (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
0.2	0.6	25	40000	360	0.015	≤0.2	20	32000	290	0.015	≤0.1
0.3	0.9	40	40000	480	0.025	≤0.3	20	21000	250	0.025	≤0.15
0.3	1.5	40	40000	360	0.02	≤0.3	20	21000	190	0.02	≤0.15
0.4	1	50	40000	800	0.03	≤0.4	20	16000	320	0.03	≤0.2
0.4	1.8	50	40000	560	0.02	≤0.4	20	16000	220	0.02	≤0.2
0.5	1.5	60	38000	910	0.04	≤0.5	20	13000	310	0.04	≤0.25
0.5	2.5	60	38000	610	0.03	≤0.5	20	13000	210	0.03	≤0.25
0.5	3	60	38000	550	0.03	≤0.5	20	13000	180	0.03	≤0.25
0.6	3	60	32000	640	0.035	≤0.6	20	10500	210	0.035	≤0.3
0.7	3.5	60	27000	640	0.035	≤0.7	20	9100	190	0.035	≤0.35
0.8	2.4	60	24000	960	0.06	≤0.8	20	8000	260	0.06	≤0.4
0.8	3	60	24000	840	0.05	≤0.8	20	8000	230	0.05	≤0.4
0.8	4	60	24000	670	0.04	≤0.8	20	8000	190	0.04	≤0.4
1	5	60	20000	800	0.05	≤1	20	6500	210	0.05	≤0.5

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

VQXL

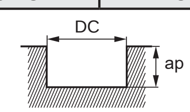
End mill, Short cut length, 3—4 flute, Long neck

RECOMMENDED CUTTING CONDITIONS

■Slotting

Work Material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steel, Titanium alloy Cobaly chromium alloy, Copper, Copper alloy AISI 1045, AISI 4140, AISI 4340, AISI 304, AISI 306, AISI 304LN, AISI 316LN, Ti-6Al-4V				Heat resistant alloy, Pre-hardened steel, Hardened steel Inconel718, AISI P21, AISI P20, AISI H13, AISI L6, AISI 431, AISI 420			
DC (mm)	**LU** (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min-1)	Table feed (mm/min)	Depth of cut ap (mm)
0.2	0.6	20	30000	270	0.03	15	24000	220	0.03
0.3	0.9	30	30000	360	0.045	14	15000	180	0.045
0.3	1.5	30	30000	270	0.045	14	15000	140	0.045
0.4	1	40	30000	600	0.06	15	12000	240	0.06
0.4	1.8	40	30000	420	0.06	15	12000	170	0.06
0.5	1.5	45	28000	670	0.075	15	9500	230	0.075
0.5	2.5	45	28000	450	0.075	15	9500	150	0.075
0.5	3	45	28000	390	0.075	15	9500	130	0.075
0.6	3	45	24000	480	0.09	15	7800	160	0.09
0.7	3.5	45	20000	480	0.11	15	6800	140	0.11
0.8	2.4	45	18000	720	0.12	15	6000	190	0.12
0.8	3	45	18000	650	0.12	15	6000	170	0.12
0.8	4	45	18000	500	0.12	15	6000	140	0.12
1	5	45	15000	600	0.15	15	4800	150	0.15

Depth of cut



DC : Dia.

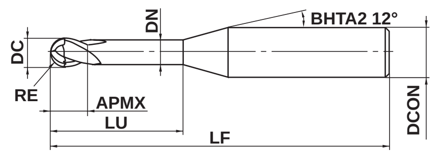
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) When the depth of cut is smaller than shown the feed rate can be increased.

Memo

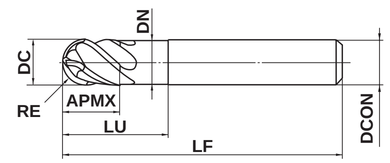
VQ4SVB

Ball nose, Medium cutting length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

1≤RE≤6				
±0.01				
DC≤12				
0 / -0.02				
DCON=6	8≤DCON≤10	DCON=12		
0 / -0.008	0 / -0.009	0 / -0.011		

- 4 flute ball nose end mill
- With the special substrate, suitable for finishing of heat resistance alloy, etc.

(mm)

Order Number	RE	DC	APMX	LU	DN	LF	DCON	No. of Flutes	Stock	Type
VQ4SVBR0100	1	2	3	5	1.9	50	6	4	●	1
VQ4SVBR0150	1.5	3	4.5	7.5	2.9	50	6	4	●	1
VQ4SVBR0200	2	4	6	10	3.9	50	6	4	●	1
VQ4SVBR0250	2.5	5	7.5	12.5	4.9	50	6	4	●	1
VQ4SVBR0300	3	6	9	15	5.85	50	6	4	●	2
VQ4SVBR0400	4	8	12	20	7.85	60	8	4	●	2
VQ4SVBR0500	5	10	15	25	9.7	70	10	4	●	2
VQ4SVBR0600	6	12	18	30	11.7	75	12	4	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

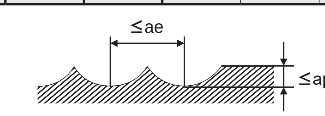
● : USA Stock

RECOMMENDED CUTTING CONDITIONS

■ Shoulder milling (slotting)

Work Material	Carbon steel, Alloy steel, Mild steel, Pre-hardened steel AISI 1045, AISI 4140, ASTM A36, AISI 1010, AISI P21, AISI P20, AISI 4340								Austenitic stainless steel, Titanium alloy, Hardened stainless steel, Cobaly chromium alloy, Ferritic and Martensitic stainless steel AISI 304, AISI 316, Ti-6Al-4V, AISI 630, AISI 631, 15-5PH, 17-4PH, AISI 431, AISI 420							
RE (mm)	α≤15°			α>15°			Depth of cut ap (mm)	Depth of cut ae (mm)	α≤15°			α>15°			Depth of cut ap (mm)	Depth of cut ae (mm)
	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)			Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)		
R 1	250	40000	8000	200	32000	3800	0.17	0.5	230	36000	6500	150	24000	2900	0.17	0.5
R 1.5	300	32000	7700	200	21000	3200	0.25	0.75	230	24000	4800	150	16000	1900	0.25	0.75
R 2	300	24000	5800	200	16000	2800	0.33	1	230	18000	4000	150	12000	1700	0.33	1
R 2.5	300	19000	5300	200	12700	2600	0.42	1.25	230	14400	3500	150	9600	1500	0.42	1.25
R 3	300	16000	4800	200	10600	2100	0.5	1.5	230	12000	3200	150	8000	1400	0.5	1.5
R 4	300	12000	4300	200	8000	1900	0.8	2	230	9000	3200	150	6000	1400	0.8	2
R 5	300	9600	4100	200	6400	1800	1	2.5	230	7200	3000	150	4800	1300	1	2.5
R 6	300	8000	4000	200	5300	1800	1.2	3	230	6000	3000	150	4000	1300	1.2	3

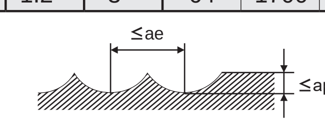
Depth of cut



RE : Radius

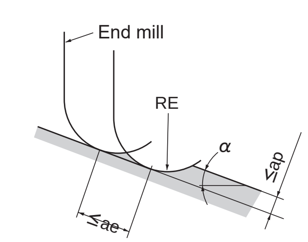
Work Material	Copper, Copper alloy								Heat resistant alloy Inconel etc.							
RE (mm)	α≤15°			α>15°			Depth of cut ap (mm)	Depth of cut ae (mm)	α≤15°			α>15°			Depth of cut ap (mm)	Depth of cut ae (mm)
	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)			Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)		
R 1	250	40000	8000	240	38000	4500	0.17	0.5	60	9600	960	40	6400	510	0.08	0.2
R 1.5	360	38000	9100	240	25000	3800	0.25	0.7	60	6400	640	40	4200	340	0.13	0.3
R 2	360	29000	7000	240	19000	3300	0.33	1	60	4800	580	40	3200	260	0.17	0.4
R 2.5	360	23000	6400	240	15000	3100	0.42	1.2	60	3800	530	39	2500	250	0.21	0.5
R 3	360	19000	5700	240	13000	2600	0.5	1.5	60	3200	500	40	2100	210	0.25	0.6
R 4	360	14000	5000	240	9600	2300	0.8	2	60	2400	430	40	1600	190	0.4	0.8
R 5	360	12000	5100	240	7700	2200	1	2.5	63	2000	420	41	1300	180	0.5	1
R 6	360	9600	4800	240	6400	2200	1.2	3	64	1700	350	41	1100	150	0.6	1.2

Depth of cut



RE : Radius

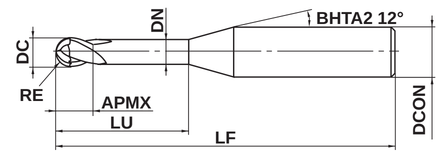
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.
Note 5) α is the inclination angle of the machined surface.



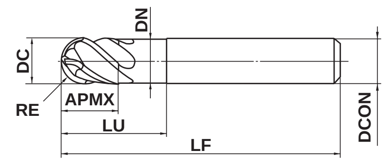
VQ4SVB - Inch sizes

Ball nose, Medium cutting length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

.0625"≤RE≤.2500"				
±.0004"				
DC<.5000"	DC=.5000"			
0 / - .0008"	0 / - .0012"			
.250"≤DCON≤.375"	DCON=.500"			
0 / - .00035"	0 / - .00043"			

● 4 flute ball nose end mill
● With the special substrate, suitable for finishing of heat resistance alloy, etc.

(inch)

Order Number	RE	DC	APMX	LU	DN	LF	DCON	No. of Flutes	Stock	Type
VQ4SVBD1/8	.0625	.1250	.188	.3126	.1213	2.0	.2500	4	●	1
VQ4SVBD3/16	.0938	.1875	.281	.4689	.1835	2.0	.2500	4	●	1
VQ4SVBD1/4	.1250	.2500	.375	.6252	.2441	2.0	.2500	4	●	2
VQ4SVBD5/16	.1563	.3125	.469	.7811	.3067	2.5	.3125	4	●	2
VQ4SVBD3/8	.1875	.3750	.563	.9374	.3693	2.75	.3750	4	●	2
VQ4SVBD1/2	.2500	.5000	.750	1.2500	.4882	3.0	.5000	4	●	2

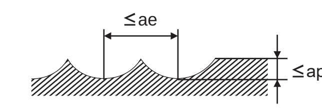
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

RECOMMENDED CUTTING CONDITIONS

■Shoulder milling (Slotting)

Work Material	Carbon steel, Alloy steel, Mild Steel, Pre-hardened steel AISI 1010, AISI 1035, AISI 1050, ASTM 283, AISI H13, AISI 4140, AISI P21						Austenitic steinless steel, Titanium alloy, Hardened stainless steel, Cobaly chomium alloy, Ferritic and Martensitic stainless steel AISI 304, AISI 316, AISI S17400, AISI S17700, AISI 430, AISI 420					
RE (inch)	α≤15°		α>15°		Depth of cut ap (inch)	Depth of cut ae (inch)	α≤15°		α>15°		Depth of cut ap (inch)	Depth of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
.0625	30000	283.5	20000	118.1	.0098	.0313	22500	189.0	15000	74.8	.0098	.0313
.0938	20000	220.5	13400	102.4	.0165	.0469	15000	137.8	10000	59.1	.0165	.0469
.1250	15000	177.2	10000	82.7	.0197	.0626	11200	126.0	7500	55.1	.0197	.0626
.1563	12000	169.3	8000	74.8	.0315	.0781	9000	126.0	6000	55.1	.0315	.0781
.1875	10000	161.4	6700	70.9	.0394	.0937	7500	118.1	5000	51.2	.0394	.0937
.2500	7600	149.6	5000	70.9	.0472	.125	5600	118.1	3800	51.2	.0472	.125

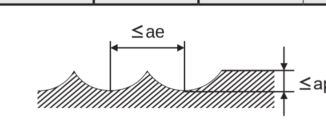
Depth of cut



RE : Radius

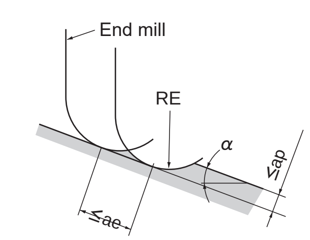
Work Material	Copper, Copper alloy						Heat resistant alloy Inconel718 etc.					
RE (inch)	α≤15°		α>15°		Depth of cut ap (inch)	Depth of cut ae (inch)	α≤15°		α>15°		Depth of cut ap (inch)	Depth of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
.0625	36000	338.6	24000	141.7	.0098	.0313	6000	25.2	4000	13.4	.0051	.0313
.0938	24000	263.8	16000	122.0	.0165	.0469	4000	20.9	2700	9.8	.0083	.0469
.1250	18000	212.6	12000	98.4	.0197	.0626	3000	19.7	2000	8.3	.0098	.0626
.1563	14000	196.9	9600	90.6	.0315	.0781	2400	16.9	1600	7.5	.0157	.0781
.1875	12000	192.9	8000	82.7	.0394	.0937	2000	16.5	1300	7.1	.0197	.0937
.2500	9100	181.1	6000	86.6	.0472	.125	1500	13.8	1000	5.9	.0236	.0125

Depth of cut



RE : Radius

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) When cutting austenitic stainless steel, the use of water-soluble cutting fluid is especially effective.
Note 3) If the depth of cut is smaller than this table, feed rate can be increased.
Note 4) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is very low, then vibration can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.
Note 5) α is the inclination of the machined surface.

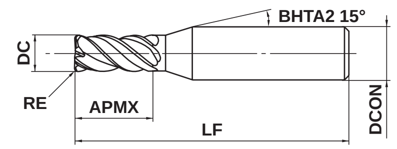


VQMHVRB

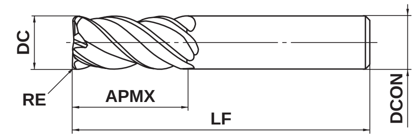
Corner radius, Medium cutting length, 4 flute, Irregular helix flutes

37°
40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

0.2≤RE≤6.35				
±0.015				
DC≤12	DC>12			
0 / - 0.02	0 / - 0.03			
4≤DCON≤6	8≤DCON≤10	12≤DCON≤16	DCON=20	
0 / - 0.008	0 / - 0.009	0 / - 0.011	0 / - 0.013	

- Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(mm)

Order Number	DC	RE	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHVRBD0200R020	2	0.2	4	45	4	4	●	1
VQMHVRBD0200R030	2	0.3	4	45	4	4	●	1
VQMHVRBD0300R020	3	0.2	8	45	6	4	●	1
VQMHVRBD0300R030	3	0.3	8	45	6	4	●	1
VQMHVRBD0300R050	3	0.5	8	45	6	4	●	1
VQMHVRBD0400R020	4	0.2	11	45	6	4	●	1
VQMHVRBD0400R030	4	0.3	11	45	6	4	●	1
VQMHVRBD0400R050	4	0.5	11	45	6	4	●	1
VQMHVRBD0500R020	5	0.2	13	50	6	4	●	1
VQMHVRBD0500R030	5	0.3	13	50	6	4	●	1
VQMHVRBD0500R050	5	0.5	13	50	6	4	●	1
VQMHVRBD0500R100	5	1	13	50	6	4	●	1
VQMHVRBD0600R030	6	0.3	13	50	6	4	●	2
VQMHVRBD0600R050	6	0.5	13	50	6	4	●	2
VQMHVRBD0600R100	6	1	13	50	6	4	●	2
VQMHVRBD0800R030	8	0.3	19	60	8	4	●	2
VQMHVRBD0800R050	8	0.5	19	60	8	4	●	2
VQMHVRBD0800R100	8	1	19	60	8	4	●	2
VQMHVRBD0800R150	8	1.5	19	60	8	4	●	2
VQMHVRBD1000R030	10	0.3	22	70	10	4	●	2
VQMHVRBD1000R050	10	0.5	22	70	10	4	●	2
VQMHVRBD1000R100	10	1	22	70	10	4	●	2
VQMHVRBD1000R150	10	1.5	22	70	10	4	●	2
VQMHVRBD1000R200	10	2	22	70	10	4	●	2
VQMHVRBD1200R050	12	0.5	26	75	12	4	●	2
VQMHVRBD1200R100	12	1	26	75	12	4	●	2
VQMHVRBD1200R150	12	1.5	26	75	12	4	●	2
VQMHVRBD1200R200	12	2	26	75	12	4	●	2
VQMHVRBD1200R250	12	2.5	26	75	12	4	●	2
VQMHVRBD1200R300	12	3	26	75	12	4	●	2

Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

● : USA Stock ★ : Stocked in Japan

SMART MIRACLE END MILLS

RECOMMENDED CUTTING CONDITIONS

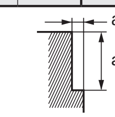
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel / AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel / AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy / AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy / AISI 630, AISI 631 15-5PH,17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)
2	150	24000	2400	3	0.6	120	19000	1100	3	0.6	100	16000	830	3	0.6	75	12000	720	3	0.4
3	150	16000	2600	4.5	0.9	120	13000	1200	4.5	0.9	100	11000	880	4.5	0.9	75	8000	770	4.5	0.6
4	150	12000	2600	6	1.2	120	9500	1300	6	1.2	100	8000	900	6	1.2	75	6000	790	6	0.8
5	150	9500	2600	7.5	1.5	120	7600	1300	7.5	1.5	100	6400	900	7.5	1.5	75	4800	810	7.5	1
6	150	8000	2600	9	1.8	120	6400	1300	9	1.8	100	5300	1100	9	1.8	75	4000	810	9	1.2
8	150	6000	2500	12	2.4	120	4800	1300	12	2.4	100	4000	1200	12	2.4	75	3000	840	12	1.6
10	150	4800	2300	15	3	120	3800	1200	15	3	100	3200	1300	15	3	75	2400	770	15	2
12	150	4000	1900	18	3.6	120	3200	1200	18	3.6	100	2700	1200	18	3.6	75	2000	720	18	2.4

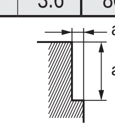
Depth of cut



General purpose cutting conditions

Work Material	Carbon steel, Alloy steel, Mild steel / AISI 1045, AISI 4140, ASTM A36, AISI 1010					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel / AISI P21, AISI P20, AISI 4340, SKD, SKT					Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy / AISI 304, AISI 316, Ti-6Al-4V					Hardened stainless steel, Cobaly chromium alloy / AISI 630, AISI 631 15-5PH,17-4PH				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)
2	120	19000	1300	3	0.6	100	16000	630	3	0.6	80	13000	450	1.5	0.2	70	11000	440	3	0.4
3	120	13000	1400	4.5	0.9	100	11000	700	4.5	0.9	80	8500	450	2.2	0.3	70	7400	470	4.5	0.6
4	120	9500	1400	6	1.2	100	8000	700	6	1.2	80	6400	470	3	0.6	70	5600	490	6	0.8
5	120	7600	1400	7.5	1.5	100	6400	710	7.5	1.5	80	5100	470	4.5	0.9	70	4500	500	7.5	1
6	120	6400	1400	9	1.8	100	5300	710	9	1.8	80	4200	580	6	1.2	70	3700	500	9	1.2
8	120	4800	1300	12	2.4	100	4000	740	12	2.4	80	3200	630	7.5	1.5	70	2800	520	12	1.6
10	120	3800	1200	15	3	100	3200	680	15	3	80	2500	660	9	1.8	70	2200	460	15	2
12	120	3200	1000	18	3.6	100	2700	640	18	3.6	80	2100	610	12	2.4	70	1900	450	18	2.4

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

VQMHVRB

Corner radius, Medium cutting length, 4 flute, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

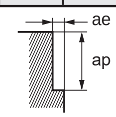
■Shoulder milling

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)
2	180	29000	2900	3	0.6	40	6400	230	3	0.2
3	180	19000	3000	4.5	0.9	40	4200	240	4.5	0.3
4	180	14000	3000	6	1.2	40	3200	240	6	0.4
5	180	11000	3000	7.5	1.5	40	2500	240	7.5	0.5
6	180	9500	3000	9	1.8	40	2100	250	9	0.6
8	180	7200	3000	12	2.4	40	1600	260	12	0.8
10	180	5700	2700	15	3	40	1300	290	15	1
12	180	4800	2300	18	3.6	40	1100	280	18	1.2

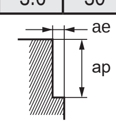
Depth of cut



General-purpose conditions

Work Material	Copper, Copper alloy					Heat resistant alloy Inconel718				
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Width of cut ae (mm)
2	140	22000	1500	3	0.6	30	4800	110	3	0.2
3	140	15000	1600	4.5	0.9	30	3200	120	4.5	0.3
4	140	11000	1600	6	1.2	30	2400	120	6	0.4
5	140	8900	1600	7.5	1.5	30	1900	120	7.5	0.5
6	140	7400	1600	9	1.8	30	1600	130	9	0.6
8	140	5600	1600	12	2.4	30	1200	130	12	0.8
10	140	4500	1400	15	3	30	950	140	15	1
12	140	3700	1200	18	3.6	30	800	140	18	1.2

Depth of cut



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

RECOMMENDED CUTTING CONDITIONS

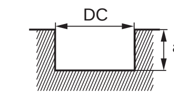
■Slotting

When machine rigidity, work material rigidity and chip discharge are enough, please select the high efficiency cutting conditions.
When either machine rigidity, work material rigidity or chip discharge are not enough, please select the general-purpose cutting conditions.

High efficiency conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V				Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				Copper, Copper alloy				Heat resistant alloy Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
2	150	24000	1200	2	120	19000	610	2	100	16000	640	2	60	9500	300	1	180	29000	1500	2	30	4800	130	0.6
3	150	16000	1500	3	120	13000	730	3	100	11000	660	3	60	6400	360	1.5	180	19000	1700	3	30	3200	150	0.9
4	150	12000	1900	4	120	9500	910	4	100	8000	700	4	60	4800	460	2	180	14000	2200	4	30	2400	170	1.2
5	150	9500	1900	5	120	7600	910	5	100	6400	720	5	60	3800	460	2.5	180	11000	2200	5	30	1900	170	1.5
6	150	8000	1900	6	120	6400	1000	6	100	5300	740	6	60	3200	510	3	180	9500	2300	6	30	1600	180	1.8
8	150	6000	1700	8	120	4800	960	8	100	4000	800	8	60	2400	480	4	180	7200	2000	8	30	1200	190	2.4
10	150	4800	1500	10	120	3800	840	10	100	3200	900	10	60	1900	420	5	180	5700	1800	10	30	950	210	3
12	150	4000	1300	12	120	3200	770	12	100	2700	860	12	60	1600	380	6	180	4800	1500	12	30	800	200	3.6

Depth of cut

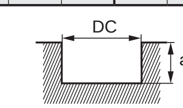


DC : Dia.

General-purpose conditions

Work Material	Carbon steel, Alloy steel, Mild steel AISI 1045, AISI 4140, ASTM A36, AISI 1010				Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel AISI P21, AISI P20, AISI 4340, SKD, SKT				Austenitic, Ferritic and Martensitic stainless steel, Titanium alloy AISI 304, AISI 316, Ti-6Al-4V				Hardened stainless steel, Cobaly chromium alloy AISI 630, AISI 631 15-5PH, 17-4PH				Copper, Copper alloy				Heat resistant alloy Inconel718			
DC (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
2	100	16000	550	2	80	13000	270	2	60	9500	250	2	50	8000	170	1	120	19000	650	2	25	4000	74	0.6
3	100	11000	670	3	80	8500	310	3	60	6400	250	3	50	5300	200	1.5	120	13000	790	3	25	2700	86	0.9
4	100	8000	840	4	80	6400	410	4	60	4800	280	4	50	4000	250	2	120	9500	1000	4	25	2000	93	1.2
5	100	6400	840	5	80	5100	410	5	60	3800	280	5	50	3200	250	2.5	120	7600	1000	5	25	1600	95	1.5
6	100	5300	840	6	80	4200	440	6	60	3200	300	6	50	2700	290	3	120	6400	1000	6	25	1300	96	1.8
8	100	4000	740	8	80	3200	420	8	60	2400	320	8	50	2000	260	4	120	4800	890	8	25	990	100	2.4
10	100	3200	680	10	80	2500	360	10	60	1900	350	10	50	1600	230	5	120	3800	800	10	25	800	120	3
12	100	2700	570	12	80	2100	330	12	60	1600	340	12	50	1300	210	6	120	3200	680	12	25	660	110	3.6

Depth of cut



DC : Dia.

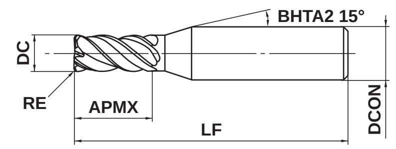
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy etc. can be achieved with the use of emulsion.
Note 3) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 4) When the depth of cut is smaller than shown the feed rate can be increased.

VQMHVRB - Inch sizes

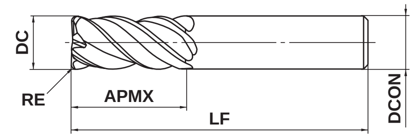
Corner radius, Medium cutting length, 4 flute, Irregular helix flutes

37°
40°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

.0080"≤RE≤.1200"	
±.0006"	
DC<.5000"	DC=.5000"
0 - .0008"	0 - .0012"
.2500"≤DCON≤.3750"	DCON=.5000"
0 - .00035"	0 - .00043"

h6

● Smart Miracle vibration control end mill achieving stable machining of difficult-to-cut materials and for long overhang applications.

(inch)

Order Number	DC	RE	APMX	LF	DCON	No. of Flutes	Stock	Type
VQMHVRBD1/8R008	.1250	.0080	.3130	2.0	.2500	4	●	1
VQMHVRBD1/8R010	.1250	.0100	.3130	2.0	.2500	4	●	1
VQMHVRBD3/16R010	.1875	.0100	.4375	2.0	.2500	4	●	1
VQMHVRBD3/16R015	.1875	.0150	.4375	2.0	.2500	4	●	1
VQMHVRBD3/16R020	.1875	.0200	.4375	2.0	.2500	4	●	1
VQMHVRBD3/16R030	.1875	.0300	.4375	2.0	.2500	4	●	1
VQMHVRBD1/4R008	.2500	.0080	.6250	2.5	.2500	4	●	2
VQMHVRBD1/4R010	.2500	.0100	.6250	2.5	.2500	4	●	2
VQMHVRBD1/4R015	.2500	.0150	.6250	2.5	.2500	4	●	2
VQMHVRBD1/4R020	.2500	.0200	.6250	2.5	.2500	4	●	2
VQMHVRBD1/4R030	.2500	.0300	.6250	2.5	.2500	4	●	2
VQMHVRBD5/16R010	.3125	.0100	.7500	2.75	.3125	4	●	2
VQMHVRBD5/16R015	.3125	.0150	.7500	2.75	.3125	4	●	2
VQMHVRBD5/16R020	.3125	.0200	.7500	2.75	.3125	4	●	2
VQMHVRBD5/16R030	.3125	.0300	.7500	2.75	.3125	4	●	2
VQMHVRBD5/16R060	.3125	.0600	.7500	2.75	.3125	4	●	2
VQMHVRBD3/8R010	.3750	.0100	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R015	.3750	.0150	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R020	.3750	.0200	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R030	.3750	.0300	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R040	.3750	.0400	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R060	.3750	.0600	.8750	3.0	.3750	4	●	2
VQMHVRBD3/8R090	.3750	.0900	.8750	3.0	.3750	4	●	2
VQMHVRBD1/2R010	.5000	.0100	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R015	.5000	.0150	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R020	.5000	.0200	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R030	.5000	.0300	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R060	.5000	.0600	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R090	.5000	.0900	1.1250	3.5	.5000	4	●	2
VQMHVRBD1/2R120	.5000	.1200	1.1250	3.5	.5000	4	●	2

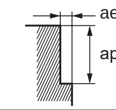
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.

● : USA Stock

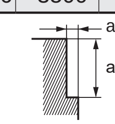
RECOMMENDED CUTTING CONDITIONS

Shoulder milling

Work Material	Carbon steel (–30HRC) AISI 1035, AISI 1050, ASTM 283						Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21						Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
1/8	15000	102.0	12000	55.1	.19	.038	12000	49.1	10000	27.2	.19	.038	10000	34.6	8000	18.1	.19	.038
3/16	10000	99.2	8000	51.2	.28	.056	8000	50.4	6700	28.0	.28	.056	6700	35.3	5300	18.5	.28	.056
1/4	7500	99.2	6000	51.2	.38	.075	6000	52.0	5000	28.7	.38	.075	5000	47.2	4000	24.8	.38	.075
5/16	6000	99.2	4800	51.2	.47	.094	4800	52.9	4000	29.1	.47	.094	4000	47.2	3200	24.8	.47	.094
3/8	5000	90.6	4000	47.2	.56	.11	4000	49.1	3300	26.8	.56	.11	3300	49.4	2700	26.8	.56	.11
1/2	3800	74.8	3000	39.0	.75	.15	3000	43.5	2500	24.0	.75	.15	2500	43.3	2000	22.8	.75	.15
Depth of cut																		



Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.						Copper, Copper alloy						Heat resistant alloy Inconel718 etc.					
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	Width of cut ae (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)			Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		
1/8	7500	30.7	7000	18.9	.19	.025	18000	122.0	14000	63.0	.19	.038	4000	9.5	3000	4.7	.19	.013
3/16	5000	31.5	4700	19.7	.28	.038	12000	119.0	9400	63.0	.28	.056	2700	9.8	2000	4.7	.28	.019
1/4	3800	32.9	3500	20.1	.38	.050	9000	119.0	7000	63.0	.38	.075	2000	10.1	1500	5.1	.38	.025
5/16	3000	33.1	2800	20.5	.47	.063	7200	119.0	5600	63.0	.47	.094	1600	10.1	1200	5.1	.47	.031
3/8	2500	30.7	2300	18.5	.56	.075	6000	109.0	4700	55.1	.56	.11	1300	10.6	1000	5.5	.56	.038
1/2	1900	27.5	1800	17.3	.75	.10	4500	88.6	3500	47.2	.75	.15	1000	10.1	750	5.1	.75	.050
Depth of cut																		



Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

VQMHVRB - Inch sizes

Corner radius, Medium cutting length, 4 flute, Irregular helix flutes

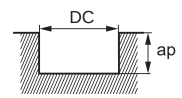
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

RECOMMENDED CUTTING CONDITIONS

■Slotting

Work Material	Carbon steel (−30HRC) AISI 1035, AISI 1050, ASTM 283					Alloy steel, Pre-hardened steel AISI H13, AISI 4140, AISI P21					Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, AISI 316L, Ti-6Al-4V etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)	
1/8	15000	59.1	10000	26.0	.13	12000	30.2	8000	13.4	.13	10000	26.8	6000	10.6	.13
3/16	10000	75.6	6700	33.5	.19	8000	35.9	5300	15.7	.19	6700	28.5	4000	11.4	.19
1/4	7500	74.4	5000	32.7	.25	6000	39.7	4000	17.3	.25	5000	29.1	3000	11.4	.25
5/16	6000	66.1	4000	29.1	.31	4800	37.8	3200	16.5	.31	4000	31.5	2400	12.6	.31
3/8	5000	61.4	3300	26.8	.38	4000	34.0	2700	15.0	.38	3300	33.8	2000	13.4	.38
1/2	3800	47.9	2500	20.9	.50	3000	29.8	2000	13.0	.50	2500	31.5	1500	12.6	.50

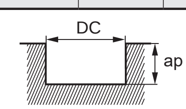
Depth of cut



DC : Dia.

Work Material	Precipitation hardening martensitic stainless steel, Co-Cr-Mo alloy ASTM S 17400, ASTM S 17700, 17-4PH, 15-5PH etc.					Copper, Copper alloy					Heat resistant alloy Inconel718 etc.				
DC (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)	High speed cutting		General purpose cutting		Depth of cut ap (inch)
	Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)		Revolution (min^{-1})	Table feed (IPM)	Revolution (min^{-1})	Table feed (IPM)	
1/8	6000	15.1	5000	8.3	.063	18000	70.9	12000	31.1	.13	3000	6.14	2500	3.4	.038
3/16	4000	18.3	3300	9.8	.094	12000	90.7	8000	39.4	.19	2000	6.80	1700	3.8	.056
1/4	3000	19.8	2500	11.0	.13	9000	89.3	6000	39.4	.25	1500	7.09	1300	3.9	.075
5/16	2400	18.9	2000	10.2	.16	7200	79.4	4800	35.0	.31	1200	7.56	1000	4.3	.094
3/8	2000	17.0	1700	9.4	.19	6000	73.7	4000	32.3	.38	1000	8.19	840	4.7	.11
1/2	1500	14.9	1300	8.7	.25	4500	56.7	3000	24.8	.50	750	7.56	630	4.3	.15

Depth of cut



DC : Dia.

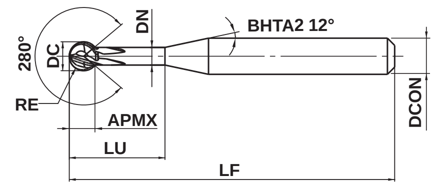
Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
Note 2) Effective cutting of stainless steel, titanium alloy and heat-resistant alloy can be achieved with the use of water-soluble cutting fluid.
Note 3) Higher feeds and speeds can be used for smaller depth of cut.
Note 4) Vibration can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.

Memo

VQ4WB NEW

Lollipop, Short cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



0.5≤RE≤3				
±0.01				
4≤DCON≤6				
0 - 0.008				

- Multi-function ball end mill with a lollipop shape for 5-axis machining.
- Optimal for back deburring, undercutting, and inner curved surface machining.

(mm)

Order Number	RE	DC	APMX	LU	DN	LF	DCON	* No.F	Stock
VQ4WBR0050N06E280	0.5	1.0	0.88	6	0.61	50	4	4	●
VQ4WBR0065N08E280	0.65	1.3	1.14	8	0.80	50	4	4	●
VQ4WBR0090N06E280	0.9	1.8	1.58	6	1.11	50	4	4	●
VQ4WBR0100N06E280	1.0	2.0	1.76	6	1.24	60	6	4	●
VQ4WBR0140N16E280	1.4	2.8	2.47	16	1.74	60	6	4	●
VQ4WBR0150N08E280	1.5	3.0	2.64	8	1.87	60	6	4	●
VQ4WBR0190N12E280	1.9	3.8	3.35	12	2.37	60	6	4	●
VQ4WBR0200N12E280	2.0	4.0	3.53	12	2.50	60	6	4	●
VQ4WBR0240N16E280	2.4	4.8	4.23	16	3.00	70	6	4	●
VQ4WBR0250N12E280	2.5	5.0	4.41	12	3.13	80	6	4	●
VQ4WBR0300N12E280	3.0	6.0	5.29	12	3.76	80	6	4	●

Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.

* Number of Flutes

<Order for Special Product>

For special products other than the above tool specifications, please contact our sales department.

DC = Dia.		**DN** = Neck Dia.	
RE = Radius		**LF** = Overall Length	
APMX = Length of Cut		**DCON** = Shank Dia.	
LU = Neck Length			

● : USA Stock

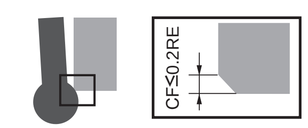
RECOMMENDED CUTTING CONDITIONS

■ Chamfering (Debarring)

(inch)

Workpiece Material				Milld Steels, Carbon Steels, Copper Alloys, Pre-hardened Steels AISI 1045, 4140, 1010, P20, P21, 4340, ASTM A36 etc.			Austentic, Ferritic and Martensitic Stainless Steels, Precipitation Hardening Stainless Steels, Cobalt Chrome Alloys, Titanium Alloys AISI 304, 316, 630, 631, 431, 420, Ti-6Al-4V, 15-5PH, 17-4PH etc.		
DC		RE		Revolution n (min^{-1})	Feed Rate vf (IPM)	Depth of Cut Max.CF	Revolution n (min^{-1})	Feed Rate vf (IPM)	Depth of Cut Max.CF
mm	inch	mm	inch						
1.0	.039	0.5	.020	19000	11.8	.004	14000	8.7	.004
1.3	.051	0.65	.026	15000	16.5	.005	11000	12.2	.005
1.8	.071	0.9	.035	11000	22.4	.007	8000	16.5	.007
2.0	.079	1.0	.039	9500	24.0	.008	7200	18.1	.008
2.8	.110	1.4	.055	6800	29.9	.011	5100	22.4	.011
3.0	.118	1.5	.059	6400	30.3	.012	4800	22.8	.012
3.8	.150	1.9	.075	5000	33.1	.015	3800	25.2	.015
4.0	.157	2.0	.079	4800	34.6	.016	3600	26.0	.016
4.8	.189	2.4	.094	4000	37.8	.019	3000	28.3	.019
5.0	.197	2.5	.098	3800	38.2	.020	2900	29.1	.020
6.0	.236	3.0	.118	3200	39.4	.024	2400	30.3	.024

Depth of Cut



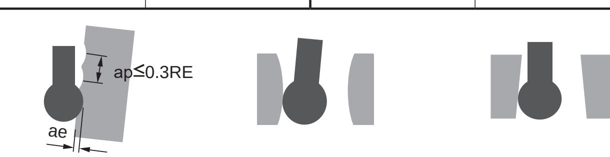
RE : Radius

■ Internal Profile / Undercut

(inch)

Workpiece Material				Milld Steels, Carbon Steels, Copper Alloys, Pre-hardened Steels AISI 1045, 4140, 1010, P20, P21, 4340, ASTM A36 etc.			Austentic, Ferritic and Martensitic Stainless Steels, Precipitation Hardening Stainless Steels, Cobalt Chrome Alloys, Titanium Alloys AISI 304, 316, 630, 631, 431, 420, Ti-6Al-4V, 15-5PH, 17-4PH etc.		
DC		RE		Revolution n (min^{-1})	Feed Rate vf (IPM)	Depth of Cut ae	Revolution n (min^{-1})	Feed Rate vf (IPM)	Depth of Cut ae
mm	inch	mm	inch						
2.0	.079	1.0	.039	9500	18.1	.001	7200	11.4	.001
3.0	.118	1.5	.059	6400	22.0	.004	4800	13.8	.004
4.0	.157	2.0	.079	4800	25.6	.006	3600	15.4	.006
5.0	.197	2.5	.098	3800	28.7	.007	2900	17.3	.007
6.0	.236	3.0	.118	3200	30.3	.009	2400	18.1	.009

Depth of Cut



RE : Radius

Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work. When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
Note 4) For sizes RE 0.5, 0.65, 0.9, 1.4, 1.9 and RE 2.4 which have long neck lengths, internal profile milling and round shape slotting are not recommended.

VQ4WB

Lollipop, Short cut length, 4 flute

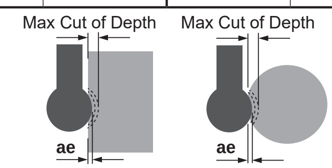
RECOMMENDED CUTTING CONDITIONS

■ Radiused Shape Slotting

(inch)

Workpiece Material				Milld Steels, Carbon Steels, Copper Alloys, Pre-hardened Steels AISI 1045, 4140, 1010, P20, P21, 4340, ASTM A36 etc.				Austentic, Ferritic and Martensitic Stainless Steels, Precipitation Hardening Stainless Steels, Cobalt Chrome Alloys, Titanium Alloys AISI 304, 316, 630, 631, 431, 420, Ti-6Al-4V, 15-5PH, 17-4PH etc.			
DC		RE		Revolution	Feed Rate	Depth of Cut		Revolution	Feed Rate	Depth of Cut	
mm	inch	mm	inch	n (min-1)	vf (IPM)	ae	Max. ae	n (min-1)	vf (IPM)	ae	Max. ae
2.0	.079	1.0	.039	9500	11.8	.001	.002	7200	5.5	.001	.002
3.0	.118	1.5	.059	6400	15.0	.004	.008	4800	7.5	.004	.008
4.0	.157	2.0	.079	4800	17.3	.006	.011	3600	9.1	.006	.011
5.0	.197	2.5	.098	3800	19.3	.007	.021	2900	10.2	.007	.021
6.0	.236	3.0	.118	3200	20.1	.009	.035	2400	10.6	.009	.035

Depth of Cut



RE : Radius

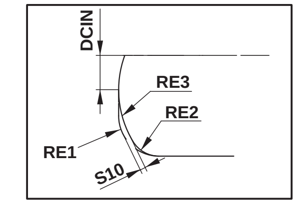
Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work. When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
Note 3) If the rigidity of the machine or the workpiece material installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
Note 4) For sizes RE 0.5, 0.65, 0.9, 1.4, 1.9 and RE 2.4 which have long neck lengths, internal profile milling and round shape slotting are not recommended.
Note 5) Though max ae means stably machinable cutting condition, maximum depth of calculated by effective cutting edge angle is 0.3 times RE. (In that case please reduce the revolution and feed rate than this table.)

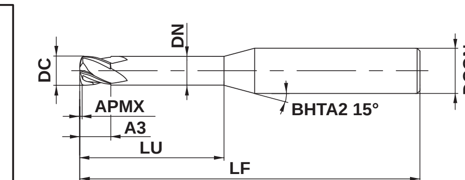
VQFDRB

Duplex corner radius end mill for high speed cutting

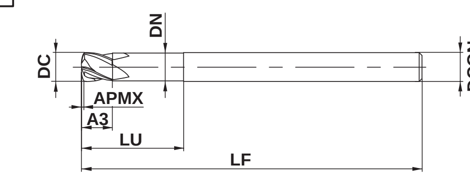
UWC VQ 30°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Precipitation Hardening Stainless Steel	Austenitic Stainless Steel	Cobalt Chrome Alloy, Heat Resistant Alloy	Titanium Alloy	Aluminum Alloy
					◎	○	





Type 1



Type 2

1≤DC≤4				
0 - 0.020				
DCON=6				
h5 0 - 0.005				

- Duplex corner radius type allows more efficient high feed.
- High feed cutting realized through use of multiple cuts.

(mm)

Order Number	DC	RE1 *1	APMX	A3 *3	LU	DN	LF	DCON	No. F *4	Multi-task radius part S10	DCIN	RE2	RE3	RMPX *2	Stock	Type
VQFDRBD0300N080	3	0.64	0.18	3	8	2.8	50	6	4	0.08	0.75	0.5	2	2.1°	●	1
VQFDRBD0300N120	3	0.64	0.18	3	12	2.8	55	6	4	0.08	0.75	0.5	2	2.1°	●	1
VQFDRBD0400N120	4	0.71	0.25	4	12	3.8	55	6	4	0.13	1.0	0.5	3	1.9°	●	1
VQFDRBD0400N160	4	0.71	0.25	4	16	3.8	60	6	4	0.13	1.0	0.5	3	1.9°	●	1
VQFDRBD0600N180	6	0.92	0.36	6	18	5.6	60	6	4	0.21	1.5	0.6	5	1.7°	●	2

*1 RE1 : Approx. R
*2 RMPX : Max. Ramping Angle
*3 A3 : Cutting Edge Effective Length
*4 Number of Flutes

DC = Dia.
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

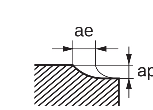
● **: USA Stock**

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material		Titanium Alloys Ti-6Al-4V ELI, ASTM F136, etc.					Cobalt Chromium Alloys ASTM F75:Casting, F1537:Wrought Bar, F799:Forgings, etc.				
DC		Revolution	Cutting Speed	Feed Rate	Depth of cut	Width of cut	Revolution	Cutting Speed	Feed Rate	Depth of cut	Width of cut
(mm)	(inch)	n (min-1)	vc (SFM)	vf (IPM)	ap	ae	n (min-1)	vc (SFM)	vf (IPM)	ap	ae
3	.118	8500	260	82.7	.008	.051	6400	195	118.1	.008	.051
4	.157	6400	260	86.6	.008	.067	4800	195	106.3	.008	.067
6	.236	4200	260	55.1	.012	.079	3200	195	82.7	.012	.102

Depth of Cut



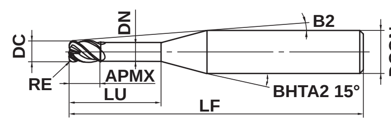
Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
Note 2) When cutting titanium alloys, the use of water-soluble cutting fluid is effective.
Note 3) If the depth of cut is smaller, the revolution and the feed rate can be increased.

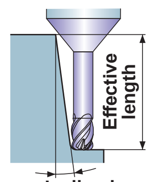
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

VQHVRB

Corner radius, Short cut length, 4 flute, Irregular helix flutes

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Precipitation Hardening Stainless Steel	Austenitic Stainless Steel	Cobalt Chrome Alloy, Heat Resistant Alloy	Titanium Alloy	Aluminum Alloy
					◎	○	





0.1≤RE≤1			
±0.01			
1≤DC≤4			
0 - 0.02			
DCON=6			
0 - 0.005			

● SMART MIRACLE corner radius end mill for high feed rates and efficient machining.

(mm)

Order Number	DC	RE	APMX	LU	DN	B2	LF	DCON	*1 No.F	Stock	Type
VQHVRBD0100R01N080	1	0.1	1	8	0.94	8.2°	50	6	4	●	1
VQHVRBD0100R01N120	1	0.1	1	12	0.94	6.7°	55	6	4	●	1
VQHVRBD0200R02N120	2	0.2	2	12	1.9	5.9°	55	6	4	●	1
VQHVRBD0200R02N160	2	0.2	2	16	1.9	4.9°	60	6	4	●	1
VQHVRBD0300R05N100	3	0.5	3	10	2.9	5.6°	55	6	4	●	1
VQHVRBD0300R05N180	3	0.5	3	18	2.9	3.7°	60	6	4	●	1
VQHVRBD0400R10N120	4	1.0	4	12	3.9	3.9°	55	6	4	●	1
VQHVRBD0400R10N200	4	1.0	4	20	3.9	2.5°	60	6	4	●	1

*1 Number of Flutes

DC = Dia.
RE = Corner Radius
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

● : USA Stock

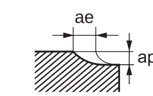
RECOMMENDED CUTTING CONDITIONS

Large Depth of Cut Conditions

(inch)

Workpiece Material				Titanium Alloys Ti-6Al-4V ELI, ASTM F136, etc.					Cobalt Chromium Alloys ASTM F75:Casting, F1537:Wrought Bar, F799:Forgings, etc.				
DC		LU		Revolution n (min^{-1})	Cutting Speed vc (SFM)	Feed Rate vf (IPM)	Depth of cut ap	Width of cut ae	Revolution n (min^{-1})	Cutting Speed vc (SFM)	Feed Rate vf (IPM)	Depth of cut ap	Width of cut ae
(mm)	(inch)	(mm)	(inch)										
1	.039	8	.315	2500	25	19.7	.001	.004	2500	25	19.7	.001	.004
1	.039	12	.472	2500	25	13.8	.001	.004	2500	25	13.8	.001	.004
2	.079	12	.472	4800	100	23.6	.003	.012	4800	100	23.6	.003	.012
2	.079	16	.630	4800	100	13.4	.003	.012	4800	100	13.8	.003	.012
3	.118	10	.394	8500	260	94.5	.007	.051	6400	195	86.6	.007	.051
3	.118	18	.709	8500	260	78.7	.007	.051	6400	195	63.0	.007	.051
4	.157	12	.472	6400	260	78.7	.010	.067	4800	195	70.9	.009	.067
4	.157	20	.787	6400	260	78.7	.010	.067	4800	195	70.9	.009	.067

Depth of Cut



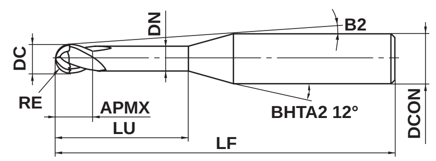
Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
Note 2) When cutting titanium alloys, the use of water-soluble cutting fluid is effective.
Note 3) If the depth of cut is smaller, the revolution and the feed rate can be increased.
Note 4) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sound can occur.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

VQ2XLB

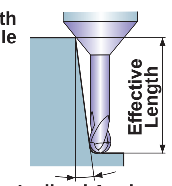
Ball nose, Short cut length, 2 flute, Long neck

UWC VQ 30°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Precipitation Hardening Stainless Steel	Austenitic Stainless Steel	Cobalt Chrome Alloy, Heat Resistant Alloy	Titanium Alloy	Aluminum Alloy
					◎	◎	



Type1



0.05≤RE≤1.5	±0.005
4≤DCON≤6 (h5)	0 / -0.005

● SMART MIRACLE coating providing better wear resistance when machining difficult-to-cut materials.

(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	*1 No.F	Stock	Type
VQ2XLBR0050N080	0.5	1	0.75	8	0.94	6.4°	50	4	2	●	1
VQ2XLBR0050N100	0.5	1	0.75	10	0.94	5.6°	50	4	2	●	1
VQ2XLBR0050N080S06	0.5	1	0.75	8	0.94	8.3°	50	6	2	●	1
VQ2XLBR0050N100S06	0.5	1	0.75	10	0.94	7.5°	55	6	2	●	1
VQ2XLBR0050N120S06	0.5	1	0.75	12	0.94	6.8°	55	6	2	●	1
VQ2XLBR0075N100S06	0.75	1.5	1.1	10	1.44	7.2°	55	6	2	●	1
VQ2XLBR0075N120S06	0.75	1.5	1.1	12	1.44	6.5°	55	6	2	●	1
VQ2XLBR0100N100	1.0	2	1.5	10	1.9	4.5°	50	4	2	●	1
VQ2XLBR0100N100S06	1.0	2	1.5	10	1.9	6.9°	55	6	2	●	1
VQ2XLBR0100N120	1.0	2	1.5	12	1.9	3.9°	50	4	2	●	1
VQ2XLBR0100N120S06	1.0	2	1.5	12	1.9	6.1°	55	6	2	●	1
VQ2XLBR0150N120	1.5	3	2.3	12	2.9	5.3°	55	6	2	●	1
VQ2XLBR0150N140	1.5	3	2.3	14	2.9	4.7°	60	6	2	●	1
VQ2XLBR0150N160	1.5	3	2.3	16	2.9	4.3°	60	6	2	●	1

*1 Number of Flutes

DC = Dia.
RE = Radius of Ball Nose
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

● : USA Stock

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
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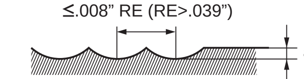
SOLID END MILLS

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material				Titanium Alloys Ti-6Al-4V ELI, ASTM F136, etc.					Cobalt Chromium Alloys ASTM F75:Casting, F1537:Wrought Bar, F799:Forgings, etc.				
RE (mm)	RE (inch)	LU (mm)	LU (inch)	Revolution n (min⁻¹)	Cutting Speed vc (SFM)	Feed Rate vf (IPM)	Depth of cut ap	Width of cut ae	Revolution n (min⁻¹)	Cutting Speed vc (SFM)	Feed Rate vf (IPM)	Depth of cut ap	Width of cut ae
0.5	.020	8	.315	32000	330	98.4	.002	.004	27000	260	78.7	.002	.004
0.5	.020	10	.394	24000	245	59.1	.002	.004	19000	195	59.1	.002	.004
0.5	.020	12	.472	24000	245	59.1	.001	.004	19000	195	59.1	.001	.004
0.75	.030	10	.394	21000	330	82.7	.005	.012	17000	260	66.9	.003	.004
0.75	.030	12	.472	16000	245	59.1	.005	.012	13000	195	47.2	.003	.004
1	.039	10	.394	16000	330	70.9	.008	.020	13000	260	59.1	.008	.020
1	.039	12	.472	16000	330	70.9	.008	.020	13000	260	59.1	.008	.020
1.5	.059	12	.472	10000	330	63.0	.012	.031	8500	260	51.2	.012	.031
1.5	.059	14	.551	10000	330	63.0	.012	.031	8500	260	51.2	.012	.031
1.5	.059	16	.630	10000	330	63.0	.012	.031	8500	260	51.2	.012	.031

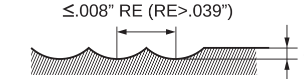
Depth of Cut



RE : Radius

Workpiece Material				Pure Titanium ASTM F67, etc.				
RE (mm)	RE (inch)	LU (mm)	LU (inch)	Revolution n (min⁻¹)	Cutting Speed vc (SFM)	Feed Rate vf (IPM)	Depth of cut ap	Width of cut ae
0.5	.020	8	.315	27000	260	63.0	.003	.004
0.5	.020	10	.394	19000	195	47.2	.003	.004
0.5	.020	12	.472	19000	195	47.2	.002	.004
0.75	.030	10	.394	25000	395	78.7	.005	.008
0.75	.030	12	.472	21000	330	63.0	.005	.008
1	.039	10	.394	32000	655	98.4	.013	.031
1	.039	12	.472	29000	590	66.9	.013	.031
1.5	.059	12	.472	21000	655	63.0	.019	.047
1.5	.059	14	.551	21000	655	63.0	.019	.047
1.5	.059	16	.630	21000	655	63.0	.019	.047

Depth of Cut



RE : Radius

Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
Note 2) When cutting titanium alloys, the use of water-soluble cutting fluid is effective.
Note 3) If the depth of cut is smaller, the revolution and the feed rate can be increased.

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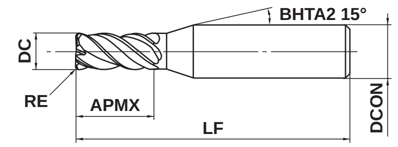
RADIUS
I
SOLID END MILLS

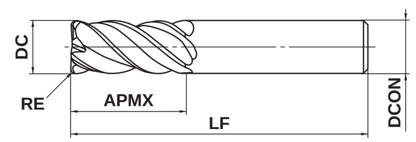
VQN4/6MVRB NEW

Corner Radius, Medium cut length, 4/6 flute

UWC VQN VQN4 33° 37° VQN6 34° 36° VQN4 VQN6

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
					◎		





VQN4	VQN6			
±0.015	±0.02			
DC≦12				
0 - 0.02				
DCON=6	DCON=8,12	DCON=12		
0 - 0.008	0 - 0.009	0 - 0.012		

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

(mm)

Order Number	DC	RE	APMX	LF	DCON	* No.F	Stock	Type
VQN4MVRBD0300R030	3	0.3	7	45	6	4	●	1
VQN4MVRBD0300R050	3	0.5	7	45	6	4	●	1
VQN4MVRBD0400R030	4	0.3	10	45	6	4	●	1
VQN4MVRBD0400R050	4	0.5	10	45	6	4	●	1
VQN4MVRBD0500R050	5	0.5	12	50	6	4	●	1
VQN4MVRBD0600R050	6	0.5	13	50	6	4	●	2
VQN4MVRBD0600R100	6	1	13	50	6	4	●	2
VQN6MVRBD0800R050	8	0.5	19	60	8	6	●	2
VQN6MVRBD0800R100	8	1	19	60	8	6	●	2
VQN6MVRBD1000R050	10	0.5	22	70	10	6	●	2
VQN6MVRBD1000R100	10	1	22	70	10	6	●	2
VQN6MVRBD1200R050	12	0.5	26	75	12	6	●	2
VQN6MVRBD1200R100	12	1	26	75	12	6	●	2

* Number of Flutes

DC = Cutting Dia.
RE = Corner Radius
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

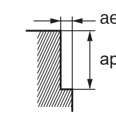
● : USA Stock

RECOMMENDED CUTTING CONDITIONS

Side milling

(inch)

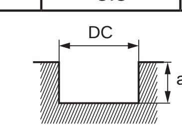
Workpiece Material			Nickel-based Heat Resistant Super Alloy Inconel718, Inconel713C, WASPALOY etc.			
DC (mm)	DC (inch)	Number of Flutes	Revolution (SFM)	Feed Rate (IPM)	Depth of Cut ap	Depth of Cut ae
3	.118	4	4200	13.4	.177	.012
4	.157	4	3200	10.2	.236	.016
5	.197	4	2500	11.8	.295	.020
6	.236	4	2100	9.8	.354	.024
8	.315	6	1600	11.4	.472	.031
10	.394	6	1300	12.2	.591	.039
12	.472	6	1100	10.2	.709	.047
Depth of cut						



Slot milling

(inch)

Workpiece Material			Nickel-based Heat Resistant Super Alloy Inconel718, Inconel713C, WASPALOY etc.		
DC (mm)	DC (inch)	Number of Flutes	Revolution (SFM)	Feed Rate (IPM)	Depth of Cut ap
3	.118	4	3200	10.2	.059
4	.157	4	2400	7.5	.079
5	.197	4	1900	9.1	.098
6	.236	4	1600	7.5	.118
8	.315	6	1200	5.5	.157
10	.394	6	1000	4.7	.197
12	.472	6	800	5.5	.236
Depth of cut					

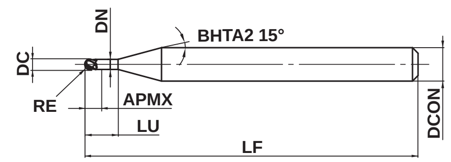


Note 1) For heat resistant super alloy, the use of water-soluble coolant is effective.
Note 2) Chattering can still occur if the machine rigidity and clamping method are insufficient.
In these cases the feed and speed should be reduced proportionately.
Note 3) If the depth of cut is shallow, the revolution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

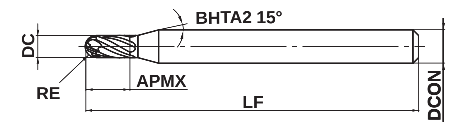
VQN4MB

Ball nose, Medium cut length, 4 flute

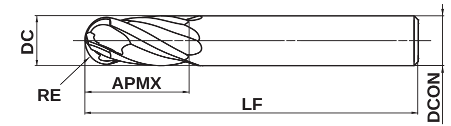
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
					◎		



Type1



Type2



Type3

RE≤6		
±0.010		
DCON=6	8≤DCON≤10	DCON=12
0 / - 0.005	0 / - 0.006	0 / - 0.008

● (Al, Ti, Si) N-based coating exhibits excellent wear and chipping resistance when machining heat resistant super alloys.
● The 2-flute end cutting edge provides excellent chip evacuation and is ideal for rough machining.

(mm)

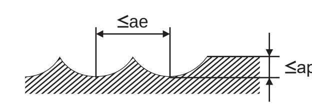
Order Number	RE	DC	APMX	LU	DN	LF	DCON	* No.F	Stock	Type
VQN4MBR0100	1.0	2	2	6	1.9	60	6	4	●	1
VQN4MBR0150	1.5	3	3	8	2.9	60	6	4	●	1
VQN4MBR0200	2.0	4	8	–	–	60	6	4	●	2
VQN4MBR0250	2.5	5	12	–	–	60	6	4	●	2
VQN4MBR0300	3.0	6	12	–	–	60	6	4	●	3
VQN4MBR0400	4.0	8	14	–	–	70	8	4	●	3
VQN4MBR0500	5.0	10	18	–	–	80	10	4	●	3
VQN4MBR0600	6.0	12	22	–	–	80	12	4	●	3

* Number of Flutes

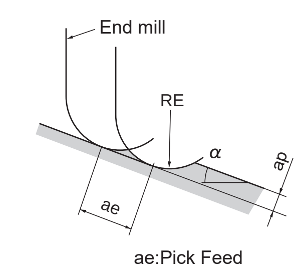
DC = Cutting Dia.
RE = Radius of Ball Nose
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material		Nickel-based Heat Resistant Super Alloy Inconel718, Inconel713C, WASPALOY etc.					
RE		α≤15°		α>15°		Depth of Cut ap	Depth of Cut ae
(mm)	(inch)	Revolution (SFM)	Feed Rate (IPM)	Revolution (SFM)	Feed Rate (IPM)		
1.0	.039	65	15.0	65	20.1	.008	.020
1.5	.059	65	13.4	65	16.5	.012	.030
2.0	.079	65	12.6	65	15.0	.016	.039
2.5	.098	65	9.8	65	12.2	.020	.049
3.0	.118	65	8.3	65	9.8	.024	.059
4.0	.157	60	6.3	60	7.5	.031	.079
5.0	.197	60	5.9	60	7.9	.039	.098
6.0	.236	60	5.9	60	6.7	.047	.118
Depth of cut							

Note 1) For heat resistant super alloy, the use of water-soluble coolant is effective.
Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 3) Vibration may occur if the rigidity of machine or workpiece is low. In this case, please reduce the revolution and feed rate proportionately.
Note 4) α is the inclination angle of the machined surface.



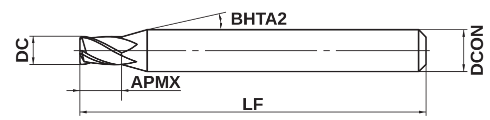
ae:Pick Feed

● : USA Stock

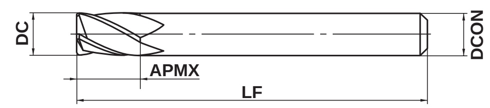
VQ4MRB-FB NEW

Corner radius end mill, Medium cutting length, 4 flute, For Swiss-type lathe

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
◎	◎			◎	◎	○	



Type1



Type2

DC				
0 - 0.020				
DCON=6	8≤DCON≤10			
0 - 0.008	0 - 0.009			

- A corner radius end mill with high fracture resistance.
- A turn milling machine tool for Swiss-type automatic lathes for machining lobe surfaces.

(mm)

Order Number	DC	RE	APMX	LF	DCON	* No.F	Stock	Type
VQ4MRBD0400R030-FB	4	0.3	6	50	6	4	●	1
VQ4MRBD0600R030-FB	6	0.3	9	50	6	4	●	2
VQ4MRBD0800R030-FB	8	0.3	12	60	8	4	●	2
VQ4MRBD1000R050-FB	10	0.5	15	70	10	4	●	2

Note 1) SMART MIRACLE Coating is not conductive because of its nature. Therefore, an external contact (voltaic type) tool setter cannot be used. An internal contact (non-voltaic) type or laser type tool setter is recommended to measure the length of the tool.

* Number of Flutes

DC = Cutting Dia.
RE = Corner Radius
APMX = Length of Cut
LU = Neck Length
DN = Neck Dia.
LF = Overall Length
DCON = Shank Dia.

● : USA Stock ★ : Stocked in Japan

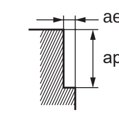
RECOMMENDED CUTTING CONDITIONS

Side Milling

(inch)

Workpiece Material		Carbon Steels, Cast Irons, Alloy Steels (—30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy Steels, Tool Steels, Pre-hardened Steels AISI H13, AISI W1-10, AISI P21				Austenitic Stainless Steels, Titanium Alloys AISI 304, AISI 306, Ti-6Al-4V				Copper, Copper Alloys			
Dia. DC mm	inch	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Depth of Cut ae	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Depth of Cut ae
4	.157	7500	35.4	.157	.024	5200	23.6	.157	.024	4500	17.7	.157	.024	9500	43.3	.157	.024
6	.236	5000	35.4	.236	.024	3500	23.6	.236	.024	3000	17.7	.236	.024	6400	43.3	.236	.024
8	.315	4000	30.7	.315	.024	2800	20.5	.315	.024	2400	15.4	.315	.024	4800	37.0	.315	.024
10	.394	3200	26.8	.394	.024	2200	17.7	.394	.024	1900	13.4	.394	.024	3800	31.9	.394	.024

Depth of Cut

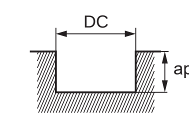


Slotting

(inch)

Workpiece Material		Carbon Steels, Cast Irons, Alloy Steels (—30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy Steels, Tool Steels, Pre-hardened Steels AISI H13, AISI W1-10, AISI P21			Austenitic Stainless Steels, Titanium Alloys AISI 304, AISI 306, Ti-6Al-4V			Copper, Copper Alloys		
Dia. DC mm	inch	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap	Revolution (min^{-1})	Feed rate (IPM)	Depth of Cut ap
4	.157	7500	35.4	.024	5200	23.6	.024	4500	17.7	.024	9500	43.3	.024
6	.236	5000	35.4	.024	3500	23.6	.024	3000	17.7	.024	6400	43.3	.024
8	.315	4000	30.7	.024	2800	20.5	.024	2400	15.4	.024	4800	37.0	.024
10	.394	3200	26.8	.024	2200	17.7	.024	1900	13.4	.024	3800	31.9	.024

Depth of Cut



DC:Dia.

Note 1) SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
Note 2) When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
Note 3) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 4) When drilling, please set the feed rate at 1/3 or below the values above.
Note 5) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

HEXALOBE OVERVIEW

Hexalobe contours are broadly used in the medical manufacturing industry as a feature for driving bolts and screws.

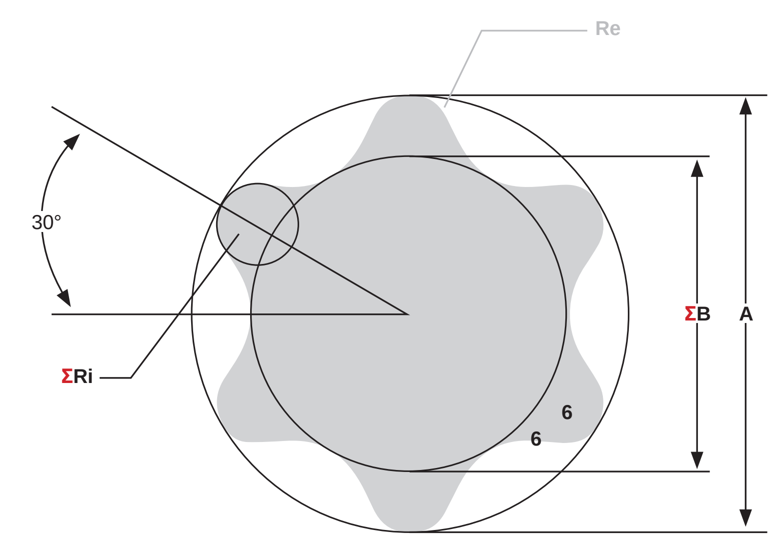
Due to the size and function of these features, they are produced using dedicated tooling that will allow the contour to be produced consistently and maintain tight tolerances such as size, shape, and straightness or perpendicularity.

They are produced using various methods including broaching, drilling and milling.

Mitsubishi Materials U.S.A. supplies tooling catered to producing these Hexalobe contours using a method that involves predrilling the minor diameter, counter sinking with the applicable lead-in angle, and helical contour milling the hexalobe shape. This strategy provides an efficient and consistent manufacturing process.

Hexalobular socket No.	Nominal dimensions[a]	
	A	*B*
6	1.75	1.27
8	2.4	1.75
10	2.8	2.05
15	3.35	2.4
20	3.95	2.85
25	4.5	3.25
30	5.6	4.05
40	6.75	4.85

Hexalobe table showing common sizes in Medical Industry
(T4, T5, T6, T7, T8, T9, T10, T15, T20, T25, T30, T40)



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SOLID END MILLS

PREDRILLING

The first process in machining a Hexalobe feature is predrilling the minor diameter of the applicable hexalobe size.

Our MVS product line provides an effective solution for predrilling the minor diameter.

They are available with thru coolant, a DP1020 coating for excellent wear resistance, and “Zero-μ” surface technology to reduce material adhesion.

Our MFE product line is another alternative for predrilling the minor diameter if a flat bottom is required.

MIRACLE SIGMA

ZERO-μ Surface

PREDRILLING PRODUCTS

MVS/MWS/MFE Drills listed by Torx Size

Torx Type	Predrill Diameter	MVS Series	MWS Series	MFE Series
T4	0.9	-	MWS0090SB	MFE0090X02S030
T5	1	MVS0100X02S030	MWS0100SB	MFE0100X02S030
T6	1.2	MVS0120X02S030	MWS0120SB	MFE0120X02S030
T7	1.4	MVS0140X02S030	MWS0140SB	MFE0140X02S030
T8	1.6	MVS0160X02S030	MWS0160SB	MFE0160X02S030
T9	1.8	MVS0180X02S030	MWS0180SB	MFE0180X02S030
T10	1.9	MVS0190X02S030	MWS0190SB	MFE0190X02S030
T15	2.3	MVS0230X02S030	MWS0230SB	MFE0230X02S040
T20	2.7	MVS0270X02S030	MWS0270SB	MFE0270X02S040
T25	3.1	MVS0310X02S060PL	-	MFE0310X02S060
T27	3.5	MVS0350X02S060PL	-	MFE0350X02S060
T30	3.8	MVS0380X02S060PL	-	MFE0380X02S060
T40	4.6	MVS0460X02S060PL	-	MFE0460X02S060

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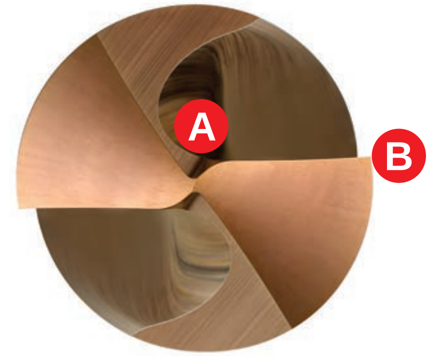
COUNTERSINKING

The second process in machining a Hexalobe feature is counter sinking the lead-in angle required.

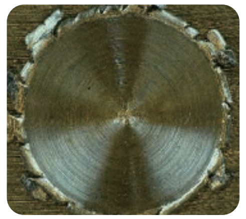
We recommend using DIAEDGE DLE drills, available in multiple angles to provide the correct lead-in.

Current angles offered are 60°, 90 °, 120 °, and 145°



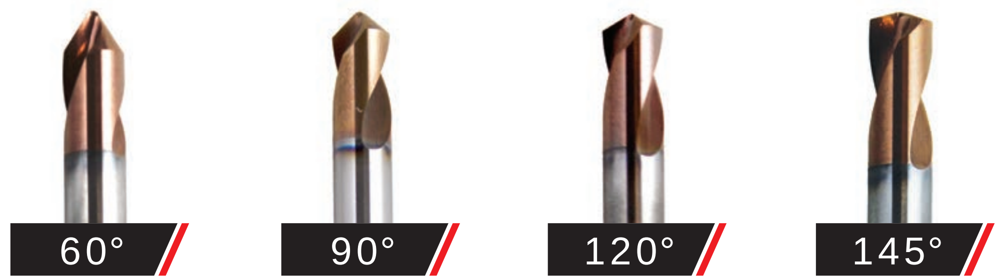
Point Angles SIG 120° 145°

DLE



Conventional

DLE DRILL ANGLES



COUNTERSINKING PRODUCTS

Countersink/lead in chamfer drills *additional sizes available

Drill Angle	Recommended Drill (DLE)
60°	DLE0600S060P060
	DLE0800S080P060
	DLE0100S100P060
90°	DLE0600S060P090
	DLE0800S080P090
	DLE0100S100P090
120°	DLE0600S060P120
	DLE0800S080P120
	DLE0100S100P120
145°	DLE0600S060P145
	DLE0800S080P145
	DLE0100S100P145

I

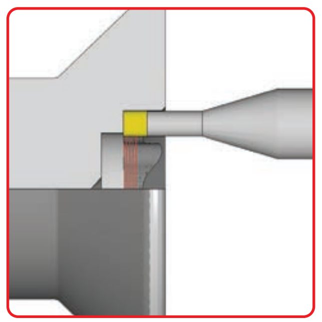
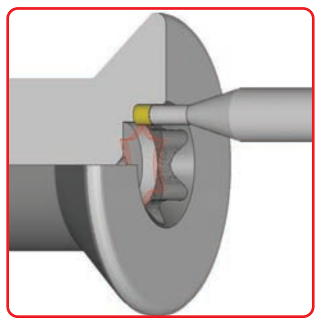
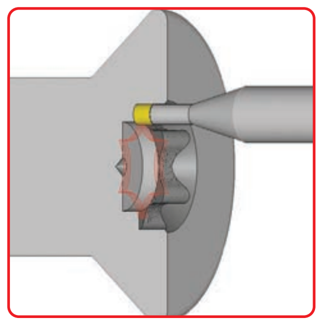
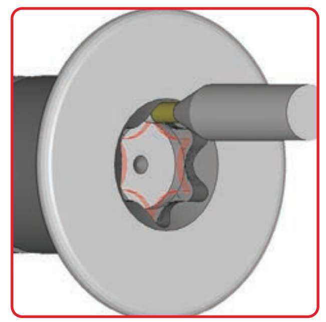
HELICAL CONTOUR MILLING

The third process in machining a Hexalobe feature is helical milling the profile of the hexalobe while ramping down to the final depth.

We recommend using DIAEDGE VQXL end mills that provide 3 or 4 cutting edges (depending on size) with a short cutting length and a relieved neck for clearance throughout the helical milling process.

These end mills are offered in a variety of cutting diameters, from Ø0.2mm to Ø1.0mm with multiple neck lengths to suit your application.

They also feature our Miracle Sigma (AlCrN) coating for excellent wear resistance, “Zero-μ” surface technology to reduce material adhesion, and irregular helix flutes to prevent vibration.

VQXL Endmill Recommendation by Hexalobe Size (based on inner radius, Re per ISO10664:2014)
***endmill length required determined by feature depth**

	T4	T5	T6	T7	T8	T9	T10	T15	T20	T25	T27	T30	T40
VQXLD0020N006	X	X											
VQXLD0030N009			X	X									
VQXLD0030N015			X	X									
VQXLD0040N010				X	X	X	X						
VQXLD0040N018				X	X	X	X						
VQXLD0050N015						X	X	X					
VQXLD0050N025						X	X	X					
VQXLD0050N030						X	X	X					
VQXLD0060N030								X	X				
VQXLD0070N035									X				
VQXLD0080N024										X	X		
VQXLD0080N030										X	X		
VQXLD0080N040										X	X		
VQXLD0100N050											X	X	X

MILLING PRODUCTS

UWC VQ 35° DC≤0.3 DC≥0.4

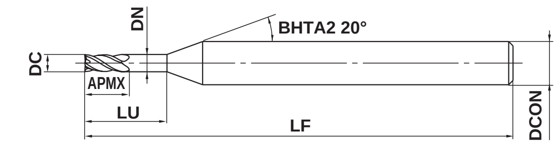
VQXL

End mill, Short cut length, 4 flute, Long neck

- SMART MIRACLE coating enhances efficiency due to an improved chip disposal.
- Providing a high efficiency and a long tool life by increasing the number of flutes.

Carbon Steel, Alloy Steel (<30HRC)	Pre-hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	

DC≤1				
0 - 0.010				
DCON=4				
0 - 0.005				



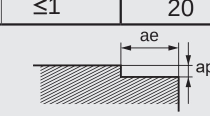
(mm)

Order Number	DC	APMX	LU	DN	LF	DCON	No.* Flutes	Stock	Type
VQXLD0020N006	0.2	0.3	0.6	0.18	40	4	3	●	1
VQXLD0030N009	0.3	0.5	0.9	0.28	40	4	3	●	1
VQXLD0030N015	0.3	0.5	1.5	0.28	40	4	3	●	1
VQXLD0040N010	0.4	0.6	1	0.37	40	4	4	●	1
VQXLD0040N018	0.4	0.6	1.8	0.37	40	4	4	●	1
VQXLD0050N015	0.5	0.7	1.5	0.47	40	4	4	●	1
VQXLD0050N025	0.5	0.7	2.5	0.47	40	4	4	●	1
VQXLD0050N030	0.5	0.7	3	0.47	40	4	4	●	1
VQXLD0060N030	0.6	0.9	3	0.57	40	4	4	●	1
VQXLD0070N035	0.7	1	3.5	0.67	40	4	4	●	1
VQXLD0080N024	0.8	1.2	2.4	0.77	40	4	4	●	1
VQXLD0080N030	0.8	1.2	3	0.77	40	4	4	●	1
VQXLD0080N040	0.8	1.2	4	0.77	40	4	4	●	1
VQXLD0100N050	1	1.5	5	0.96	40	4	4	●	1

Face Milling

(mm)

Work Material		Carbon Steel, Alloy Steel, Mild Steel, Alloy Tool Steel, Austenitic Stainless Steels, Titanium Alloys Cobaly Chromium Alloy, Copper, Copper Alloy					Heat Resistant Alloys, Pre-hardened Steel, Hardened Steel				
DC	LU	vc (m/min)	n (min^{-1})	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	vf (mm/min)	ap	ae
0.2	0.6	25	40000	360	0.015	≤0.2	20	32000	290	0.015	≤0.1
0.3	0.9	40	40000	480	0.025	≤0.3	20	21000	250	0.025	≤0.15
0.3	1.5	40	40000	360	0.02	≤0.3	20	21000	190	0.02	≤0.15
0.4	1.2	50	40000	800	0.03	≤0.4	20	16000	320	0.03	≤0.2
0.4	2	50	40000	560	0.02	≤0.4	20	16000	220	0.02	≤0.2
0.5	1.5	60	38000	910	0.04	≤0.5	20	13000	310	0.04	≤0.25
0.5	2.5	60	38000	610	0.03	≤0.5	20	13000	210	0.03	≤0.25
0.5	3	60	38000	550	0.03	≤0.5	20	13000	180	0.03	≤0.25
0.6	3	60	32000	640	0.035	≤0.6	20	10500	210	0.035	≤0.3
0.7	3.5	60	27000	640	0.035	≤0.7	20	9100	190	0.035	≤0.35
0.8	2.4	60	24000	960	0.06	≤0.8	20	8000	260	0.06	≤0.4
0.8	3	60	24000	840	0.05	≤0.8	20	8000	230	0.05	≤0.4
0.8	4	60	24000	670	0.04	≤0.8	20	8000	190	0.04	≤0.4
1	5	60	20000	800	0.05	≤1	20	6500	210	0.05	≤0.5
Depth of Cut											



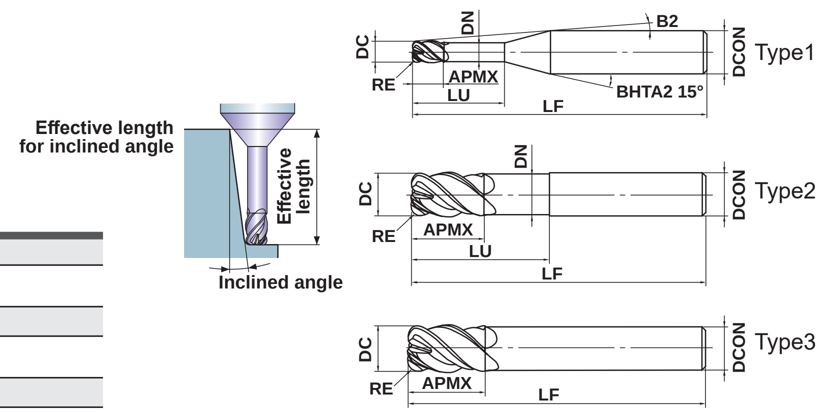
(Note 1) SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
(Note 2) Effective cutting of stainless steel, titanium alloys and heat-resistant alloys etc. can be achieved with the use of emulsion.
(Note 3) When the depth of cut is smaller than shown the revolution and feed rate can be increased.

VFHVRB

4 flute, Corner radius, Short cut length, Irregular helix flutes

43°
45°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎	○	○	○		



	DC≤10	DC>10		
	±0.007	±0.01		
	DC≤12	DC>12		
	0 / - 0.02	0 / - 0.03		
h6	DCON=6	8≤DCON≤10	12≤DCON≤16	
	0 / - 0.008	0 / - 0.009	0 / - 0.011	

● Impact Miracle corner radius end mill for high feed and efficient machining.

(mm)

Order Number	DC	RE	APMX	LU	DN	B2	LF	DCON	No. of Flutes	Stock	Type	Effective length for inclined angle			
												0.5°	1°	2°	3°
VFHVRBD0100R02N004	1	0.2	1	4	0.94	10.6°	60	6	4	●	1	4.2	4.5	4.7	5.3
VFHVRBD0100R02N006	1	0.2	1	6	0.94	9.2°	60	6	4	●	1	6.4	6.7	7.2	7.7
VFHVRBD0100R02N008	1	0.2	1	8	0.94	8.2°	60	6	4	●	1	8.5	8.8	9.5	10.2
VFHVRBD0100R02N010	1	0.2	1	10	0.94	7.4°	60	6	4	●	1	10.5	11	11.8	12.7
VFHVRBD0100R02N015	1	0.2	1	15	0.94	5.9°	60	6	4	★	1	15.8	16.3	17.5	18.9
VFHVRBD0100R02N020	1	0.2	1	20	0.94	4.9°	80	6	4	★	1	20.9	21.7	23.3	25.1
VFHVRBD0150R03N004	1.5	0.3	1.5	4	1.44	10.3°	60	6	4	●	1	4.2	4.5	4.6	5.2
VFHVRBD0150R03N006	1.5	0.3	1.5	6	1.44	8.9°	60	6	4	●	1	6.3	6.6	7.2	7.7
VFHVRBD0150R03N010	1.5	0.3	1.5	10	1.44	7°	60	6	4	●	1	10.5	10.9	11.8	12.7
VFHVRBD0150R03N015	1.5	0.3	1.5	15	1.44	5.5°	60	6	4	●	1	15.7	16.3	17.5	18.9
VFHVRBD0150R03N020	1.5	0.3	1.5	20	1.44	4.6°	80	6	4	★	1	20.9	21.6	23.3	25.1
VFHVRBD0150R03N025	1.5	0.3	1.5	25	1.44	3.9°	80	6	4	★	1	26.1	27	29	31.3
VFHVRBD0150R03N030	1.5	0.3	1.5	30	1.44	3.4°	80	6	4	★	1	31.3	32.3	34.7	37.5
VFHVRBD0200R05N006	2	0.5	2	6	1.9	8.7°	60	6	4	●	1	6.3	6.5	7	7.5
VFHVRBD0200R05N010	2	0.5	2	10	1.9	6.7°	60	6	4	●	1	10.5	10.8	11.6	12.5
VFHVRBD0200R05N015	2	0.5	2	15	1.9	5.2°	60	6	4	●	1	15.6	16.2	17.4	18.7
VFHVRBD0200R05N020	2	0.5	2	20	1.9	4.3°	80	6	4	●	1	20.8	21.5	23.1	24.9
VFHVRBD0200R05N025	2	0.5	2	25	1.9	3.6°	80	6	4	★	1	26	26.9	28.9	31.2
VFHVRBD0200R05N030	2	0.5	2	30	1.9	3.1°	80	6	4	★	1	31.2	32.2	34.6	37.4
VFHVRBD0200R05N035	2	0.5	2	35	1.9	2.8°	90	6	4	★	1	36.3	37.6	40.4	⋆
VFHVRBD0200R05N040	2	0.5	2	40	1.9	2.5°	90	6	4	★	1	41.5	42.9	46.1	⋆
VFHVRBD0300R05N010	3	0.5	3	10	2.9	5.6°	60	6	4	●	1	10.5	10.8	11.6	12.5
VFHVRBD0300R05N015	3	0.5	3	15	2.9	4.3°	60	6	4	●	1	15.6	16.2	17.4	18.7
VFHVRBD0300R05N020	3	0.5	3	20	2.9	3.4°	80	6	4	●	1	20.8	21.5	23.1	24.9
VFHVRBD0300R05N030	3	0.5	3	30	2.9	2.5°	80	6	4	●	1	31.2	32.2	34.6	⋆
VFHVRBD0300R08N010	3	0.8	3	10	2.9	5.7°	60	6	4	●	1	10.4	10.8	11.6	12.4
VFHVRBD0300R08N015	3	0.8	3	15	2.9	4.3°	60	6	4	●	1	15.6	16.2	17.3	18.7
VFHVRBD0300R08N020	3	0.8	3	20	2.9	3.5°	80	6	4	●	1	20.8	21.5	23.1	24.9
VFHVRBD0300R08N030	3	0.8	3	30	2.9	2.5°	80	6	4	●	1	31.1	32.2	34.6	⋆
VFHVRBD0300R08N040	3	0.8	3	40	2.9	2°	90	6	4	★	1	41.5	42.9	⋆	⋆
VFHVRBD0300R08N050	3	0.8	3	50	2.9	1.6°	90	6	4	★	1	51.8	53.6	⋆	⋆
VFHVRBD0400R05N012	4	0.5	4	12	3.9	3.8°	60	6	4	●	1	12.5	13	13.9	15

⋆ No interference

● : USA Stock ★ : Stocked in Japan

(mm)

Order Number	DC	RE	APMX	LU	DN	B2	LF	DCON	No. of Flutes	Stock	Type	Effective length for inclined angle			
												0.5°	1°	2°	3°
VFHVRBD0400R05N020	4	0.5	4	20	3.9	2.5°	80	6	4	●	1	20.8	21.5	23.1	⋆
VFHVRBD0400R05N030	4	0.5	4	30	3.9	1.8°	80	6	4	●	1	31.2	32.2	⋆	⋆
VFHVRBD0400R05N048	4	0.5	4	48	3.9	1.2°	90	6	4	★	1	49.8	51.5	⋆	⋆
VFHVRBD0400R10N012	4	1	4	12	3.9	3.9°	60	6	4	●	1	12.5	12.9	13.8	14.9
VFHVRBD0400R10N020	4	1	4	20	3.9	2.5°	80	6	4	●	1	20.8	21.5	23	⋆
VFHVRBD0400R10N030	4	1	4	30	3.9	1.8°	80	6	4	●	1	31.1	32.2	⋆	⋆
VFHVRBD0600R05N018	6	0.5	9	18	5.85	—	60	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R05N030	6	0.5	9	30	5.85	—	80	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R10N018	6	1	9	18	5.85	—	60	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R10N030	6	1	9	30	5.85	—	80	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R10N054	6	1	9	54	5.85	—	90	6	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD0600R15N018	6	1.5	9	18	5.85	—	60	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R15N030	6	1.5	9	30	5.85	—	80	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R15N042	6	1.5	9	42	5.85	—	90	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R15N054	6	1.5	9	54	5.85	—	90	6	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD0600R20N018	6	2	9	18	5.85	—	60	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0600R20N030	6	2	9	30	5.85	—	80	6	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0700R15	7	1.5	11	—	—	—	80	6	4	★	3	⋆	⋆	⋆	⋆
VFHVRBD0800R05N024	8	0.5	12	24	7.85	—	60	8	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD0800R05N040	8	0.5	12	40	7.85	—	100	8	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD0800R10N024	8	1	12	24	7.85	—	60	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0800R10N040	8	1	12	40	7.85	—	100	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0800R20N024	8	2	12	24	7.85	—	60	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0800R20N040	8	2	12	40	7.85	—	100	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0800R20N056	8	2	12	56	7.85	—	120	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0800R20N072	8	2	12	72	7.85	—	120	8	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD0900R20	9	2	13.5	—	—	—	100	8	4	★	3	⋆	⋆	⋆	⋆
VFHVRBD1000R05N030	10	0.5	15	30	9.7	—	70	10	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1000R05N050	10	0.5	15	50	9.7	—	110	10	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1000R10N030	10	1	15	30	9.7	—	70	10	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1000R10N050	10	1	15	50	9.7	—	110	10	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1000R20N030	10	2	15	30	9.7	—	70	10	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1000R20N050	10	2	15	50	9.7	—	110	10	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1000R20N070	10	2	15	70	9.7	—	150	10	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1000R20N090	10	2	15	90	9.7	—	150	10	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1100R20	11	2	16.5	—	—	—	110	10	4	★	3	⋆	⋆	⋆	⋆
VFHVRBD1200R05N036	12	0.5	18	36	11.7	—	80	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R05N060	12	0.5	18	60	11.7	—	120	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R10N036	12	1	18	36	11.7	—	80	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R10N060	12	1	18	60	11.7	—	120	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R20N036	12	2	18	36	11.7	—	80	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R20N060	12	2	18	60	11.7	—	120	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R20N084	12	2	18	84	11.7	—	160	12	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1200R20N108	12	2	18	108	11.7	—	160	12	4	★	2	⋆	⋆	⋆	⋆
VFHVRBD1200R30N036	12	3	18	36	11.7	—	80	12	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1200R30N060	12	3	18	60	11.7	—	120	12	4	●	2	⋆	⋆	⋆	⋆

⋆ No interference

CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

VFHVRB

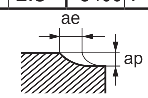
4 flute, Corner radius, Short cut length, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

■High feed conditions

Work Material			Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI 35, AISI P20 etc.					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1—10, AISI P21 etc.					Hardened steel (45—55HRC) AISI H13 etc.					Hardened steel (55—62HRC) AISI D2 etc.				
DC (mm)	RE (mm)	LU (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)
1	0.2	4	40000	7200	283.5	0.04	0.45	33000	5100	200.8	0.03	0.45	27000	4100	161.4	0.025	0.45	20000	1800	70.9	0.013	0.45
1	0.2	6	40000	6500	255.9	0.03	0.45	33000	4600	181.1	0.022	0.45	27000	3700	145.7	0.018	0.45	20000	1600	63.0	0.01	0.45
1	0.2	8	32000	4500	177.2	0.022	0.45	27000	3200	126.0	0.018	0.45	21000	2600	102.4	0.012	0.45	16000	1100	43.3	0.008	0.45
1	0.2	10	24000	2700	106.3	0.015	0.45	20000	1900	74.8	0.01	0.45	16000	1500	59.1	0.008	0.45	12000	700	27.6	0.006	0.45
1	0.2	15	16000	1200	47.2	0.008	0.45	14000	700	27.6	0.005	0.45	12000	500	19.7	0.003	0.45	10000	400	15.7	0.003	0.45
1	0.2	20	14000	1000	39.4	0.005	0.45	12000	600	23.6	0.004	0.45	10000	400	15.7	0.002	0.45	9000	300	11.8	0.002	0.45
1.5	0.3	4	32000	10000	393.7	0.1	0.65	27000	7100	279.5	0.08	0.65	21000	5700	224.4	0.06	0.65	16000	2500	98.4	0.03	0.65
1.5	0.3	6	32000	7800	307.1	0.08	0.65	27000	5500	216.5	0.06	0.65	21000	4200	165.4	0.05	0.65	16000	2000	78.7	0.025	0.65
1.5	0.3	10	27000	5700	224.4	0.05	0.65	22000	4000	157.5	0.035	0.65	18000	3000	118.1	0.03	0.65	14000	1400	55.1	0.014	0.65
1.5	0.3	15	22000	3200	126.0	0.03	0.65	18000	2300	90.6	0.025	0.65	15000	1700	66.9	0.018	0.65	11000	1000	39.4	0.009	0.65
1.5	0.3	20	16000	1400	55.1	0.02	0.65	14000	1200	47.2	0.016	0.65	13000	1000	39.4	0.012	0.65	9000	700	27.6	0.007	0.65
1.5	0.3	25	13000	1000	39.4	0.015	0.65	11000	800	31.5	0.012	0.65	10000	700	27.6	0.009	0.65	7500	500	19.7	0.005	0.65
1.5	0.3	30	13000	900	35.4	0.01	0.65	11000	700	27.6	0.008	0.65	10000	600	23.6	0.006	0.65	7500	400	15.7	0.004	0.65
2	0.5	6	24000	10000	393.7	0.1	0.75	20000	7100	279.5	0.08	0.75	16000	5700	224.4	0.06	0.75	12000	2500	98.4	0.03	0.75
2	0.5	10	24000	10000	393.7	0.08	0.75	20000	7100	279.5	0.06	0.75	16000	5700	224.4	0.05	0.75	12000	2500	98.4	0.025	0.75
2	0.5	15	20000	7000	275.6	0.05	0.75	17000	5000	196.9	0.04	0.75	13000	3200	126.0	0.03	0.75	10000	1800	70.9	0.016	0.75
2	0.5	20	20000	3600	141.7	0.04	0.75	17000	2600	102.4	0.03	0.75	13000	1800	70.9	0.025	0.75	10000	900	35.4	0.012	0.75
2	0.5	25	16000	1800	70.9	0.03	0.75	14000	1400	55.1	0.025	0.75	12000	1100	43.3	0.02	0.75	9000	720	28.3	0.01	0.75
2	0.5	30	16000	1400	55.1	0.025	0.75	14000	1200	47.2	0.02	0.75	12000	900	35.4	0.016	0.75	9000	650	25.6	0.008	0.75
2	0.5	35	13000	1100	43.3	0.02	0.75	11000	800	31.5	0.018	0.75	10000	700	27.6	0.014	0.75	7000	500	19.7	0.007	0.75
2	0.5	40	13000	1000	39.4	0.02	0.75	11000	700	27.6	0.015	0.75	10000	600	23.6	0.012	0.75	7000	400	15.7	0.006	0.75
3	0.5	10	16000	11000	433.1	0.12	1.5	13000	7800	307.1	0.09	1.5	11000	6300	248.0	0.07	1.5	8000	2800	110.2	0.04	1.5
3	0.5	15	16000	9000	354.3	0.11	1.5	13000	6400	252.0	0.08	1.5	11000	5100	200.8	0.06	1.5	8000	2300	90.6	0.04	1.5
3	0.5	20	13000	7200	283.5	0.09	1.5	11000	5100	200.8	0.07	1.5	8700	4000	157.5	0.05	1.5	6500	1800	70.9	0.03	1.5
3	0.5	30	13000	5700	224.4	0.06	1.5	11000	4000	157.5	0.05	1.5	8700	3000	118.1	0.04	1.5	6500	1400	55.1	0.02	1.5
3	0.8	10	16000	11000	433.1	0.24	1	13000	7800	307.1	0.19	1	11000	6300	248.0	0.14	1	8000	2800	110.2	0.07	1
3	0.8	15	16000	9000	354.3	0.22	1	13000	6400	252.0	0.17	1	11000	5100	200.8	0.13	1	8000	2300	90.6	0.07	1
3	0.8	20	13000	7200	283.5	0.19	1	11000	5100	200.8	0.15	1	8700	4000	157.5	0.11	1	6500	1800	70.9	0.06	1
3	0.8	30	13000	5700	224.4	0.12	1	11000	4000	157.5	0.09	1	8700	3000	118.1	0.07	1	6500	1400	55.1	0.04	1
3	0.8	40	11000	3600	141.7	0.08	1	9100	2600	102.4	0.06	1	7400	2000	78.7	0.05	1	5500	1000	39.4	0.025	1
3	0.8	50	8000	2600	102.4	0.07	1	6600	1800	70.9	0.05	1	5800	1500	59.1	0.04	1	4600	800	31.5	0.02	1
4	0.5	12	8400	6000	236.2	0.15	2	7000	4300	169.3	0.12	2	5600	3400	133.9	0.09	2	4200	1500	59.1	0.05	2
4	0.5	20	8400	6000	236.2	0.14	2	7000	4300	169.3	0.11	2	5600	3400	133.9	0.08	2	4200	1500	59.1	0.04	2
4	0.5	30	6900	4900	192.9	0.12	2	5700	3500	137.8	0.09	2	4600	2800	110.2	0.07	2	3500	1200	47.2	0.03	2
4	0.5	48	5600	2000	78.7	0.07	2	4600	1400	55.1	0.05	2	3800	1100	43.3	0.04	2	2800	500	19.7	0.02	2
4	1	12	12000	12000	472.4	0.3	1.5	10000	8500	334.6	0.23	1.5	8000	6800	267.7	0.18	1.5	6000	3000	118.1	0.1	1.5
4	1	20	12000	12000	472.4	0.27	1.5	10000	8500	334.6	0.21	1.5	8000	6800	267.7	0.16	1.5	6000	3000	118.1	0.08	1.5
4	1	30	10000	9900	389.8	0.24	1.5	8300	7000	275.6	0.19	1.5	6700	5600	220.5	0.14	1.5	5000	2500	98.4	0.07	1.5
6	0.5	18	4000	3900	153.5	0.15	3.5	3300	2800	110.2	0.12	3.5	2700	2200	86.6	0.09	3.5	2000	1000	39.4	0.05	3.5
6	0.5	30	4000	3900	153.5	0.14	3.5	3300	2800	110.2	0.11	3.5	2700	2200	86.6	0.08	3.5	2000	1000	39.4	0.04	3.5
6	1	18	8000	13000	511.8	0.5	3	6600	9200	362.2	0.4	3	5400	7400	291.3	0.3	3	4000	3300	129.9	0.15	3
6	1	30	8000	13000	511.8	0.45	3	6600	9200	362.2	0.35	3	5400	7400	291.3	0.27	3	4000	3300	129.9	0.14	3
6	1	54	6600	11000	433.1	0.25	3	5500	7800	307.1	0.2	3	4400	6300	248.0	0.15	3	3300	2800	110.2	0.08	3
6	1.5	18	8000	13000	511.8	0.5	2	6600	9200	362.2	0.4	2	5400	7400	291.3	0.3	2	4000	3300	129.9	0.15	2
6	1.5	30	8000	13000	511.8	0.45	2	6600	9200	362.2	0.35	2	5400	7400	291.3	0.27	2	4000	3300	129.9	0.14	2
6	1.5	42	6600	11000	433.1	0.4	2	5500	7800	307.1	0.3	2	4400	6300	248.0	0.24	2	3300	2800	110.2	0.12	2
6	1.5	54	6600	11000	433.1	0.25	2	5500	7800	307.1	0.2	2	4400	6300	248.0	0.15	2	3300	2800	110.2	0.08	2
6	2	18	8000	13000	511.8	0.5	1.5	6600	9200	362.2	0.4	1.5	5400	7400	291.3	0.3	1.5	4000	3300	129.9	0.15	1.5
6	2	30	8000	13000	511.8	0.45	1.5	6600	9200	362.2	0.35	1.5	5400	7400	291.3	0.27	1.5	4000	3300	129.9	0.14	1.5

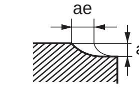
Depth of cut



Note 1) If the depth of cut is smaller than this table, feed rate can be increased.
Note 2) Using air blow or mist is recommended.

Work Material			Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI 35, AISI P20 etc.					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1—10, AISI P21 etc.					Hardened steel (45—55HRC) AISI H13 etc.					Hardened steel (55—62HRC) AISI D2 etc.				
DC (mm)	RE (mm)	LU (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min⁻¹)	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)
7	1.5	—	6800	13000	511.8	0.5	3	5600	9200	362.2	0.4	3	4600	7400	291.3	0.3	3	3400	3300	129.9	0.15	3
8	0.5	24	3000	3900	153.5	0.18	5	2500	2800	110.2	0.14	5	2000	2200	86.6	0.11	5	1500	1000	39.4	0.05	5
8	0.5	40	3000	3900	153.5	0.16	5	2500	2800	110.2	0.12	5	2000	2200	86.6	0.1	5	1500	1000	39.4	0.05	5
8	1	24	4200	6500	255.9	0.3	4.5	3500	4600	181.1	0.23	4.5	2800	3700	145.7	0.18	4.5	2100	1600	63.0	0.09	4.5
8	1	40	4200	6500	255.9	0.27	4.5	3500	4600	181.1	0.21	4.5	2800	3700	145.7	0.16	4.5	2100	1600	63.0	0.08	4.5
8	2	24	6000	13000	511.8	0.6	3	5000	9200	362.2	0.46	3	4000	7400	291.3	0.36	3	3000	3300	129.9	0.18	3
8	2	40	6000	13000	511.8	0.54	3	5000	9200	362.2	0.42	3	4000	7400	291.3	0.32	3	3000	3300	129.9	0.16	3
8	2	56	5000	11000	433.1	0.48	3	4200	7800	307.1	0.37	3	3400	6300	248.0	0.3	3	2500	2800	110.2	0.14	3
8	2	72	5000	11000	433.1	0.3	3	4200	7800	307.1	0.23	3	3400	6300	248.0	0.2	3	2500	2800	110.2	0.09	3
9	2	—	5300	13000	511.8	0.6	3.5	4400	9200	362.2	0.46	3.5	3600	7400	291.3	0.36	3.5	2700	3300	129.9	0.18	3.5
10	0.5	30	2400	3900	153.5	0.18	6.5	2000	2800	110.2	0.14	6.5	1600	2200	86.6	0.11	6.5	1200	1000	39.4	0.05	6.5
10	0.5	50	2400	3900	153.5	0.16	6.5	2000	2800	110.2	0.12	6.5	1600	2200	86.6	0.1	6.5	1200	1000	39.4	0.05	6.5
10	1	30	3300	6500	255.9	0.3	6	2700	4600	181.1	0.23	6	2200	3700	145.7	0.18	6	1700	1600	63.0	0.09	6
10	1	50	3300	6500	255.9	0.27	6	2700	4600	181.1	0.21	6	2200	3700	145.7	0.16	6	1700	1600	63.0	0.08	6
10	2	30	4800	13000	511.8	0.6	4.5	4000	9200	362.2	0.46	4.5	3200	7400	291.3	0.36	4.5	2400	3300	129.9	0.18	4.5
10	2	50	4800	13000	511.8	0.54	4.5	4000	9200	362.2	0.42	4.5	3200	7400	291.3	0.32	4.5	2400	3300	129.9	0.16	4.5
10	2	70	4000	11000	433.1	0.48	4.5	3300	7800	307.1	0.37	4.5	2700	6300	248.0	0.3	4.5	2000	2800	110.2	0.14	4.5
10	2	90	4000	11000	433.1	0.48	4.5	3300	7800	307.1	0.37	4.5	2700	6300	248.0	0.3	4.5	2000	2800	110.2	0.14	4.5
11	2	—	4300	12000	472.4	0.6	5	3600	8500	334.6	0.46	5	2900	6800	267.7	0.36	5	2200	3000	118.1	0.18	5
12	0.5	36	2000	3600	141.7	0.27	8	1700	2600	102.4	0.21	8	1300	2100	82.7	0.14	8	1000	900	35.4	0.07	8
12	0.5	60	2000	3600	141.7	0.24	8	1700	2600	102.4	0.18	8	1300	2100	82.7	0.12	8	1000	900	35.4	0.06	8
12	1	36	2400	4800	189.0	0.36	7.5	2000	3400	133.9	0.28	7.5	1600	2700	106.3	0.18	7.5	1200	1200	47.2	0.09	7.5
12	1	60	2400	4800	189.0	0.32	7.5	2000	3400	133.9	0.25	7.5	1600	2700	106.3	0.16	7.5	1200	1200	47.2	0.08	7.5
12	2	36	4000	12000	472.4	0.9	6	3300	8500	334.6	0.7	6	2700	6800	267.7	0.45	6	2000	3000	118.1	0.23	6
12	2	60	4000	12000	472.4	0.8	6	3300	8500	334.6	0.6	6	2700	6800	267.7	0.4	6	2000	3000	118.1	0.2	6
12	2	84	3300	9900	389.8	0.7	6	2700	7000	275.6	0.55	6	2200	5600	220.5	0.36	6	1700	2500	98.4	0.18	6
12	2	108	3300	9900	389.8	0.45	6	2700	7000	275.6	0.35	6	2200	5600	220.5	0.23	6	1700	2500	98.4	0.11	6
12	3	36	4000	12000	472.4	0.9	4.5	3300	8500	334.6	0.7	4.5	2700	6800	267.7	0.45	4.5	2000	3000	118.1	0.23	4.5
12	3	60	4000	12000	472.4	0.8	4.5	3300	8500	334.6	0.6	4.5	2700	6800	267.7	0.4	4.5	2000	3000	118.1	0.2	4.5

Depth of cut



Note 3) When contour milling, cutting conditions can vary greatly due to the geometry of the work material and depth of cut.
Note 4) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is very low, then vibration can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

VFHVRB

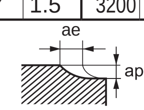
4 flute, Corner radius, Short cut length, Irregular helix flutes

RECOMMENDED CUTTING CONDITIONS

■High depth of cut conditions

Work Material			Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI 35, AISI P20 etc.					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1—10, AISI P21 etc.					Hardened steel (45—55HRC) AISI H13 etc.					Hardened steel (55—62HRC) AISI D2 etc.				
DC (mm)	RE (mm)	LU (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)
1	0.2	4	24000	2200	86.6	0.08	0.45	20000	1500	59.1	0.07	0.45	16000	1200	47.2	0.05	0.45	12000	550	21.7	0.025	0.45
1	0.2	6	24000	2000	78.7	0.07	0.45	20000	1400	55.1	0.05	0.45	16000	1100	43.3	0.04	0.45	12000	500	19.7	0.02	0.45
1	0.2	8	19000	1400	55.1	0.05	0.45	16000	1000	39.4	0.04	0.45	13000	800	31.5	0.03	0.45	9500	350	13.8	0.016	0.45
1	0.2	10	14000	800	31.5	0.04	0.45	12000	600	23.6	0.03	0.45	9000	400	15.7	0.025	0.45	7000	200	7.9	0.012	0.45
1	0.2	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	0.2	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.5	0.3	4	19000	3000	118.1	0.2	0.65	16000	2100	82.7	0.16	0.65	13000	1700	66.9	0.12	0.65	9500	750	29.5	0.06	0.65
1.5	0.3	6	19000	2300	90.6	0.16	0.65	16000	1600	63.0	0.13	0.65	13000	1300	51.2	0.1	0.65	9500	580	22.8	0.05	0.65
1.5	0.3	10	16000	1700	66.9	0.1	0.65	13000	1200	47.2	0.07	0.65	11000	1000	39.4	0.05	0.65	8000	430	16.9	0.03	0.65
1.5	0.3	15	13000	1000	39.4	0.06	0.65	11000	700	27.6	0.05	0.65	9000	600	23.6	0.04	0.65	6500	250	9.8	0.018	0.65
1.5	0.3	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.5	0.3	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.5	0.3	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	0.5	6	14000	3000	118.1	0.2	0.75	12000	2100	82.7	0.16	0.75	9400	1700	66.9	0.12	0.75	7000	750	29.5	0.06	0.75
2	0.5	10	14000	3000	118.1	0.16	0.75	12000	2100	82.7	0.13	0.75	9400	1700	66.9	0.1	0.75	7000	750	29.5	0.05	0.75
2	0.5	15	12000	2100	82.7	0.1	0.75	10000	1500	59.1	0.08	0.75	8000	1200	47.2	0.06	0.75	6000	530	20.9	0.03	0.75
2	0.5	20	12000	1100	43.3	0.08	0.75	10000	800	31.5	0.06	0.75	8000	600	23.6	0.05	0.75	6000	280	11.0	0.025	0.75
2	0.5	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	0.5	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	0.5	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	0.5	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	0.5	10	9600	3300	129.9	0.24	1.5	8000	2300	90.6	0.2	1.5	6400	1800	70.9	0.14	1.5	4800	830	32.7	0.07	1.5
3	0.5	15	9600	2700	106.3	0.22	1.5	8000	1900	74.8	0.17	1.5	6400	1500	59.1	0.13	1.5	4800	680	26.8	0.06	1.5
3	0.5	20	7800	2200	86.6	0.18	1.5	6500	1500	59.1	0.14	1.5	5200	1200	47.2	0.11	1.5	3900	550	21.7	0.05	1.5
3	0.5	30	7800	1700	66.9	0.12	1.5	6500	1200	47.2	0.1	1.5	5200	1000	39.4	0.07	1.5	3900	430	16.9	0.04	1.5
3	0.8	10	9600	3300	129.9	0.5	1	8000	2300	90.6	0.4	1	6400	1800	70.9	0.3	1	4800	830	32.7	0.14	1
3	0.8	15	9600	2700	106.3	0.5	1	8000	1900	74.8	0.35	1	6400	1500	59.1	0.25	1	4800	680	26.8	0.13	1
3	0.8	20	7800	2200	86.6	0.4	1	6500	1500	59.1	0.3	1	5200	1200	47.2	0.23	1	3900	550	21.7	0.11	1
3	0.8	30	7800	1700	66.9	0.24	1	6500	1200	47.2	0.2	1	5200	1000	39.4	0.14	1	3900	430	16.9	0.05	1
3	0.8	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	0.8	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	0.5	12	5000	1800	70.9	0.3	2	4200	1300	51.2	0.24	2	3400	1000	39.4	0.18	2	2500	450	17.7	0.06	2
4	0.5	20	5000	1800	70.9	0.3	2	4200	1300	51.2	0.22	2	3400	1000	39.4	0.17	2	2500	450	17.7	0.06	2
4	0.5	30	4100	1500	59.1	0.24	2	3400	1100	43.3	0.19	2	2700	840	33.1	0.14	2	2100	380	15.0	0.05	2
4	0.5	48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	1	12	7200	3600	141.7	0.6	1.5	6000	2500	98.4	0.5	1.5	4800	2000	78.7	0.36	1.5	3600	900	35.4	0.12	1.5
4	1	20	7200	3600	141.7	0.6	1.5	6000	2500	98.4	0.4	1.5	4800	2000	78.7	0.32	1.5	3600	900	35.4	0.11	1.5
4	1	30	6000	3000	118.1	0.5	1.5	5000	2100	82.7	0.4	1.5	4000	1700	66.9	0.3	1.5	3000	750	29.5	0.1	1.5
6	0.5	18	2400	1200	47.2	0.3	3.5	2000	840	33.1	0.24	3.5	1600	670	26.4	0.18	3.5	1200	300	11.8	0.06	3.5
6	0.5	30	2400	1200	47.2	0.3	3.5	2000	840	33.1	0.22	3.5	1600	670	26.4	0.17	3.5	1200	300	11.8	0.06	3.5
6	1	18	4800	3900	153.5	1	3	4000	2700	106.3	0.8	3	3200	2200	86.6	0.6	3	2400	980	38.6	0.2	3
6	1	30	4800	3900	153.5	0.9	3	4000	2700	106.3	0.7	3	3200	2200	86.6	0.5	3	2400	980	38.6	0.18	3
6	1	54	4000	3300	129.9	0.5	3	3300	2300	90.6	0.4	3	2700	1800	70.9	0.3	3	2000	830	32.7	0.1	3
6	1.5	18	4800	3900	153.5	1	2	4000	2700	106.3	0.8	2	3200	2200	86.6	0.6	2	2400	980	38.6	0.2	2
6	1.5	30	4800	3900	153.5	0.9	2	4000	2700	106.3	0.7	2	3200	2200	86.6	0.5	2	2400	980	38.6	0.18	2
6	1.5	42	4000	3300	129.9	0.8	2	3300	2300	90.6	0.6	2	2700	1800	70.9	0.5	2	2000	830	32.7	0.16	2
6	1.5	54	4000	3300	129.9	0.5	2	3300	2300	90.6	0.4	2	2700	1800	70.9	0.3	2	2000	830	32.7	0.1	2
6	2	18	4800	3900	153.5	1	1.5	4000	2700	106.3	0.8	1.5	3200	2200	86.6	0.6	1.5	2400	980	38.6	0.2	1.5
6	2	30	4800	3900	153.5	0.9	1.5	4000	2700	106.3	0.7	1.5	3200	2200	86.6	0.5	1.5	2400	980	38.6	0.18	1.5

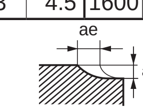
Depth of cut



Note 1) If the depth of cut is smaller than this table, feed rate can be increased.
Note 2) Using air blow or mist is recommended.

Work Material			Carbon steel, Cast iron, Alloy steel (—30HRC) AISI 1050, AISI 35, AISI P20 etc.					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1—10, AISI P21 etc.					Hardened steel (45—55HRC) AISI H13 etc.					Hardened steel (55—62HRC) AISI D2 etc.				
DC (mm)	RE (mm)	LU (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (mm)	Width of cut ae (mm)
7	1.5	—	4100	3900	153.5	1	3	3400	2700	106.3	0.8	3	2700	2200	86.6	0.6	3	2100	980	38.6	0.2	3
8	0.5	24	1800	1200	47.2	0.35	5	1500	840	33.1	0.3	5	1200	670	26.4	0.2	5	900	300	11.8	0.07	5
8	0.5	40	1800	1200	47.2	0.3	5	1500	840	33.1	0.25	5	1200	670	26.4	0.2	5	900	300	11.8	0.06	5
8	1	24	2500	2000	78.7	0.6	4.5	2100	1400	55.1	0.5	4.5	1700	1100	43.3	0.4	4.5	1300	500	19.7	0.12	4.5
8	1	40	2500	2000	78.7	0.5	4.5	2100	1400	55.1	0.4	4.5	1700	1100	43.3	0.3	4.5	1300	500	19.7	0.11	4.5
8	2	24	3600	3900	153.5	1.2	3	3000	2700	106.3	1	3	2400	2200	86.6	0.7	3	1800	980	38.6	0.24	3
8	2	40	3600	3900	153.5	1.1	3	3000	2700	106.3	0.9	3	2400	2200	86.6	0.7	3	1800	980	38.6	0.22	3
8	2	56	3000	3300	129.9	1	3	2500	2300	90.6	0.8	3	2000	1800	70.9	0.6	3	1500	830	32.7	0.2	3
8	2	72	3000	3300	129.9	0.6	3	2500	2300	90.6	0.5	3	2000	1800	70.9	0.4	3	1500	830	32.7	0.12	3
9	2	—	3200	3900	153.5	1.2	3.5	2700	2700	106.3	1	3.5	2100	2200	86.6	0.7	3.5	1600	980	38.6	0.24	3.5
10	0.5	30	1400	1200	47.2	0.35	6.5	1200	840	33.1	0.3	6.5	940	670	26.4	0.2	6.5	700	300	11.8	0.07	6.5
10	0.5	50	1400	1200	47.2	0.3	6.5	1200	840	33.1	0.25	6.5	940	670	26.4	0.2	6.5	700	300	11.8	0.06	6.5
10	1	30	2000	2000	78.7	0.6	6	1700	1400	55.1	0.5	6	1300	1100	43.3	0.4	6	1000	500	19.7	0.12	6
10	1	50	2000	2000	78.7	0.5	6	1700	1400	55.1	0.4	6	1300	1100	43.3	0.3	6	1000	500	19.7	0.11	6
10	2	30	2900	3900	153.5	1.2	4.5	2400	2700	106.3	1	4.5	1900	2200	86.6	0.7	4.5	1500	980	38.6	0.24	4.5
10	2	50	2900	3900	153.5	1.1	4.5	2400	2700	106.3	0.9	4.5	1900	2200	86.6	0.7	4.5	1500	980	38.6	0.22	4.5
10	2	70	2400	3300	129.9	1	4.5	2000	2300	90.6	0.8	4.5	1600	1800	70.9	0.6	4.5	1200	830	32.7	0.2	4.5
10	2	90	2400	3300	129.9	1	4.5	2000	2300	90.6	0.8	4.5	1600	1800	70.9	0.6	4.5	1200	830	32.7	0.2	4.5
11	2	—	2600	3600	141.7	1.2	5	2200	2500	98.4	1	5	1700	2000	78.7	0.7	5	1300	900	35.4	0.24	5
12	0.5	36	1200	1100	43.3	0.5	8	1000	770	30.3	0.4	8	800	620	24.4	0.3	8	600	280	11.0	0.11	8
12	0.5	60	1200	1100	43.3	0.5	8	1000	770	30.3	0.4	8	800	620	24.4	0.3	8	600	280	11.0	0.1	8
12	1	36	1400	1400	55.1	0.7	7.5	1200	1000	39.4	0.6	7.5	940	780	30.7	0.4	7.5	700	350	13.8	0.14	7.5
12	1	60	1400	1400	55.1	0.6	7.5	1200	1000	39.4	0.5	7.5	940	780	30.7	0.4	7.5	700	350	13.8	0.13	7.5
12	2	36	2400	3600	141.7	1.8	6	2000	2500	98.4	1.4	6	1600	2000	78.7	1.1	6	1200	900	35.4	0.4	6
12	2	60	2400	3600	141.7	1.6	6	2000	2500	98.4	1.3	6	1600	2000	78.7	1	6	1200	900	35.4	0.3	6
12	2	84	2000	3000	118.1	1.4	6	1700	2100	82.7	1.1	6	1300	1700	66.9	0.8	6	1000	750	29.5	0.3	6
12	2	108	2000	3000	118.1	0.9	6	1700	2100	82.7	0.7	6	1300	1700	66.9	0.5	6	1000	750	29.5	0.2	6
12	3	36	2400	3600	141.7	1.8	4.5	2000	2500	98.4	1.4	4.5	1600	2000	78.7	1.1	4.5	1200	900	35.4	0.4	4.5
12	3	60	2400	3600	141.7	1.6	4.5	2000	2500	98.4	1.3	4.5	1600	2000	78.7	1	4.5	1200	900	35.4	0.3	4.5

Depth of cut



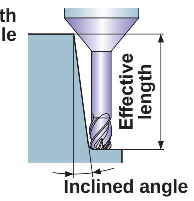
Note 3) When contour milling, cutting conditions can vary greatly due to the geometry of the work material and depth of cut.
Note 4) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is very low, then vibration can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

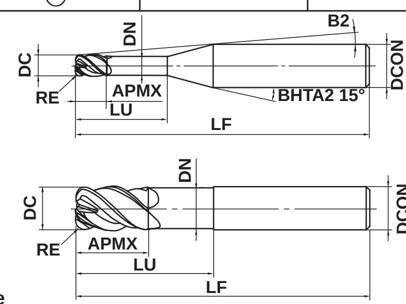
VFHVRB - Inch sizes

4 flute, Corner radius, Short cut length, Irregular helix flutes

43°
45°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎	○	○	○		





DC≤.5000"			
±.0004"			
DC≤.5000"			
0 - .0008"			
.2500"≤DCON≤.3750"	DCON=.5000"		
0 - .00035	0 - .00043		

● Impact Miracle corner radius end mill for high feed and efficient machining.

(inch)

Order Number	DC	RE	APMX	LU	DN	B2	LF	DCON	No. of Flutes	Stock	Type	Effective length for inclined angle 0.5°	1°	2°	3°
VFHVRBD1/8N3DR0.03	.1250	.030	.125	.375	.1211	6.1°	2.25	.2500	4	●	1	9.9	10.3	11	11.9
VFHVRBD1/8N5DR0.03	.1250	.030	.125	.625	.1211	4.3°	2.25	.2500	4	●	1	16.5	17.1	18.3	19.8
VFHVRBD3/16N3DR0.05	.1875	.050	.188	.563	.1835	2.9°	2.25	.2500	4	●	1	14.9	15.4	16.4	⋆
VFHVRBD3/16N5DR0.05	.1875	.050	.188	.938	.1835	1.8°	2.25	.2500	4	●	1	24.7	25.6	⋆	⋆
VFHVRBD1/4N3DR0.06	.2500	.060	.375	.750	.2441	–	2.25	.2500	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1/4N5DR0.06	.2500	.060	.375	1.250	.2441	–	3.00	.2500	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD5/16N3DR0.08	.3125	.080	.469	.938	.3066	–	3.00	.3125	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD5/16N5DR0.08	.3125	.080	.469	1.563	.3066	–	4.00	.3125	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD3/8N3DR0.08	.3750	.080	.563	1.125	.3691	–	3.00	.3750	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD3/8N5DR0.08	.3750	.080	.563	1.875	.3691	–	4.00	.3750	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1/2N3DR0.12	.5000	.120	.750	1.500	.4882	–	4.00	.5000	4	●	2	⋆	⋆	⋆	⋆
VFHVRBD1/2N5DR0.12	.5000	.120	.750	2.500	.4882	–	5.00	.5000	4	●	2	⋆	⋆	⋆	⋆

⋆ No interference

● : USA Stock

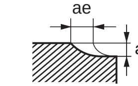
IMPACT MIRACLE END MILLS

RECOMMENDED CUTTING CONDITIONS

■High feed conditions

Work Material			Carbon Steel, Cast Iron, Alloy Steel (—30HRC) AISI 1049, AISI 30, AISI P20					Alloy steel, Tool steel, Pre-haedened steel AIAI H13, AISI W1-10, AISI P21					Hardened Steel (45—55HRC) AISI H13					Hardened Steel (55—62HRC) AISI D2				
DC (inch)	RE (inch)	LU (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)
0.1250	0.03	0.375	16000	11000	433.1	.009	.039	13000	7800	307.1	.007	.039	11000	6300	248	.006	.039	8000	2800	110.2	.003	.039
0.1250	0.03	0.625	16000	9000	354.3	.009	.039	13000	6400	252	.007	.039	11000	5100	200.8	.006	.039	8000	2300	90.6	.003	.039
0.1875	0.05	0.563	12000	12000	472.4	.012	.059	10000	8500	334.6	.009	.059	8000	6800	267.7	.007	.059	6000	3000	118.1	.004	.059
0.1875	0.05	0.938	12000	12000	472.4	.011	.059	10000	8500	334.6	.008	.059	8000	6800	267.7	.006	.059	6000	3000	118.1	.003	.059
0.2500	0.06	0.750	8000	13000	511.8	.020	.078	6600	9200	362.2	.016	.078	5400	7400	291.3	.012	.078	4000	3300	129.9	.006	.078
0.2500	0.06	1.250	8000	13000	511.8	.018	.078	6600	9200	362.2	.014	.078	5400	7400	291.3	.011	.078	4000	3300	129.9	.006	.078
0.3125	0.08	0.938	6000	13000	511.8	.024	.118	5000	9200	362.2	.018	.118	4000	7400	291.3	.014	.118	3000	3300	129.9	.007	.118
0.3125	0.08	1.563	6000	13000	511.8	.021	.118	5000	9200	362.2	.017	.118	4000	7400	291.3	.013	.118	3000	3300	129.9	.006	.118
0.3750	0.08	1.125	4800	13000	511.8	.024	.177	4000	9200	362.2	.018	.177	3200	7400	291.3	.014	.177	2400	3300	129.9	.007	.177
0.3750	0.08	1.875	4800	13000	511.8	.021	.177	4000	9200	362.2	.017	.177	3200	7400	291.3	.013	.177	2400	3300	129.9	.006	.177
0.5000	0.12	1.500	4000	12000	472.4	.035	.177	3300	8500	334.6	.028	.177	2700	6800	267.7	.018	.177	2000	3000	118.1	.009	.177
0.5000	0.12	2.500	4000	12000	472.4	.031	.177	3300	8500	334.6	.024	.177	2700	6800	267.7	.016	.177	2000	3000	118.1	.008	.177

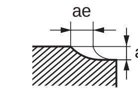
Depth of cut



■High depth of cut conditions

Work Material			Carbon Steel, Cast Iron, Alloy Steel (—30HRC) AISI 1049, AISI 30, AISI P20					Alloy steel, Tool steel, Pre-haedened steel AIAI H13, AISI W1-10, AISI P21					Hardened Steel (45—55HRC) AISI H13					Hardened Steel (55—62HRC) AISI D2				
DC (inch)	RE (inch)	LU (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap (inch)	Width of cut ae (inch)
0.1250	0.03	0.375	9600	3300	129.9	.020	.039	8000	2300	90.6	.016	.039	6400	1800	70.9	.012	.039	4800	830	32.7	.006	.039
0.1250	0.03	0.625	9600	2700	106.3	.020	.039	8000	1900	74.8	.014	.039	6400	1500	59.1	.010	.039	4800	680	26.8	.005	.039
0.1875	0.05	0.563	7200	3600	141.7	.024	.059	6000	2500	98.4	.020	.059	4800	2000	78.7	.014	.059	3600	900	35.4	.005	.059
0.1875	0.05	0.938	7200	3600	141.7	.024	.059	6000	2500	98.4	.016	.059	4800	2000	78.7	.013	.059	3600	900	35.4	.004	.059
0.2500	0.06	0.750	4000	3300	129.9	.020	.118	3300	2300	90.6	.016	.118	2700	1800	70.9	.012	.118	2000	830	32.7	.004	.118
0.2500	0.06	1.250	4800	3900	153.5	.040	.079	4000	2700	106.3	.031	.079	3200	2200	86.6	.024	.079	2400	980	38.6	.008	.079
0.3125	0.08	0.938	3600	3900	153.5	.047	.118	3000	2700	106.3	.040	.118	2400	2200	86.6	.028	.118	1800	980	38.6	.009	.118
0.3125	0.08	1.563	3600	3900	153.5	.043	.118	3000	2700	106.3	.035	.118	2400	2200	86.6	.028	.118	1800	980	38.6	.009	.118
0.3750	0.08	1.125	2900	3900	153.5	.047	.177	2400	2700	106.3	.040	.177	1900	2200	86.6	.028	.177	1500	980	38.6	.009	.177
0.3750	0.08	1.875	2900	3900	153.5	.043	.177	2400	2700	106.3	.035	.177	1900	2200	86.6	.028	.177	1500	980	38.6	.009	.177
0.5000	0.12	1.500	2400	3600	141.7	.071	.177	2000	2500	98.4	.055	.177	1600	2000	78.7	.043	.177	1200	900	35.4	.016	.177
0.5000	0.12	2.500	2400	3600	141.7	.063	.177	2000	2500	98.4	.051	.177	1600	2000	78.7	.040	.177	1200	900	35.4	.012	.177

Depth of cut



Note 1) If the depth of cut is smaller than this table, feed rate can be increased.
Note 2) Using air blow or mist is recommended.
Note 3) When contour milling, cutting conditions can vary greatly due to the geometry of the work material and depth of cut.
Note 4) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is very low, then vibration can occur. In this case, please reduce the revolution and feed rate proportionally, or set a lower depth of cut.

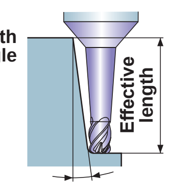
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

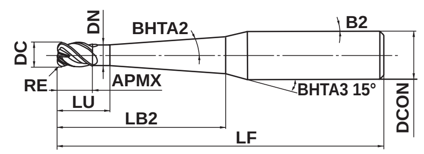
VFHVRB

4 flute, Corner radius, Short cut length, Irregular helix flutes

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎	○	○	○		

Taper neck type





DC≤10	DC>10		
±0.007	±0.01		
DC≤12			
0 / - 0.02			
DCON=6	8≤DCON≤10	12≤DCON≤16	
0 / - 0.008	0 / - 0.009	0 / - 0.011	

● Impact Miracle corner radius end mill for high feed and efficient machining.

(mm)

Order Number	DC	RE	BHTA2	APMX	LU	LB2	DN	B2	LF	DCON	No. of Flutes	Stock	Effective length for inclined angle 0.5°	1°	2°	3°
VFHVRBD010R02N006T09	1	0.2	0.9°	1	2.5	6	0.94	9.3°	60	6	4	●	–	6.6	7.1	7.6
VFHVRBD010R02N010T09	1	0.2	0.9°	1	2.5	10	0.94	7.5°	60	6	4	●	–	10.6	11.4	12.3
VFHVRBD010R02N015T09	1	0.2	0.9°	1	2.5	15	0.94	6.1°	60	6	4	●	–	15.6	16.8	18.1
VFHVRBD010R02N020T09	1	0.2	0.9°	1	2.5	20	0.94	5.1°	80	6	4	★	–	20.6	22.1	23.9
VFHVRBD010R02N025T09	1	0.2	0.9°	1	2.5	25	0.94	4.4°	80	6	4	★	–	25.6	27.5	29.7
VFHVRBD010R02N030T09	1	0.2	0.9°	1	2.5	30	0.94	3.8°	80	6	4	★	–	30.6	32.9	35.5
VFHVRBD010R02N035T09	1	0.2	0.9°	1	2.5	35	0.94	3.4°	90	6	4	★	–	35.6	38.3	41.3
VFHVRBD010R02N040T09	1	0.2	0.9°	1	2.5	40	0.94	3.1°	90	6	4	★	–	40.6	43.6	47.2
VFHVRBD010R02N045T09	1	0.2	0.9°	1	2.5	45	0.94	2.8°	90	6	4	★	–	45.6	49	⋆
VFHVRBD010R02N050T09	1	0.2	0.9°	1	2.5	50	0.94	2.6°	90	6	4	★	–	50.6	54.4	⋆
VFHVRBD015R03N010T09	1.5	0.3	0.9°	1.5	3	10	1.44	7.1°	60	6	4	●	–	10.6	11.4	12.3
VFHVRBD015R03N015T09	1.5	0.3	0.9°	1.5	3	15	1.44	5.7°	60	6	4	●	–	15.6	16.8	18.1
VFHVRBD015R03N020T09	1.5	0.3	0.9°	1.5	3	20	1.44	4.7°	80	6	4	●	–	20.6	22.2	23.9
VFHVRBD015R03N030T09	1.5	0.3	0.9°	1.5	3	30	1.44	3.5°	80	6	4	★	–	30.6	32.9	35.6
VFHVRBD015R03N040T09	1.5	0.3	0.9°	1.5	3	40	1.44	2.8°	90	6	4	★	–	40.6	43.7	⋆
VFHVRBD015R03N050T09	1.5	0.3	0.9°	1.5	3	50	1.44	2.4°	90	6	4	★	–	50.6	54.4	⋆
VFHVRBD020R05N015T04	2	0.5	0.4°	2	4	15	1.9	5.2°	60	6	4	★	15.6	16.2	17.4	18.7
VFHVRBD020R05N020T04	2	0.5	0.4°	2	4	20	1.9	4.3°	80	6	4	★	20.6	21.3	22.9	24.7
VFHVRBD020R05N025T04	2	0.5	0.4°	2	4	25	1.9	3.6°	80	6	4	★	25.6	26.5	28.5	30.8
VFHVRBD020R05N030T04	2	0.5	0.4°	2	4	30	1.9	3.2°	80	6	4	★	30.6	31.7	34	36.8
VFHVRBD020R05N035T04	2	0.5	0.4°	2	4	35	1.9	2.8°	80	6	4	★	35.6	36.9	39.6	⋆
VFHVRBD020R05N040T04	2	0.5	0.4°	2	4	40	1.9	2.5°	80	6	4	★	40.6	42	45.2	⋆
VFHVRBD020R05N020T09	2	0.5	0.9°	2	4	20	1.9	4.4°	80	6	4	●	–	20.8	22.3	24.1
VFHVRBD020R05N025T09	2	0.5	0.9°	2	4	25	1.9	3.7°	90	6	4	●	–	25.8	27.7	29.9
VFHVRBD020R05N030T09	2	0.5	0.9°	2	4	30	1.9	3.2°	90	6	4	●	–	30.8	33	35.7
VFHVRBD020R05N035T09	2	0.5	0.9°	2	4	35	1.9	2.9°	90	6	4	●	–	35.8	38.4	⋆
VFHVRBD020R05N040T09	2	0.5	0.9°	2	4	40	1.9	2.6°	90	6	4	●	–	40.8	43.8	⋆
VFHVRBD020R05N045T09	2	0.5	0.9°	2	4	45	1.9	2.3°	90	6	4	★	–	45.8	49.2	⋆
VFHVRBD020R05N050T09	2	0.5	0.9°	2	4	50	1.9	2.2°	100	6	4	★	–	50.8	54.5	⋆
VFHVRBD020R05N055T09	2	0.5	0.9°	2	4	55	1.9	2°	100	6	4	★	–	55.8	59.9	⋆
VFHVRBD020R05N060T09	2	0.5	0.9°	2	4	60	1.9	1.8°	100	6	4	★	–	60.8	⋆	⋆

⋆ No interference

● : USA Stock ★ : Stocked in Japan

(mm)

Order Number	DC	RE	BHTA2	APMX	LU	LB2	DN	B2	LF	DCON	No. of Flutes	Stock	Effective length for inclined angle 0.5°	1°	2°	3°
VFHVRBD030R08N020T09	3	0.8	0.9°	3	6	20	2.9	3.6°	80	6	4	●	–	20.9	22.4	24.1
VFHVRBD030R08N025T09	3	0.8	0.9°	3	6	25	2.9	3°	80	6	4	●	–	25.9	27.8	30
VFHVRBD030R08N030T09	3	0.8	0.9°	3	6	30	2.9	2.6°	80	6	4	●	–	30.9	33.1	⋆
VFHVRBD030R08N040T09	3	0.8	0.9°	3	6	40	2.9	2°	90	6	4	●	–	40.9	43.9	⋆
VFHVRBD030R08N050T09	3	0.8	0.9°	3	6	50	2.9	1.7°	90	6	4	●	–	50.9	⋆	⋆
VFHVRBD030R08N060T09	3	0.8	0.9°	3	6	60	2.9	1.4°	100	6	4	●	–	60.9	⋆	⋆
VFHVRBD040R10N025T04	4	1	0.4°	4	7	25	3.9	2.1°	80	6	4	★	25.7	26.6	28.5	⋆
VFHVRBD040R10N030T04	4	1	0.4°	4	7	30	3.9	1.8°	80	6	4	★	30.7	31.8	⋆	⋆
VFHVRBD040R10N035T04	4	1	0.4°	4	7	35	3.9	1.6°	80	6	4	★	35.7	36.9	⋆	⋆
VFHVRBD040R10N040T04	4	1	0.4°	4	7	40	3.9	1.4°	80	6	4	★	40.7	42.1	⋆	⋆
VFHVRBD040R10N045T04	4	1	0.4°	4	7	45	3.9	1.3°	90	6	4	★	45.7	47.3	⋆	⋆
VFHVRBD040R10N050T04	4	1	0.4°	4	7	50	3.9	1.2°	90	6	4	★	50.7	52.5	⋆	⋆
VFHVRBD040R10N025T09	4	1	0.9°	4	7	25	3.9	2.2°	90	6	4	●	–	25.9	27.8	⋆
VFHVRBD040R10N030T09	4	1	0.9°	4	7	30	3.9	1.9°	90	6	4	●	–	30.9	⋆	⋆
VFHVRBD040R10N040T09	4	1	0.9°	4	7	40	3.9	1.4°	100	6	4	●	–	40.9	⋆	⋆
VFHVRBD040R10N050T09	4	1	0.9°	4	7	50	3.9	1.2°	100	6	4	●	–	50.9	⋆	⋆
VFHVRBD040R10N060T09	4	1	0.9°	4	7	60	3.9	1°	100	6	4	●	–	60.9	⋆	⋆
VFHVRBD060R15N040T09	6	1.5	0.9°	9	12	40	5.85	1.4°	110	8	4	●	–	41.4	⋆	⋆
VFHVRBD060R15N050T09	6	1.5	0.9°	9	12	50	5.85	1.2°	110	8	4	●	–	51.4	⋆	⋆
VFHVRBD060R15N060T09	6	1.5	0.9°	9	12	60	5.85	1°	110	8	4	●	–	61.4	⋆	⋆
VFHVRBD060R15N070T09	6	1.5	0.9°	9	12	70	5.85	0.9°	110	8	4	●	–	⋆	⋆	⋆
VFHVRBD080R20N060T09	8	2	0.9°	12	15	60	7.85	1°	150	10	4	★	–	61.5	⋆	⋆
VFHVRBD080R20N080T09	8	2	0.9°	12	15	80	7.85	0.8°	150	10	4	★	–	⋆	⋆	⋆
VFHVRBD100R20N080T09	10	2	0.9°	15	18	80	9.7	2°	130	16	4	★	–	82	88	⋆
VFHVRBD100R20N120T09	10	2	0.9°	15	18	120	9.7	1.4°	180	16	4	★	–	122	⋆	⋆
VFHVRBD120R20N080T09	12	2	0.9°	18	21	80	11.7	1.4°	130	16	4	★	–	82.2	⋆	⋆
VFHVRBD120R20N120T09	12	2	0.9°	18	21	120	11.7	1°	180	16	4	★	–	122.2	⋆	⋆

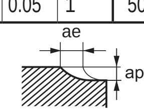
⋆ No interference

VFHVRB

4 flute, Corner radius, Short cut length, Irregular helix flutes

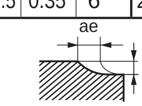
RECOMMENDED CUTTING CONDITIONS

■High depth cut conditions

Work Material				Carbon Steel, Cast Iron, Alloy Steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21					Hardened Steel (45−55HRC) AISI H13					Hardened Steel (55−62HRC) AISI D2				
DC (mm)	RE (mm)	BHTA2	LU (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)
1	0.2	0.9°	6	40000	6500	255.9	0.03	0.45	33000	4600	181.1	0.022	0.45	27000	3700	145.7	0.018	0.45	20000	1600	63.0	0.01	0.45
1	0.2	0.9°	10	24000	2700	106.3	0.015	0.45	20000	1900	74.8	0.01	0.45	16000	1500	59.1	0.008	0.45	12000	700	27.6	0.006	0.45
1	0.2	0.9°	15	16000	1200	47.2	0.013	0.45	14000	700	27.6	0.008	0.45	12000	500	19.7	0.007	0.45	10000	400	15.7	0.003	0.45
1	0.2	0.9°	20	14000	1000	39.4	0.01	0.45	12000	600	23.6	0.006	0.45	10000	400	15.7	0.005	0.45	9000	300	11.8	0.002	0.45
1	0.2	0.9°	25	9500	610	24.0	0.008	0.45	8000	440	17.3	0.005	0.45	6000	320	12.6	0.004	0.45	4800	160	6.3	0.002	0.45
1	0.2	0.9°	30	4900	320	12.6	0.007	0.45	4100	220	8.7	0.004	0.45	3000	160	6.3	0.003	0.45	2500	80	3.1	0.002	0.45
1	0.2	0.9°	35	4000	260	10.2	0.006	0.45	3400	190	7.5	0.003	0.45	3000	160	6.3	0.003	0.45	2000	70	2.8	0.001	0.45
1	0.2	0.9°	40	3500	180	7.1	0.005	0.45	2900	130	5.1	0.003	0.45	2000	90	3.5	0.003	0.45	1700	50	2.0	0.001	0.45
1	0.2	0.9°	45	2900	150	5.9	0.004	0.45	2400	100	3.9	0.002	0.45	2000	90	3.5	0.002	0.45	1400	40	1.6	0.001	0.45
1	0.2	0.9°	50	2900	110	4.3	0.003	0.45	2400	80	3.1	0.002	0.45	2000	60	2.4	0.002	0.45	1400	30	1.2	0.001	0.45
1.5	0.3	0.9°	10	27000	5700	224.4	0.05	0.65	22000	4000	157.5	0.035	0.65	18000	3000	118.1	0.03	0.65	14000	1400	55.1	0.014	0.65
1.5	0.3	0.9°	15	22000	3200	126.0	0.03	0.65	18000	2300	90.6	0.025	0.65	15000	1700	66.9	0.018	0.65	11000	1000	39.4	0.009	0.65
1.5	0.3	0.9°	20	16000	1400	55.1	0.02	0.65	14000	1200	47.2	0.016	0.65	13000	1000	39.4	0.012	0.65	9000	700	27.6	0.007	0.65
1.5	0.3	0.9°	30	13000	900	35.4	0.01	0.65	11000	700	27.6	0.008	0.65	10000	600	23.6	0.006	0.65	7500	400	15.7	0.004	0.65
1.5	0.3	0.9°	40	4500	230	9.1	0.008	0.65	3700	160	6.3	0.007	0.65	3000	120	4.7	0.005	0.65	2300	70	2.8	0.003	0.65
1.5	0.3	0.9°	50	3700	190	7.5	0.007	0.65	3000	130	5.1	0.006	0.65	3000	120	4.7	0.004	0.65	1900	60	2.4	0.002	0.65
2	0.5	0.4°	15	20000	7000	275.6	0.05	0.75	17000	5000	196.9	0.04	0.75	13000	3200	126.0	0.03	0.75	10000	1800	70.9	0.016	0.75
2	0.5	0.4°	20	20000	3600	141.7	0.04	0.75	17000	2600	102.4	0.03	0.75	13000	1800	70.9	0.025	0.75	10000	900	35.4	0.012	0.75
2	0.5	0.4°	25	16000	1800	70.9	0.03	0.75	14000	1400	55.1	0.025	0.75	12000	1100	43.3	0.02	0.75	9000	720	28.3	0.01	0.75
2	0.5	0.4°	30	16000	1400	55.1	0.025	0.75	14000	1200	47.2	0.02	0.75	12000	900	35.4	0.016	0.75	9000	650	25.6	0.008	0.75
2	0.5	0.4°	35	13000	1100	43.3	0.02	0.75	11000	800	31.5	0.018	0.75	10000	700	27.6	0.014	0.75	7000	500	19.7	0.007	0.75
2	0.5	0.4°	40	13000	1000	39.4	0.02	0.75	11000	700	27.6	0.015	0.75	10000	600	23.6	0.012	0.75	7000	400	15.7	0.006	0.75
2	0.5	0.9°	20	20000	3600	141.7	0.04	0.75	17000	2600	102.4	0.03	0.75	13000	1800	70.9	0.025	0.75	10000	900	35.4	0.012	0.75
2	0.5	0.9°	25	16000	1800	70.9	0.03	0.75	14000	1400	55.1	0.025	0.75	12000	1100	43.3	0.02	0.75	9000	720	28.3	0.01	0.75
2	0.5	0.9°	30	16000	1400	55.1	0.025	0.75	14000	1200	47.2	0.02	0.75	12000	900	35.4	0.016	0.75	9000	650	25.6	0.008	0.75
2	0.5	0.9°	35	13000	1100	43.3	0.02	0.75	11000	800	31.5	0.018	0.75	10000	700	27.6	0.014	0.75	7000	500	19.7	0.007	0.75
2	0.5	0.9°	40	13000	1000	39.4	0.02	0.75	11000	700	27.6	0.015	0.75	10000	600	23.6	0.012	0.75	7000	400	15.7	0.006	0.75
2	0.5	0.9°	45	8000	500	19.7	0.016	0.75	6800	360	14.2	0.012	0.75	5200	250	9.8	0.01	0.75	4000	120	4.7	0.005	0.75
2	0.5	0.9°	50	8000	500	19.7	0.016	0.75	6800	360	14.2	0.012	0.75	5200	250	9.8	0.01	0.75	4000	120	4.7	0.005	0.75
2	0.5	0.9°	55	4100	230	9.1	0.012	0.75	3500	170	6.7	0.009	0.75	2700	120	4.7	0.008	0.75	2000	60	2.4	0.004	0.75
2	0.5	0.9°	60	4100	230	9.1	0.012	0.75	3500	170	6.7	0.009	0.75	2700	120	4.7	0.008	0.75	2000	60	2.4	0.004	0.75
3	0.8	0.9°	20	13000	7200	283.5	0.19	1	11000	5100	200.8	0.15	1	8700	4000	157.5	0.11	1	6500	1800	70.9	0.06	1
3	0.8	0.9°	25	13000	7200	283.5	0.19	1	11000	5100	200.8	0.15	1	8700	4000	157.5	0.11	1	6500	1800	70.9	0.06	1
3	0.8	0.9°	30	13000	5700	224.4	0.12	1	11000	4000	157.5	0.09	1	8700	3000	118.1	0.07	1	6500	1400	55.1	0.04	1
3	0.8	0.9°	40	11000	3600	141.7	0.08	1	9100	2600	102.4	0.06	1	7400	2000	78.7	0.05	1	5500	1000	39.4	0.025	1
3	0.8	0.9°	50	8000	2600	102.4	0.07	1	6600	1800	70.9	0.05	1	5800	1500	59.1	0.04	1	4600	800	31.5	0.02	1
3	0.8	0.9°	60	7800	2480	97.6	0.06	1	6600	1740	68.5	0.05	1	5000	1250	49.2	0.04	1	3900	610	24.0	0.02	1
Depth of cut																							

Note 1) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 2) Air blow or oil mist is recommended for good chip evacuation.
Note 3) For profile machining such as molds, machining conditions may differ considerably depending on the work material geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a work material.
Note 4) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, then vibration can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

IMPACT MIRACLE END MILLS

Work Material				Carbon Steel, Cast Iron, Alloy Steel (−30HRC) AISI 1050, AISI No 35 B, AISI P20					Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21					Hardened Steel (45−55HRC) AISI H13					Hardened Steel (55−62HRC) AISI D2				
DC (mm)	RE (mm)	BHTA2	LU (mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)	Revolution (min^{-1})	Table feed (mm/min)	Table feed (IPM)	Depth of cut ap(mm)	Width of cut ae(mm)
4	1	0.4°	25	10000	9900	389.8	0.24	1.5	8300	7000	275.6	0.19	1.5	6700	5600	220.5	0.14	1.5	5000	2500	98.4	0.07	1.5
4	1	0.4°	30	10000	9900	389.8	0.24	1.5	8300	7000	275.6	0.19	1.5	6700	5600	220.5	0.14	1.5	5000	2500	98.4	0.07	1.5
4	1	0.4°	35	10000	9900	389.8	0.15	1.5	8300	7000	275.6	0.12	1.5	6700	5600	220.5	0.09	1.5	5000	2500	98.4	0.04	1.5
4	1	0.4°	40	10000	9900	389.8	0.15	1.5	8300	7000	275.6	0.12	1.5	6700	5600	220.5	0.09	1.5	5000	2500	98.4	0.04	1.5
4	1	0.4°	45	10000	9900	389.8	0.15	1.5	8300	7000	275.6	0.12	1.5	6700	5600	220.5	0.09	1.5	5000	2500	98.4	0.04	1.5
4	1	0.4°	50	8100	6300	248.0	0.14	1.5	6700	4420	174.0	0.11	1.5	5400	3500	137.8	0.08	1.5	4000	1600	63.0	0.04	1.5
4	1	0.9°	25	10000	9900	389.8	0.24	1.5	8300	7000	275.6	0.19	1.5	6700	5600	220.5	0.14	1.5	5000	2500	98.4	0.07	1.5
4	1	0.9°	30	10000	9900	389.8	0.15	1.5	8300	7000	275.6	0.12	1.5	6700	5600	220.5	0.09	1.5	5000	2500	98.4	0.04	1.5
4	1	0.9°	40	10000	9900	389.8	0.15	1.5	8300	7000	275.6	0.12	1.5	6700	5600	220.5	0.09	1.5	5000	2500	98.4	0.04	1.5
4	1	0.9°	50	8100	6300	248.0	0.14	1.5	6700	4420	174.0	0.11	1.5	5400	3500	137.8	0.08	1.5	4000	1600	63.0	0.04	1.5
4	1	0.9°	60	8100	6300	248.0	0.11	1.5	6700	4420	174.0	0.08	1.5	5400	3500	137.8	0.06	1.5	4000	1600	63.0	0.03	1.5
6	1.5	0.9°	40	6600	11000	433.1	0.4	2	5500	7600	299.2	0.32	2	4500	6100	240.2	0.24	2	3300	2700	106.3	0.12	2
6	1.5	0.9°	50	6600	11000	433.1	0.4	2	5500	7600	299.2	0.32	2	4500	6100	240.2	0.24	2	3300	2700	106.3	0.12	2
6	1.5	0.9°	60	6600	11000	433.1	0.25	2	5500	7600	299.2	0.2	2	4500	6100	240.2	0.15	2	3300	2700	106.3	0.08	2
6	1.5	0.9°	70	5400	8700	342.5	0.23	2	4400	6200	244.1	0.18	2	3600	5000	196.9	0.14	2	2700	2200	86.6	0.07	2
8	2	0.9°	60	5000	11000	433.1	0.48	3	4200	7600	299.2	0.37	3	3300	6100	240.2	0.29	3	2500	2700	106.3	0.14	3
8	2	0.9°	80	5000	11000	433.1	0.3	3	4200	7600	299.2	0.23	3	3300	6100	240.2	0.18	3	2500	2700	106.3	0.09	3
10	2	0.9°	80	4000	11000	433.1	0.48	4.5	3300	7600	299.2	0.37	4.5	2700	6100	240.2	0.29	4.5	2000	2700	106.3	0.14	4.5
10	2	0.9°	120	3200	8700	342.5	0.27	4.5	2700	6200	244.1	0.21	4.5	2100	5000	196.9	0.16	4.5	1600	2200	86.6	0.08	4.5
12	2	0.9°	80	3300	10000	393.7	0.72	6	2700	7100	279.5	0.56	6	2200	5600	220.5	0.36	6	1700	2500	98.4	0.18	6
12	2	0.9°	120	3300	10000	393.7	0.45	6	2700	7100	279.5	0.35	6	2200	5600	220.5	0.23	6	1700	2500	98.4	0.12	6
Depth of cut																							

Note 1) If the depth of cut is shallow, the revolution and feed rate can be increased.
Note 2) Air blow or oil mist is recommended for good chip evacuation.
Note 3) For profile machining such as molds, machining conditions may differ considerably depending on the work material geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a work material.
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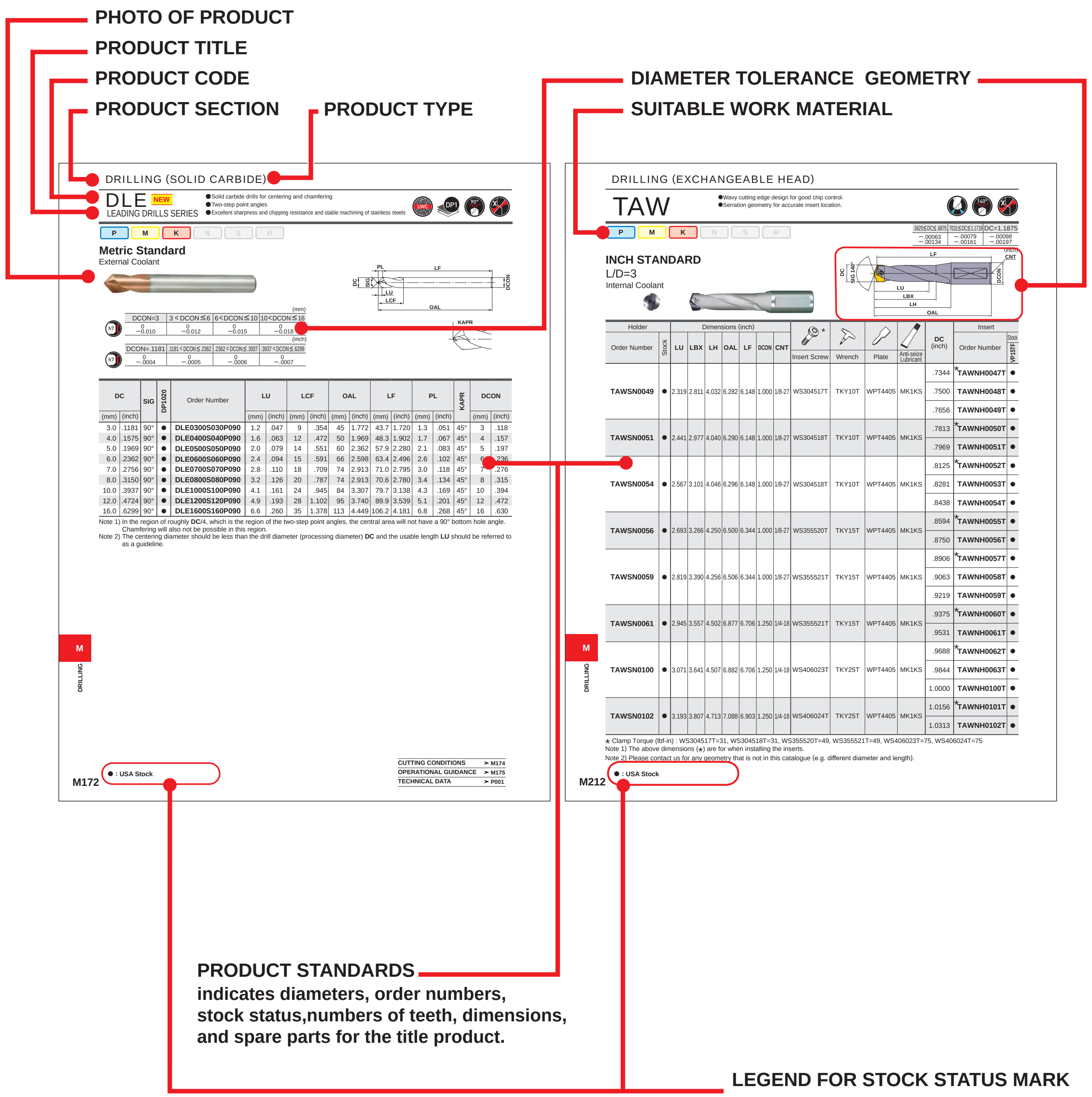
CARBIDE
CHAMFER
SQUARE
BALL
RADIUS
I
SOLID END MILLS

HOW TO READ THE STANDARD OF DRILLING TOOLS

●How this section page is organized

①Arranged in order of solid carbide drills, high-speed steel drills, indexable type drills and brazed type drills.



●To Order : For solid-carbide or brazed drills, please specify order number and grade.
For indexable type drills, please specify order number for the drill.
For indexable type drill inserts, please specify insert number and insert grade.

DRILLING

DRILL STANDARD

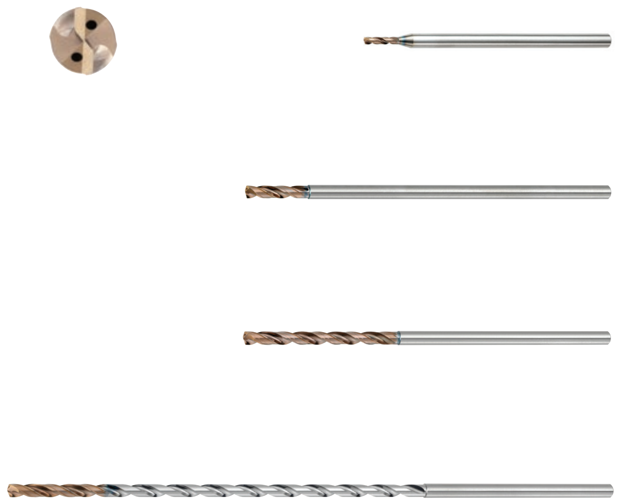
SOLID CARBIDE

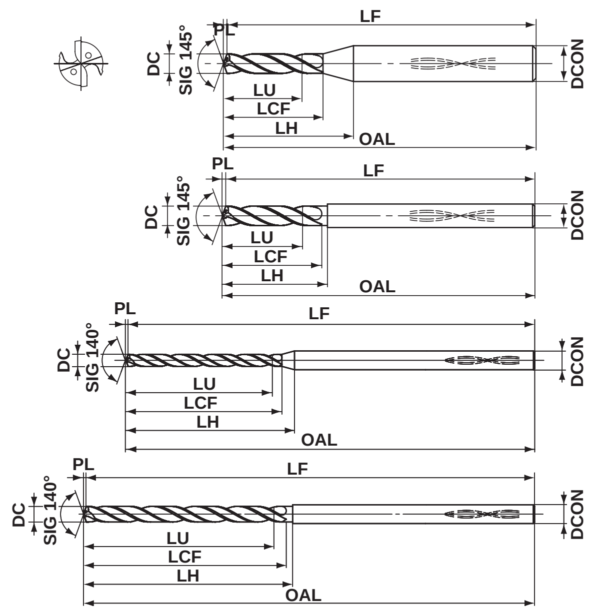
MICRO-MVS

- Straight cutting edge profile improves both chip evacuation and cutting edge strength.
- Double margin offers excellent straightness and high precision.

P | M | K | N | S | H

Internal Coolant





Type1

Type2

Type3

Type4

(inch) (mm)

Type	DC<.1181	DC<3
Type 1	+.00055 / 0	+0.014 / 0
Type2,3,4	0 / −.00055	0 / −0.014
	DCON<.1181	DCON<3
	0 / −.00024	0 / −0.006

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.000	.0394				2	●	MVS0100X02S030	2.2	.087	5.2	.205	8.9	.350	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0100X07S030	7.2	.283	10.2	.402	13.9	.547	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0100X12S030	12.2	.480	15.2	.598	18.9	.744	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0100X20S030	20.2	.795	24.2	.953	27.9	1.098	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0100X25S030	25.2	.992	28.2	1.110	31.9	1.256	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0100X30S030	30.2	1.189	33.2	1.307	36.9	1.453	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.016	.0400		60		2	●	MVS0102X02S030	2.2	.087	5.6	.220	9.3	.366	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0102X07S030	7.3	.287	11.2	.441	14.9	.587	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0102X12S030	12.4	.488	17.2	.677	20.9	.823	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0102X20S030	20.5	.807	25.2	.992	28.9	1.138	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0102X25S030	25.6	1.008	31.2	1.228	34.9	1.374	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0102X30S030	30.7	1.209	36.2	1.425	39.9	1.571	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.042	.0410		59		2	●	MVS0104X02S030	2.3	.091	5.6	.220	9.3	.366	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0104X07S030	7.5	.295	11.2	.441	14.9	.587	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0104X12S030	12.7	.500	17.2	.677	20.9	.823	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0104X20S030	21.0	.827	25.2	.992	28.9	1.138	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0104X25S030	26.2	1.031	31.2	1.228	34.9	1.374	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0104X30S030	31.4	1.236	36.2	1.425	39.9	1.571	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.067	.0420		58		2	●	MVS0107X02S030	2.3	.091	5.6	.220	9.2	.362	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0107X07S030	7.7	.303	11.2	.441	14.8	.583	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0107X12S030	13.0	.512	17.2	.677	20.8	.819	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0107X20S030	21.5	.846	25.2	.992	28.8	1.134	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0107X25S030	26.9	1.059	31.2	1.228	34.8	1.370	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0107X30S030	32.2	1.268	36.2	1.425	39.8	1.567	72.2	2.843	72	2.835	0.2	.008	3	.118	3

Note 1) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.093	.0430		57		2	●	MVS0109X02S030	2.4	.094	5.6	.220	9.2	.362	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0109X07S030	7.8	.307	11.2	.441	14.8	.583	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0109X12S030	13.3	.524	17.2	.677	20.8	.819	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0109X20S030	22.0	.866	25.2	.992	28.8	1.134	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0109X25S030	27.5	1.083	31.2	1.228	34.8	1.370	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0109X30S030	33.0	1.299	36.2	1.425	39.8	1.567	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.100	.0433				2	●	MVS0110X02S030	2.4	.094	5.6	.220	9.1	.358	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0110X07S030	7.9	.311	11.2	.441	14.7	.579	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0110X12S030	13.4	.528	17.2	.677	20.7	.815	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0110X20S030	22.2	.874	25.2	.992	28.7	1.130	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0110X25S030	27.7	1.091	31.2	1.228	34.7	1.366	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0110X30S030	33.2	1.307	36.2	1.425	39.7	1.563	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.182	.0465		56		2	●	MVS0118X02S030	2.5	.098	6.2	.244	9.6	.378	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0118X07S030	8.5	.335	12.2	.480	15.6	.614	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0118X12S030	14.4	.567	18.2	.717	21.6	.850	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0118X20S030	23.8	.937	28.2	1.110	31.6	1.244	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0118X25S030	29.7	1.169	34.2	1.346	37.6	1.480	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0118X30S030	35.6	1.402	40.2	1.583	43.6	1.717	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.200	.0472				2	●	MVS0120X02S030	2.6	.102	6.2	.244	9.6	.378	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0120X07S030	8.6	.339	12.2	.480	15.6	.614	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0120X12S030	14.6	.575	18.2	.717	21.6	.850	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0120X20S030	24.2	.953	28.2	1.110	31.6	1.244	60.2	2.370	60	2.362	0.2	.008	3	.118	3
					25	●	MVS0120X25S030	30.2	1.189	34.2	1.346	37.6	1.480	66.2	2.606	66	2.598	0.2	.008	3	.118	3
					30	●	MVS0120X30S030	36.2	1.425	40.2	1.583	43.6	1.717	72.2	2.843	72	2.835	0.2	.008	3	.118	3
1.300	.0512				2	●	MVS0130X02S030	2.8	.110	6.6	.260	9.8	.386	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0130X07S030	9.3	.366	13.2	.520	16.4	.646	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0130X12S030	15.8	.622	20.2	.795	23.4	.921	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0130X20S030	26.2	1.031	30.2	1.189	33.4	1.315	68.2	2.685	68	2.677	0.2	.008	3	.118	3
					25	●	MVS0130X25S030	32.7	1.287	36.2	1.425	39.4	1.551	74.2	2.921	74	2.913	0.2	.008	3	.118	3
					30	●	MVS0130X30S030	39.2	1.543	43.2	1.701	46.4	1.827	82.2	3.236	82	3.228	0.2	.008	3	.118	3
1.321	.0520		55		2	●	MVS0132X02S030	2.9	.114	7.2	.283	10.3	.406	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0132X07S030	9.5	.374	14.2	.559	17.3	.681	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					12	●	MVS0132X12S030	16.1	.634	21.2	.835	24.3	.957	55.2	2.173	55	2.165	0.2	.008	3	.118	3
					20	●	MVS0132X20S030	26.7	1.051	32.2	1.268	35.3	1.390	68.2	2.685	68	2.677	0.2	.008	3	.118	3
					25	●	MVS0132X25S030	33.3	1.311	39.2	1.543	42.3	1.665	74.2	2.921	74	2.913	0.2	.008	3	.118	3
					30	●	MVS0132X30S030	39.9	1.571	46.2	1.819	49.3	1.941	82.2	3.236	82	3.228	0.2	.008	3	.118	3
1.397	.0550		54		2	●	MVS0139X02S030	3.0	.118	7.2	.283	10.2	.402	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0139X07S030	10.0	.394	14.3	.563	17.3	.681	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					12	●	MVS0139X12S030	17.0	.669	21.3	.839	24.3	.957	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					20	●	MVS0139X20S030	28.2	1.110	32.3	1.272	35.3	1.390	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					25	●	MVS0139X25S030	35.2	1.386	39.3	1.547	42.3	1.665	74.3	2.925	74	2.913	0.3	.012	3	.118	3
					30	●	MVS0139X30S030	42.2	1.661	46.3	1.823	49.3	1.941	82.3	3.240	82	3.228	0.3	.012	3	.118	3
1.400	.0551				2	●	MVS0140X02S030	3.0	.118	7.2	.283	10.2	.402	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0140X07S030	10.1	.398	14.3	.563	17.3	.681	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					12	●	MVS0140X12S030	17.1	.673	21.3	.839	24.3	.957	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					20	●	MVS0140X20S030	28.3	1.114	32.3	1.272	35.3	1.390	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					25	●	MVS0140X25S030	35.3	1.390	39.3	1.547	42.3	1.665	74.3	2.925	74	2.913	0.3	.012	3	.118	3
					30	●	MVS0140X30S030	42.3	1.665	46.3	1.823	49.3	1.941	82.3	3.240	82	3.228	0.3	.012	3	.118	3

MICRO-MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.500	.0591			#1-64	2	●	MVS0150X02S030	3.2	.126	7.6	.299	10.4	.409	55.2	2.173	55	2.165	0.2	.008	3	.118	1
					7	●	MVS0150X07S030	10.8	.425	15.3	.602	18.1	.713	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					12	●	MVS0150X12S030	18.3	.720	23.3	.917	26.1	1.028	55.3	2.177	55	2.165	0.3	.012	3	.118	3
					20	●	MVS0150X20S030	30.3	1.193	35.3	1.390	38.1	1.500	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					25	●	MVS0150X25S030	37.8	1.488	42.3	1.665	45.1	1.776	74.3	2.925	74	2.913	0.3	.012	3	.118	3
					30	●	MVS0150X30S030	45.3	1.783	50.3	1.980	53.1	2.091	82.3	3.240	82	3.228	0.3	.012	3	.118	3
1.588	.0625	1/16			2	●	MVS0159X02S030	3.4	.134	8.3	.327	10.9	.429	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0159X07S030	11.4	.449	16.3	.642	18.9	.744	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0159X12S030	19.3	.760	24.3	.957	26.9	1.059	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0159X20S030	32.0	1.260	37.3	1.469	39.9	1.571	78.3	3.083	78	3.071	0.3	.012	3	.118	3
					25	●	MVS0159X25S030	40.0	1.575	45.3	1.783	47.9	1.886	86.3	3.398	86	3.386	0.3	.012	3	.118	3
					30	●	MVS0159X30S030	47.0	1.850	53.3	2.098	55.9	2.201	95.3	3.752	95	3.740	0.3	.012	3	.118	3
1.600	.0630				2	●	MVS0160X02S030	3.5	.138	8.3	.327	10.9	.429	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0160X07S030	11.5	.453	16.3	.642	18.9	.744	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0160X12S030	19.5	.768	24.3	.957	26.9	1.059	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0160X20S030	32.3	1.272	37.3	1.469	39.9	1.571	78.3	3.083	78	3.071	0.3	.012	3	.118	3
					25	●	MVS0160X25S030	40.3	1.587	45.3	1.783	47.9	1.886	86.3	3.398	86	3.386	0.3	.012	3	.118	3
					30	●	MVS0160X30S030	48.3	1.902	53.3	2.098	55.9	2.201	95.3	3.752	95	3.740	0.3	.012	3	.118	3
1.613	.0635		52		2	●	MVS0161X02S030	3.5	.138	8.7	.343	11.3	.445	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0161X07S030	11.5	.453	17.3	.681	19.9	.783	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0161X12S030	19.7	.776	26.3	1.035	28.9	1.138	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0161X20S030	32.6	1.283	39.3	1.547	41.9	1.650	78.3	3.083	78	3.071	0.3	.012	3	.118	3
					25	●	MVS0161X25S030	40.6	1.598	48.3	1.902	50.9	2.004	86.3	3.398	86	3.386	0.3	.012	3	.118	3
					30	●	MVS0161X30S030	48.7	1.917	56.3	2.217	58.9	2.319	95.3	3.752	95	3.740	0.3	.012	3	.118	3
1.700	.0669				2	●	MVS0170X02S030	3.7	.146	8.7	.343	11.1	.437	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0170X07S030	12.2	.480	17.3	.681	19.7	.776	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0170X12S030	20.7	.815	26.3	1.035	28.7	1.130	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0170X20S030	34.3	1.350	39.3	1.547	41.7	1.642	78.3	3.083	78	3.071	0.3	.012	3	.118	3
					25	●	MVS0170X25S030	42.8	1.685	48.3	1.902	50.7	1.996	86.3	3.398	86	3.386	0.3	.012	3	.118	3
					30	●	MVS0170X30S030	51.3	2.020	56.3	2.217	58.7	2.311	95.3	3.752	95	3.740	0.3	.012	3	.118	3
1.778	.0700		50	#2-56	2	●	MVS0178X02S030	3.8	.150	9.3	.366	11.6	.457	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0178X07S030	12.8	.504	18.3	.720	20.6	.811	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0178X12S030	21.7	.854	27.3	1.075	29.6	1.165	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0178X20S030	35.9	1.413	41.3	1.626	43.6	1.717	84.3	3.319	84	3.307	0.3	.012	3	.118	3
					25	●	MVS0178X25S030	44.8	1.764	50.3	1.980	52.6	2.071	94.3	3.713	94	3.701	0.3	.012	3	.118	3
					30	●	MVS0178X30S030	53.7	2.114	59.3	2.335	61.6	2.425	102.3	4.028	102	4.016	0.3	.012	3	.118	3
1.800	.0709				2	●	MVS0180X02S030	3.9	.154	9.3	.366	11.5	.453	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0180X07S030	12.9	.508	18.3	.720	20.5	.807	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0180X12S030	21.9	.862	27.3	1.075	29.5	1.161	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0180X20S030	36.3	1.429	41.3	1.626	43.5	1.713	84.3	3.319	84	3.307	0.3	.012	3	.118	3
					25	●	MVS0180X25S030	45.3	1.783	50.3	1.980	52.5	2.067	94.3	3.713	94	3.701	0.3	.012	3	.118	3
					30	●	MVS0180X30S030	54.3	2.138	59.3	2.335	61.5	2.421	102.3	4.028	102	4.016	0.3	.012	3	.118	3
1.855	.0730		49		2	●	MVS0186X02S030	4.0	.157	9.7	.382	11.8	.465	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0186X07S030	13.3	.524	19.3	.760	21.4	.843	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0186X12S030	22.6	.890	29.3	1.154	31.4	1.236	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0186X20S030	37.4	1.472	44.3	1.744	46.4	1.827	84.3	3.319	84	3.307	0.3	.012	3	.118	3
					25	●	MVS0186X25S030	46.7	1.839	53.3	2.098	55.4	2.181	94.3	3.713	94	3.701	0.3	.012	3	.118	3
					30	●	MVS0186X30S030	56.0	2.205	63.3	2.492	65.4	2.575	102.3	4.028	102	4.016	0.3	.012	3	.118	3

Note 1) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.900	.0748				2	●	MVS0190X02S030	4.1	.161	9.7	.382	11.8	.465	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0190X07S030	13.6	.535	19.3	.760	21.4	.843	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					12	●	MVS0190X12S030	23.1	.909	29.3	1.154	31.4	1.236	68.3	2.689	68	2.677	0.3	.012	3	.118	3
					20	●	MVS0190X20S030	38.3	1.508	44.3	1.744	46.4	1.827	84.3	3.319	84	3.307	0.3	.012	3	.118	3
					25	●	MVS0190X25S030	47.8	1.882	53.3	2.098	55.4	2.181	94.3	3.713	94	3.701	0.3	.012	3	.118	3
					30	●	MVS0190X30S030	57.3	2.256	63.3	2.492	65.4	2.575	102.3	4.028	102	4.016	0.3	.012	3	.118	3
1.931	.0760		48		2	●	MVS0193X02S030	4.2	.165	10.3	.406	12.3	.484	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0193X07S030	13.9	.547	20.4	.803	22.4	.882	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					12	●	MVS0193X12S030	23.5	.925	30.4	1.197	32.4	1.276	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					20	●	MVS0193X20S030	39.0	1.535	46.4	1.827	48.4	1.906	84.4	3.323	84	3.307	0.4	.016	3	.118	3
					25	●	MVS0193X25S030	48.6	1.913	56.4	2.220	58.4	2.299	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					30	●	MVS0193X30S030	58.3	2.295	66.4	2.614	68.4	2.693	102.4	4.031	102	4.016	0.4	.016	3	.118	3
1.994	.0785				2	●	MVS0199X02S030	4.3	.169	10.3	.406	12.2	.480	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0199X07S030	14.3	.563	20.4	.803	22.3	.878	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					12	●	MVS0199X12S030	24.3	.957	30.4	1.197	32.3	1.272	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					20	●	MVS0199X20S030	40.2	1.583	46.4	1.827	48.3	1.902	84.4	3.323	84	3.307	0.4	.016	3	.118	3
					25	●	MVS0199X25S030	50.2	1.976	56.4	2.220	58.3	2.295	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					30	●	MVS0199X30S030	60.2	2.370	66.4	2.614	68.3	2.689	102.4	4.031	102	4.016	0.4	.016	3	.118	3
2.000	.0787			#3-48	2	●	MVS0200X02S030	4.3	.169	10.3	.406	12.2	.480	68.3	2.689	68	2.677	0.3	.012	3	.118	1
					7	●	MVS0200X07S030	14.4	.567	20.4	.803	22.3	.878	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					12	●	MVS0200X12S030	24.4	.961	30.4	1.197	32.3	1.272	68.4	2.693	68	2.677	0.4	.016	3	.118	3
					20	●	MVS0200X20S030	40.4	1.591	46.4	1.827	48.3	1.902	84.4	3.323	84	3.307	0.4	.016	3	.118	3
					25	●	MVS0200X25S030	50.4	1.984	56.4	2.220	58.3	2.295	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					30	●	MVS0200X30S030	60.4	2.378	66.4	2.614	68.3	2.689	102.4	4.031	102	4.016	0.4	.016	3	.118	3
2.058	.0810		46		2	●	MVS0206X02S030	4.4	.173	10.7	.421	12.5	.492	74.3	2.925	74	2.913	0.3	.012	3	.118	1
					7	●	MVS0206X07S030	14.8	.583	21.4	.843	23.2	.913	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0206X12S030	25.1	.988	32.4	1.276	34.2	1.346	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0206X20S030	41.5	1.634	48.4	1.906	50.2	1.976	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0206X25S030	51.8	2.039	59.4	2.339	61.2	2.409	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0206X30S030	62.1	2.445	69.4	2.732	71.2	2.803	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.100	.0827				2	●	MVS0210X02S030	4.5	.177	10.7	.421	12.4	.488	74.3	2.925	74	2.913	0.3	.012	3	.118	1
					7	●	MVS0210X07S030	15.1	.594	21.4	.843	23.1	.909	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0210X12S030	25.6	1.008	32.4	1.276	34.1	1.343	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0210X20S030	42.4	1.669	48.4	1.906	50.1	1.972	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0210X25S030	52.9	2.083	59.4	2.339	61.1	2.406	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0210X30S030	63.4	2.496	69.4	2.732	71.1	2.799	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.185	.0860		44		2	●	MVS0218X02S030	4.7	.185	11.3	.445	12.8	.504	74.3	2.925	74	2.913	0.3	.012	3	.118	1
					7	●	MVS0218X07S030	15.7	.618	22.4	.882	23.9	.941	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0218X12S030	26.6	1.047	33.4	1.315	34.9	1.374	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0218X20S030	44.1	1.736	51.4	2.024	52.9	2.083	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0218X25S030	55.0	2.165	62.4	2.457	63.9	2.516	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0218X30S030	65.9	2.594	73.4	2.890	74.9	2.949	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.200	.0866				2	●	MVS0220X02S030	4.7	.185	11.3	.445	12.8	.504	74.3	2.925	74	2.913	0.3	.012	3	.118	1
					7	●	MVS0220X07S030	15.8	.622	22.4	.882	23.9	.941	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0220X12S030	26.8	1.055	33.4	1.315	34.9	1.374	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0220X20S030	44.4	1.748	51.4	2.024	52.9	2.083	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0220X25S030	55.4	2.181	62.4	2.457	63.9	2.516	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0220X30S030	66.4	2.614	73.4	2.890	74.9	2.949	118.4	4.661	118	4.646	0.4	.016	3	.118	3

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DRILLING

MICRO-MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.261	.0890		43	#4-40	2	●	MVS0226X02S030	4.9	.193	11.8	.465	13.2	.520	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0226X07S030	16.2	.638	23.4	.921	24.8	.976	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0226X12S030	27.5	1.083	35.4	1.394	36.8	1.449	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0226X20S030	45.6	1.795	53.4	2.102	54.8	2.157	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0226X25S030	56.9	2.240	64.4	2.535	65.8	2.591	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0226X30S030	68.2	2.685	76.4	3.008	77.8	3.063	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.300	.0906				2	●	MVS0230X02S030	5.0	.197	11.8	.465	13.1	.516	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0230X07S030	16.5	.650	23.4	.921	24.7	.972	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0230X12S030	28.0	1.102	35.4	1.394	36.7	1.445	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0230X20S030	46.4	1.827	53.4	2.102	54.7	2.154	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0230X25S030	57.9	2.280	64.4	2.535	65.7	2.587	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0230X30S030	69.4	2.732	76.4	3.008	77.7	3.059	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.382	.0938	3/32			2	●	MVS0238X02S030	5.1	.201	12.4	.488	13.6	.535	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0238X07S030	17.1	.673	24.4	.961	25.6	1.008	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0238X12S030	29.0	1.142	36.4	1.433	37.6	1.480	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0238X20S030	48.1	1.894	55.4	2.181	56.6	2.228	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0238X25S030	60.0	2.362	67.4	2.654	68.6	2.701	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0238X30S030	71.9	2.831	79.4	3.126	80.6	3.173	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.400	.0945				2	●	MVS0240X02S030	5.2	.205	12.4	.488	13.5	.531	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0240X07S030	17.2	.677	24.4	.961	25.5	1.004	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0240X12S030	29.2	1.150	36.4	1.433	37.5	1.476	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0240X20S030	48.4	1.906	55.4	2.181	56.5	2.224	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0240X25S030	60.4	2.378	67.4	2.654	68.5	2.697	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0240X30S030	72.4	2.850	79.4	3.126	80.5	3.169	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.439	.0960		41		2	●	MVS0244X02S030	5.3	.209	12.8	.504	13.8	.543	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0244X07S030	17.5	.689	25.4	1.000	26.4	1.039	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					12	●	MVS0244X12S030	29.7	1.169	38.4	1.512	39.4	1.551	74.4	2.929	74	2.913	0.4	.016	3	.118	3
					20	●	MVS0244X20S030	49.2	1.937	58.4	2.299	59.4	2.339	94.4	3.717	94	3.701	0.4	.016	3	.118	3
					25	●	MVS0244X25S030	61.4	2.417	70.4	2.772	71.4	2.811	107.4	4.228	107	4.213	0.4	.016	3	.118	3
					30	●	MVS0244X30S030	73.6	2.898	83.4	3.283	84.4	3.323	118.4	4.661	118	4.646	0.4	.016	3	.118	3
2.500	.0984				2	●	MVS0250X02S030	5.4	.213	12.8	.504	13.7	.539	74.4	2.929	74	2.913	0.4	.016	3	.118	1
					7	●	MVS0250X07S030	18.0	.709	25.5	1.004	26.4	1.039	74.5	2.933	74	2.913	0.5	.020	3	.118	3
					12	●	MVS0250X12S030	30.5	1.201	38.5	1.516	39.4	1.551	74.5	2.933	74	2.913	0.5	.020	3	.118	3
					20	●	MVS0250X20S030	50.5	1.988	58.5	2.303	59.4	2.339	94.5	3.720	94	3.701	0.5	.020	3	.118	3
					25	●	MVS0250X25S030	63.0	2.480	70.5	2.776	71.4	2.811	107.5	4.232	107	4.213	0.5	.020	3	.118	3
					30	●	MVS0250X30S030	75.5	2.972	83.5	3.287	84.4	3.323	118.5	4.665	118	4.646	0.5	.020	3	.118	3
2.566	.1010				2	●	MVS0257X02S030	5.5	.217	13.4	.528	13.4	.528	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0257X07S030	18.4	.724	26.5	1.043	26.5	1.043	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0257X12S030	31.2	1.228	39.5	1.555	39.5	1.555	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0257X20S030	51.8	2.039	60.5	2.382	60.5	2.382	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0257X25S030	64.6	2.543	73.5	2.894	73.5	2.894	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0257X30S030	77.4	3.047	86.5	3.406	86.5	3.406	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.600	.1024				2	●	MVS0260X02S030	5.6	.220	13.4	.528	13.4	.528	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0260X07S030	18.7	.736	26.5	1.043	26.5	1.043	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0260X12S030	31.7	1.248	39.5	1.555	39.5	1.555	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0260X20S030	52.5	2.067	60.5	2.382	60.5	2.382	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0260X25S030	65.5	2.579	73.5	2.894	73.5	2.894	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0260X30S030	78.5	3.091	86.5	3.406	86.5	3.406	132.5	5.217	132	5.197	0.5	.020	3	.118	4

Note 1) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.642	.1040		37	#5-44	2	●	MVS0264X02S030	5.7	.224	13.8	.543	13.8	.543	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0264X07S030	19.0	.748	27.5	1.083	27.5	1.083	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0264X12S030	32.2	1.268	41.5	1.634	41.5	1.634	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0264X20S030	53.3	2.098	62.5	2.461	62.5	2.461	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0264X25S030	66.5	2.618	76.5	3.012	76.5	3.012	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0264X30S030	79.7	3.138	89.5	3.524	89.5	3.524	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.693	.1060				2	●	MVS0269X02S030	5.8	.228	13.8	.543	13.8	.543	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0269X07S030	19.3	.760	27.5	1.083	27.5	1.083	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0269X12S030	32.8	1.291	41.5	1.634	41.5	1.634	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0269X20S030	54.3	2.138	62.5	2.461	62.5	2.461	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0269X25S030	67.8	2.669	76.5	3.012	76.5	3.012	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0269X30S030	81.2	3.197	89.5	3.524	89.5	3.524	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.700	.1063		36	#6-32	2	●	MVS0270X02S030	5.8	.228	13.8	.543	13.8	.543	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0270X07S030	19.4	.764	27.5	1.083	27.5	1.083	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0270X12S030	32.9	1.295	41.5	1.634	41.5	1.634	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0270X20S030	54.5	2.146	62.5	2.461	62.5	2.461	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0270X25S030	68.0	2.677	76.5	3.012	76.5	3.012	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0270X30S030	81.5	3.209	89.5	3.524	89.5	3.524	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.779	.1094	7/64			2	●	MVS0278X02S030	6.0	.236	14.4	.567	14.4	.567	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0278X07S030	20.0	.787	28.5	1.122	28.5	1.122	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0278X12S030	33.9	1.335	42.5	1.673	42.5	1.673	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0278X20S030	56.1	2.209	64.5	2.539	64.5	2.539	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0278X25S030	70.0	2.756	78.5	3.091	78.5	3.091	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0278X30S030	83.9	3.303	92.5	3.642	92.5	3.642	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.800	.1102		35		2	●	MVS0280X02S030	6.0	.236	14.4	.567	14.4	.567	81.4	3.205	81	3.189	0.4	.016	3	.118	2
					7	●	MVS0280X07S030	20.1	.791	28.5	1.122	28.5	1.122	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0280X12S030	34.1	1.343	42.5	1.673	42.5	1.673	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0280X20S030	56.5	2.224	64.5	2.539	64.5	2.539	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0280X25S030	70.5	2.776	78.5	3.091	78.5	3.091	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0280X30S030	84.5	3.327	92.5	3.642	92.5	3.642	132.5	5.217	132	5.197	0.5	.020	3	.118	4
2.900	.1142				2	●	MVS0290X02S030	6.3	.248	14.9	.587	14.9	.587	81.5	3.209	81	3.189	0.5	.020	3	.118	2
					7	●	MVS0290X07S030	20.8	.819	29.5	1.161	29.5	1.161	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					12	●	MVS0290X12S030	35.3	1.390	44.5	1.752	44.5	1.752	81.5	3.209	81	3.189	0.5	.020	3	.118	4
					20	●	MVS0290X20S030	58.5	2.303	67.5	2.657	67.5	2.657	103.5	4.075	103	4.055	0.5	.020	3	.118	4
					25	●	MVS0290X25S030	73.0	2.874	81.5	3.209	81.5	3.209	117.5	4.626	117	4.606	0.5	.020	3	.118	4
					30	●	MVS0290X30S030	87.5	3.445	96.5	3.799	96.5	3.799	132.5	5.217	132	5.197	0.5	.020	3	.118	4

M

DRILLING

DRILL SELECTION CHART

Applications	Product Code	Size Range	Size	Item	Hole Depth (L/D)	Workpiece Material P Steel	M Stainless Steel	K Cast Iron	N Non-ferrous Metal	S Heat Resistant Alloy	Shape
For Small Diameter	DVAS...X02	ϕ.0394" −ϕ.1142"	.0039"	20	2	◎	◎	○	○	◎	Pilot drill etc.
	DVAS...X07	ϕ.0394" −ϕ.1142"	.0039"	20	7	◎	◎	○	○	◎	
	DVAS...X12	ϕ.0394" −ϕ.1142"	.0039"	20	12	◎	◎	○	○	◎	
	DVAS...X20	ϕ.0394" −ϕ.1142"	.0039"	20	20	◎	◎	○	○	◎	
	DVAS...X25	ϕ.0394" −ϕ.1142"	.0039"	20	25	◎	◎	○	○	◎	
	DVAS...X30	ϕ.0394" −ϕ.1142"	.0039"	20	30	◎	◎	○	○	◎	
	DVAS...X40	ϕ.0394" −ϕ.1142"	.0039"	20	40	◎	◎	○	○	◎	
	DVAS...X50	ϕ.0394" −ϕ.0984"	.0197"	6	50	◎	◎	○	○	◎	

IDENTIFICATION

DVA S 0100 X50 S040

Applications	Coolant	Diameter	L/D	Type of Shank
DVA : General-purpose	**S** : Internal Coolant	0100 → ϕ.0394" 0290 → ϕ.1142"	**X50** : L/D=50 **X02** : L/D=2	**S040** : Shank Diameter .158"

M

DRILLING

DVAS

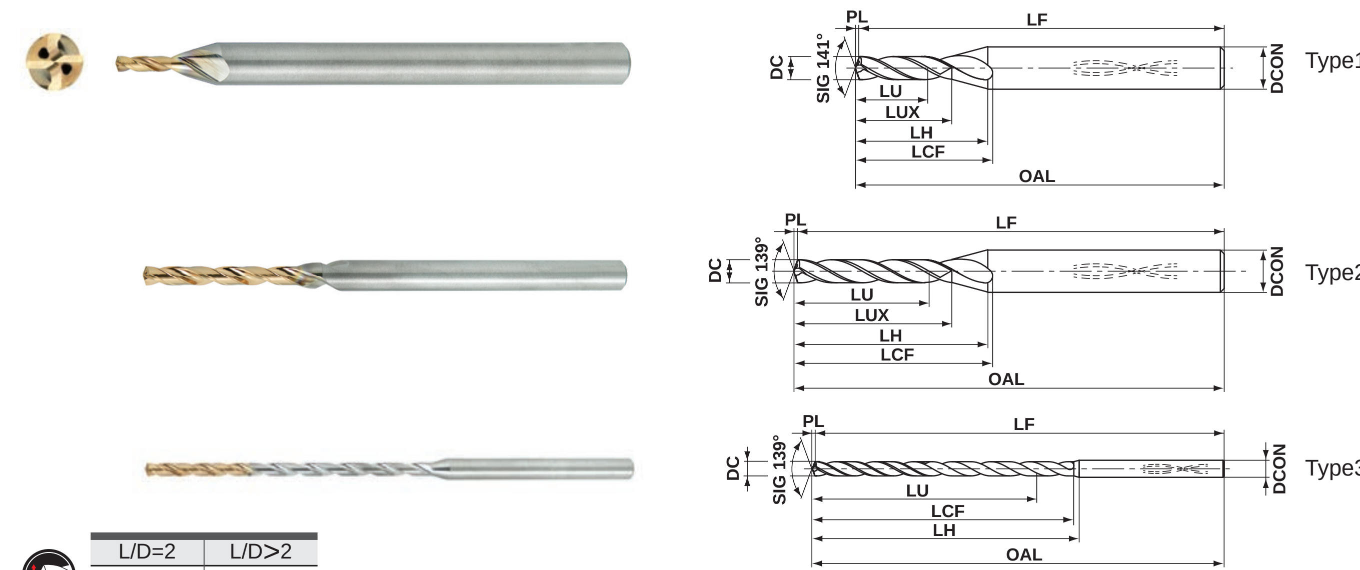
Mini Size **NEW**

TRISTAR Drills

P M K N S H

Internal Coolant

UWC DP1 141° L/D=2 139° L/D>2 XR



L/D=2	L/D>2
.00024 − .00016	0 − .00039
DCON=4	
h6: 0 − .00031	

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.0	.0394				2	int.	DVAS0100X02S040	●	2.2	.087	3.2	.126	8.6	.339	8.8	.346	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0100X07S040	●	7.2	.283	8.2	.323	13.6	.535	13.8	.543	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0100X12S040	●	12.2	.480	13.2	.520	18.6	.732	18.8	.740	58	2.283	57.8	2.276	0.2	.008	4	.157	2
					20	int.	DVAS0100X20S040	●	20.2	.795	–	–	23.2	.913	28.8	1.134	67	2.638	66.8	2.630	0.2	.008	4	.157	3
					25	int.	DVAS0100X25S040	●	25.2	.992	–	–	28.2	1.110	33.8	1.331	73	2.874	72.8	2.866	0.2	.008	4	.157	3
					30	int.	DVAS0100X30S040	●	30.2	1.189	–	–	33.2	1.307	38.8	1.528	79	3.110	78.8	3.102	0.2	.008	4	.157	3
					40	int.	DVAS0100X40S040	●	40.2	1.583	–	–	43.2	1.701	48.8	1.921	90	3.543	89.8	3.535	0.2	.008	4	.157	3
					50	int.	DVAS0100X50S040	●	50.2	1.976	–	–	53.2	2.094	58.8	2.315	102	4.016	101.8	4.008	0.2	.008	4	.157	3
1.1	.0433				2	int.	DVAS0110X02S040	●	2.4	.094	3.5	.138	9	.354	8.9	.350	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0110X07S040	●	7.9	.311	9.1	.358	14.5	.571	14.4	.567	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0110X12S040	●	13.4	.528	14.6	.575	20	.787	19.9	.783	58	2.283	57.8	2.276	0.2	.008	4	.157	2
					20	int.	DVAS0110X20S040	●	22.2	.874	–	–	25.5	1.004	30.9	1.217	67	2.638	66.8	2.630	0.2	.008	4	.157	3
					25	int.	DVAS0110X25S040	●	27.7	1.091	–	–	31	1.220	36.4	1.433	73	2.874	72.8	2.866	0.2	.008	4	.157	3
					30	int.	DVAS0110X30S040	●	33.2	1.307	–	–	36.5	1.437	41.9	1.650	79	3.110	78.8	3.102	0.2	.008	4	.157	3
					40	int.	DVAS0110X40S040	●	44.2	1.740	–	–	47.5	1.870	52.9	2.083	90	3.543	89.8	3.535	0.2	.008	4	.157	3
1.2	.0472				2	int.	DVAS0120X02S040	●	2.6	.102	3.9	.154	9.4	.370	9	.354	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0120X07S040	●	8.6	.339	9.9	.390	15.4	.606	15	.591	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0120X12S040	●	14.6	.575	15.9	.626	21.4	.843	21	.827	60	2.362	59.8	2.354	0.2	.008	4	.157	2
					20	int.	DVAS0120X20S040	●	24.2	.953	–	–	27.8	1.094	33	1.299	71	2.795	70.8	2.787	0.2	.008	4	.157	3
					25	int.	DVAS0120X25S040	●	30.2	1.189	–	–	33.8	1.331	39	1.535	77	3.031	76.8	3.024	0.2	.008	4	.157	3
					30	int.	DVAS0120X30S040	●	36.2	1.425	–	–	39.8	1.567	45	1.772	84	3.307	83.8	3.299	0.2	.008	4	.157	3
					40	int.	DVAS0120X40S040	●	48.2	1.898	–	–	51.8	2.039	57	2.244	97	3.819	96.8	3.811	0.2	.008	4	.157	3
					50	int.	DVAS0120X50S040	●	60.2	2.370	–	–	63.8	2.512	69	2.717	110	4.331	109.8	4.323	0.2	.008	4	.157	3

DC = Cutting Diameter
LU = Usable Length
LUX = Max. Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

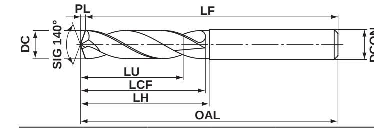
M

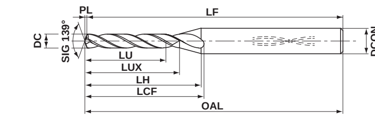
DRILLING

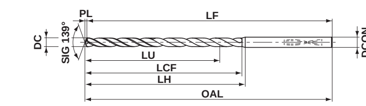
Solid Carbide TRISTAR Drill Series

DVAS Mini Size NEW

TRISTAR Drills







DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.3	.0512			#1-64	2	int.	DVAS0130X02S040	●	2.8	.110	4.2	.165	9.9	.390	9.2	.362	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0130X07S040	●	9.3	.366	10.7	.421	16.4	.646	15.7	.618	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0130X12S040	●	15.8	.622	17.2	.677	22.9	.902	22.2	.874	60	2.362	59.8	2.354	0.2	.008	4	.157	2
					20	int.	DVAS0130X20S040	●	26.2	1.031	–	–	30.1	1.185	35.2	1.386	71	2.795	70.8	2.787	0.2	.008	4	.157	3
					25	int.	DVAS0130X25S040	●	32.7	1.287	–	–	36.6	1.441	41.7	1.642	77	3.031	76.8	3.024	0.2	.008	4	.157	3
					30	int.	DVAS0130X30S040	●	39.2	1.543	–	–	43.1	1.697	48.2	1.898	84	3.307	83.8	3.299	0.2	.008	4	.157	3
					40	int.	DVAS0130X40S040	●	52.2	2.055	–	–	56.1	2.209	61.2	2.409	97	3.819	96.8	3.811	0.2	.008	4	.157	3
					50	int.	DVAS0130X50S040	●	65.2	2.567	–	–	69.1	2.720	74.2	2.921	110	4.331	109.8	4.323	0.2	.008	4	.157	3
1.4	.0551				2	int.	DVAS0140X02S040	●	3	.118	4.5	.177	10.3	.406	9.3	.366	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0140X07S040	●	10.1	.398	11.5	.453	17.3	.681	16.3	.642	55	2.165	54.7	2.154	0.3	.012	4	.157	2
					12	int.	DVAS0140X12S040	●	17.1	.673	18.5	.728	24.3	.957	23.3	.917	63	2.480	62.7	2.469	0.3	.012	4	.157	2
					20	int.	DVAS0140X20S040	●	28.3	1.114	–	–	32.5	1.280	37.3	1.469	75	2.953	74.7	2.941	0.3	.012	4	.157	3
					25	int.	DVAS0140X25S040	●	35.3	1.390	–	–	39.5	1.555	44.3	1.744	82	3.228	81.7	3.217	0.3	.012	4	.157	3
					30	int.	DVAS0140X30S040	●	42.3	1.665	–	–	46.5	1.831	51.3	2.020	90	3.543	89.7	3.531	0.3	.012	4	.157	3
					40	int.	DVAS0140X40S040	●	56.3	2.217	–	–	60.5	2.382	65.3	2.571	105	4.134	104.7	4.122	0.3	.012	4	.157	3
1.5	.0591				2	int.	DVAS0150X02S040	●	3.3	.130	4.8	.189	10.7	.421	9.4	.370	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0150X07S040	●	10.8	.425	12.3	.484	18.2	.717	16.9	.665	55	2.165	54.7	2.154	0.3	.012	4	.157	2
					12	int.	DVAS0150X12S040	●	18.3	.720	19.8	.780	25.7	1.012	24.4	.961	63	2.480	62.7	2.469	0.3	.012	4	.157	2
					20	int.	DVAS0150X20S040	●	30.3	1.193	–	–	34.8	1.370	39.4	1.551	75	2.953	74.7	2.941	0.3	.012	4	.157	3
					25	int.	DVAS0150X25S040	●	37.8	1.488	–	–	42.3	1.665	46.9	1.846	82	3.228	81.7	3.217	0.3	.012	4	.157	3
					30	int.	DVAS0150X30S040	●	45.3	1.783	–	–	49.8	1.961	54.4	2.142	90	3.543	89.7	3.531	0.3	.012	4	.157	3
					40	int.	DVAS0150X40S040	●	60.3	2.374	–	–	64.8	2.551	69.4	2.732	105	4.134	104.7	4.122	0.3	.012	4	.157	3
					50	int.	DVAS0150X50S040	●	75.3	2.965	–	–	79.8	3.142	84.4	3.323	120	4.724	119.7	4.713	0.3	.012	4	.157	3
1.6	.0630				2	int.	DVAS0160X02S040	●	3.5	.138	5.1	.201	11.1	.437	9.6	.378	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0160X07S040	●	11.5	.453	13.1	.516	19.2	.756	17.6	.693	57	2.244	56.7	2.232	0.3	.012	4	.157	2
					12	int.	DVAS0160X12S040	●	19.5	.768	21.1	.831	27.2	1.071	25.6	1.008	66	2.598	65.7	2.587	0.3	.012	4	.157	2
					20	int.	DVAS0160X20S040	●	32.3	1.272	–	–	37.1	1.461	41.6	1.638	79	3.110	78.7	3.098	0.3	.012	4	.157	3
					25	int.	DVAS0160X25S040	●	40.3	1.587	–	–	45.1	1.776	49.6	1.953	88	3.465	87.7	3.453	0.3	.012	4	.157	3
					30	int.	DVAS0160X30S040	●	48.3	1.902	–	–	53.1	2.091	57.6	2.268	99	3.898	98.7	3.886	0.3	.012	4	.157	3
					40	int.	DVAS0160X40S040	●	64.3	2.531	–	–	69.1	2.720	73.6	2.898	113	4.449	112.7	4.437	0.3	.012	4	.157	3
1.7	.0669				2	int.	DVAS0170X02S040	●	3.7	.146	5.5	.217	11.6	.457	9.7	.382	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0170X07S040	●	12.2	.480	14	.551	20.1	.791	18.2	.717	57	2.244	56.7	2.232	0.3	.012	4	.157	2
					12	int.	DVAS0170X12S040	●	20.7	.815	22.5	.886	28.6	1.126	26.7	1.051	66	2.598	65.7	2.587	0.3	.012	4	.157	2
					20	int.	DVAS0170X20S040	●	34.3	1.350	–	–	39.4	1.551	43.7	1.720	79	3.110	78.7	3.098	0.3	.012	4	.157	3
					25	int.	DVAS0170X25S040	●	42.8	1.685	–	–	47.9	1.886	52.2	2.055	88	3.465	87.7	3.453	0.3	.012	4	.157	3
					30	int.	DVAS0170X30S040	●	51.3	2.020	–	–	56.4	2.220	60.7	2.390	99	3.898	98.7	3.886	0.3	.012	4	.157	3
					40	int.	DVAS0170X40S040	●	68.3	2.689	–	–	73.4	2.890	77.7	3.059	113	4.449	112.7	4.437	0.3	.012	4	.157	3
1.8	.0709				2	int.	DVAS0180X02S040	●	3.9	.154	5.8	.228	12	.472	9.8	.386	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0180X07S040	●	12.9	.508	14.8	.583	21	.827	18.8	.740	59	2.323	58.7	2.311	0.3	.012	4	.157	2
					12	int.	DVAS0180X12S040	●	21.9	.862	23.8	.937	30	1.181	27.8	1.094	69	2.717	68.7	2.705	0.3	.012	4	.157	2
					20	int.	DVAS0180X20S040	●	36.3	1.429	–	–	41.7	1.642	45.8	1.803	84	3.307	83.7	3.295	0.3	.012	4	.157	3
					25	int.	DVAS0180X25S040	●	45.3	1.783	–	–	50.7	1.996	54.8	2.157	94	3.701	93.7	3.689	0.3	.012	4	.157	3
					30	int.	DVAS0180X30S040	●	54.3	2.138	–	–	59.7	2.350	63.8	2.512	104	4.094	103.7	4.083	0.3	.012	4	.157	3
					40	int.	DVAS0180X40S040	●	72.3	2.846	–	–	77.7	3.059	81.8	3.220	123	4.843	122.7	4.831	0.3	.012	4	.157	3
1.9	.0748				2	int.	DVAS0190X02S040	●	4.1	.161	6.1	.240	12.4	.488	10	.394	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0190X07S040	●	13.7	.539	15.6	.614	21.9	.862	19.5	.768	59	2.323	58.6	2.307	0.4	.016	4	.157	2
					12	int.	DVAS0190X12S040	●	23.2	.913	25.1	.988	31.4	1.236	29	1.142	69	2.717	68.6	2.701	0.4	.016	4	.157	2
					20	int.	DVAS0190X20S040	●	38.4	1.512	–	–	44.1	1.736	48	1.890	84	3.307	83.6	3.291	0.4	.016	4	.157	3
					25	int.	DVAS0190X25S040	●	47.9	1.886	–	–	53.6	2.110	57.5	2.264	94	3.701	93.6	3.685	0.4	.016	4	.157	3
					30	int.	DVAS0190X30S040	●	57.4	2.260	–	–	63.1	2.484	67	2.638	104	4.094	103.6	4.079	0.4	.016	4	.157	3
					40	int.	DVAS0190X40S040	●	76.4	3.008	–	–	82.1	3.232	86	3.386	123	4.843	122.6	4.827	0.4	.016	4	.157	3

● : USA Stock

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.0	.0787			#3-48	2	int.	DVAS0200X02S040	●	4.4	.173	6.4	.252	12.9	.508	10.1	.398	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0200X07S040	●	14.4	.567	16.4	.646	22.9	.902	20.1	.791	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0200X12S040	●	24.4	.961	26.4	1.039	32.9	1.295	30.1	1.185	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0200X20S040	●	40.4	1.591	–	–	46.4	1.827	50.1	1.972	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0200X25S040	●	50.4	1.984	–	–	56.4	2.220	60.1	2.366	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0200X30S040	●	60.4	2.378	–	–	66.4	2.614	70.1	2.760	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0200X40S040	●	80.4	3.165	–	–	86.4	3.402	90.1	3.547	136	5.354	135.6	5.339	0.4	.016	4	.157	3
					50	int.	DVAS0200X50S040	●	100.4	3.953	–	–	106.4	4.189	110.1	4.335	158	6.220	157.6	6.205	0.4	.016	4	.157	3
2.1	.0827				2	int.	DVAS0210X02S040	●	4.6	.181	6.7	.264	13.3	.524	10.2	.402	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0210X07S040	●	15.1	.594	17.2	.677	23.8	.937	20.7	.815	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0210X12S040	●	25.6	1.008	27.7	1.091	34.3	1.350	31.2	1.228	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0210X20S040	●	42.4	1.669	–	–	48.7	1.917	52.2	2.055	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0210X25S040	●	52.9	2.083	–	–	59.2	2.331	62.7	2.469	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0210X30S040	●	63.4	2.496	–	–	69.7	2.744	73.2	2.882	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0210X40S040	●	84.4	3.323	–	–	90.7	3.571	94.2	3.709	136	5.354	135.6	5.339	0.4	.016	4	.157	3
2.2	.0866				2	int.	DVAS0220X02S040	●	4.8	.189	7	.276	13.7	.539	10.3	.406	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0220X07S040	●	15.8	.622	18.1	.713	24.7	.972	21.4	.843	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0220X12S040	●	26.8	1.055	29.1	1.146	35.7	1.406	32.4	1.276	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0220X20S040	●	44.4	1.748	–	–	51	2.008	54.4	2.142	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0220X25S040	●	55.4	2.181	–	–	62	2.441	65.4	2.575	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0220X30S040	●	66.4	2.614	–	–	73	2.874	76.4	3.008	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0220X40S040	●	88.4	3.480	–	–	95	3.740	98.4	3.874	136	5.354	135.6	5.339	0.4	.016	4	.157	3
2.3	.0906				2	int.	DVAS0230X02S040	●	5	.197	7.4	.291	14.1	.555	10.5	.413	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0230X07S040	●	16.5	.650	18.9	.744	25.7	1.012	22	.866	65	2.559	64.6	2.543	0.4	.016	4	.157	2
					12	int.	DVAS0230X12S040	●	28	1.102	30.4	1.197	37.2	1.465	33.5	1.319	78	3.071	77.6	3.055	0.4	.016	4	.157	2
					20	int.	DVAS0230X20S040	●	46.4	1.827	–	–	53.3	2.098	56.5	2.224	98	3.858	97.6	3.843	0.4	.016	4	.157	3
					25	int.	DVAS0230X25S040	●	57.9	2.280	–	–	64.8	2.551	68	2.677	111	4.370	110.6	4.354	0.4	.016	4	.157	3
					30	int.	DVAS0230X30S040	●	69.4	2.732	–	–	76.3	3.004	79.5	3.130	124	4.882	123.6	4.866	0.4	.016	4	.157	3
					40	int.	DVAS0230X40S040	●	92.4	3.638	–	–	99.3	3.909	102.5	4.035	150	5.906	149.6	5.890	0.4	.016	4	.157	3
2.4	.0945				2	int.	DVAS0240X02S040	●	5.2	.205	7.7	.303	14.6	.575	10.6	.417	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0240X07S040	●	17.2	.677	19.7	.776	26.6	1.047	22.6	.890	65	2.559	64.6	2.543	0.4	.016	4	.157	2
					12	int.	DVAS0240X12S040	●	29.2	1.150	31.7	1.248	38.6	1.520	34.6	1.362	78	3.071	77.6	3.055	0.4	.016	4	.157	2
					20	int.	DVAS0240X20S040	●	48.4	1.906	–	–	55.6	2.189	58.6	2.307	98	3.858	97.6	3.843	0.4	.016	4	.157	3
					25	int.	DVAS0240X25S040	●	60.4	2.378	–	–	67.6	2.661	70.6	2.780	111	4.370	110.6	4.354	0.4	.016	4	.157	3
					30	int.	DVAS0240X30S040	●	72.4	2.850	–	–	79.6	3.134	82.6	3.252	124	4.882	123.6	4.866	0.4	.016	4	.157	3
					40	int.	DVAS0240X40S040	●	96.4	3.795	–	–	103.6	4.079	106.6	4.197	150	5.906	149.6	5.890	0.4	.016	4	.157	3
2.5	.0984				2	int.	DVAS0250X02S040	●	5.5	.217	8	.315	15	.591	10.7	.421	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0250X07S040	●	18	.709	20.5	.807	27.5	1.083	23.3	.917	65	2.559	64.5	2.539	0.5	.020	4	.157	2
					12	int.	DVAS0250X12S040	●	30.5	1.201	33	1.299	40	1.575	35.8	1.409	78	3.071	77.5	3.051	0.5	.020	4	.157	2
					20	int.	DVAS0250X20S040	●	50.5	1.988	–	–	58	2.283	60.8	2.394	98	3.858	97.5	3.839	0.5	.020	4	.157	3
					25	int.	DVAS0250X25S040	●	63	2.480	–	–	70.5	2.776	73.3	2.886	111	4.370	110.5	4.350	0.5	.020	4	.157	3
					30	int.	DVAS0250X30S040	●	75.5	2.972	–	–	83	3.268	85.8	3.378	124	4.882	123.5	4.862	0.5	.020	4	.157	3
					40	int.	DVAS0250X40S040	●	100.5	3.957	–	–	108	4.252	110.8	4.362	150	5.906	149.5	5.886	0.5	.020	4	.157	3
					50	int.	DVAS0250X50S040	●	125.5	4.941	–	–	133	5.236	135.8	5.346	176	6.929	175.5	6.909	0.5	.020	4	.157	3

DC = Cutting Diameter
LU = Usable Length
LUX = Max. Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

Solid Carbide TRISTAR Drill Series

DVAS Mini Size NEW

TRISTAR Drills

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.6	.1024				2	int.	DVAS0260X02S040	●	5.7	.224	8.3	.327	15.4	.606	10.9	.429	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0260X07S040	●	18.7	.736	21.3	.839	28.4	1.118	23.9	.941	65	2.559	64.5	2.539	0.5	.020	4	.157	2
					12	int.	DVAS0260X12S040	●	31.7	1.248	34.3	1.350	41.4	1.630	36.9	1.453	78	3.071	77.5	3.051	0.5	.020	4	.157	2
					20	int.	DVAS0260X20S040	●	52.5	2.067	–	–	60.3	2.374	62.9	2.476	98	3.858	97.5	3.839	0.5	.020	4	.157	3
					25	int.	DVAS0260X25S040	●	65.5	2.579	–	–	73.3	2.886	75.9	2.988	111	4.370	110.5	4.350	0.5	.020	4	.157	3
					30	int.	DVAS0260X30S040	●	78.5	3.091	–	–	86.3	3.398	88.9	3.500	124	4.882	123.5	4.862	0.5	.020	4	.157	3
					40	int.	DVAS0260X40S040	●	104.5	4.114	–	–	112.3	4.421	114.9	4.524	150	5.906	149.5	5.886	0.5	.020	4	.157	3
2.7	.1063		36	#6-32	2	int.	DVAS0270X02S040	●	5.9	.232	8.6	.339	15.8	.622	11	.433	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0270X07S040	●	19.4	.764	22.2	.874	29.4	1.157	24.5	.965	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0270X12S040	●	32.9	1.295	35.7	1.406	42.9	1.689	38	1.496	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0270X20S040	●	54.5	2.146	–	–	62.6	2.465	65	2.559	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0270X25S040	●	68	2.677	–	–	76.1	2.996	78.5	3.091	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0270X30S040	●	81.5	3.209	–	–	89.6	3.528	92	3.622	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0270X40S040	●	108.5	4.272	–	–	116.6	4.591	119	4.685	167	6.575	166.5	6.555	0.5	.020	4	.157	3
2.8	.1102		35		2	int.	DVAS0280X02S040	●	6.1	.240	8.9	.350	16.3	.642	11.1	.437	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0280X07S040	●	20.1	.791	23	.906	30.3	1.193	25.2	.992	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0280X12S040	●	34.1	1.343	37	1.457	44.3	1.744	39.2	1.543	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0280X20S040	●	56.5	2.224	–	–	64.9	2.555	67.2	2.646	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0280X25S040	●	70.5	2.776	–	–	78.9	3.106	81.2	3.197	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0280X30S040	●	84.5	3.327	–	–	92.9	3.657	95.2	3.748	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0280X40S040	●	112.5	4.429	–	–	120.9	4.760	123.2	4.850	167	6.575	166.5	6.555	0.5	.020	4	.157	3
2.9	.1142				2	int.	DVAS0290X02S040	●	6.3	.248	9.3	.366	16.7	.657	11.3	.445	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0290X07S040	●	20.8	.819	23.8	.937	31.2	1.228	25.8	1.016	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0290X12S040	●	35.3	1.390	38.3	1.508	45.7	1.799	40.3	1.587	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0290X20S040	●	58.5	2.303	–	–	67.2	2.646	69.3	2.728	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0290X25S040	●	73	2.874	–	–	81.7	3.217	83.8	3.299	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0290X30S040	●	87.5	3.445	–	–	96.2	3.787	98.3	3.870	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0290X40S040	●	116.5	4.587	–	–	125.2	4.929	127.3	5.012	167	6.575	166.5	6.555	0.5	.020	4	.157	3

DC = Cutting Diameter
LU = Usable Length
LUX = Max. Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

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DRILLING

Recommended Cutting Conditions

(inch)

Workpiece Material			Mild Steels Carbon Steels, Alloy Steels AISI 1010, 1045, 4140 etc.		Austenitic Stainless Steels, Ferritic Stainless Steels Ferritic and Martensitic Stainless Steels Precipitation Hardening Stainless Steels AISI 304, 316, 410 etc.	
DC mm	DC inch	Hole Depth L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
1.0	.0394	2–30	210(100–330)	.0014(.0008–.0020)	195(65–330)	.0010(.0004–.0016)
1.0	.0394	40, 50	210(100–330)	.0012(.0008–.0016)	195(65–330)	.0008(.0004–.0012)
1.5	.0591	2–30	210(100–330)	.0021(.0012–.0030)	195(65–330)	.0015(.0006–.0024)
1.5	.0591	40, 50	210(100–330)	.0018(.0012–.0024)	195(65–330)	.0012(.0006–.0018)
2.0	.0787	2–30	230(130–330)	.0028(.0016–.0039)	195(65–330)	.0020(.0008–.0031)
2.0	.0787	40, 50	230(130–330)	.0024(.0016–.0031)	195(65–330)	.0016(.0008–.0024)
2.5	.0984	2–30	230(130–330)	.0035(.0020–.0049)	195(65–330)	.0025(.0010–.0039)
2.5	.0984	40, 50	230(130–330)	.0030(.0020–.0039)	195(65–330)	.0020(.0010–.0030)
2.9	.1142	2–30	230(130–330)	.0040(.0023–.0057)	195(65–330)	.0029(.0011–.0046)
2.9	.1142	40, 50	230(130–330)	.0034(.0023–.0046)	195(65–330)	.0023(.0011–.0034)

Workpiece Material			Cast Irons Ductile Cast Irons AISI No 45B, 60-60-8 etc.		Aluminum Alloys ASTM 6061, 7075 etc.	
DC mm	DC inch	Hole Depth L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
1.0	.0394	2–30	230(130–330)	.0014(.0008–.0020)	460(330–590)	.0016(.0008–.0024)
1.0	.0394	40, 50	230(130–330)	.0012(.0008–.0016)	460(330–590)	.0014(.0008–.0020)
1.5	.0591	2–30	230(130–330)	.0021(.0012–.0030)	460(330–590)	.0024(.0012–.0035)
1.5	.0591	40, 50	230(130–330)	.0018(.0012–.0024)	460(330–590)	.0021(.0012–.0030)
2.0	.0787	2–30	230(130–330)	.0028(.0016–.0039)	460(330–590)	.0031(.0016–.0047)
2.0	.0787	40, 50	230(130–330)	.0024(.0016–.0031)	460(330–590)	.0028(.0016–.0039)
2.5	.0984	2–30	230(130–330)	.0035(.0020–.0049)	460(330–590)	.0039(.0020–.0059)
2.5	.0984	40, 50	230(130–330)	.0030(.0020–.0039)	460(330–590)	.0035(.0020–.0049)
2.9	.1142	2–30	230(130–330)	.0040(.0023–.0057)	460(330–590)	.0046(.0023–.0069)
2.9	.1142	40, 50	230(130–330)	.0034(.0023–.0046)	460(330–590)	.0040(.0023–.0057)

Workpiece Material			Heat Resistant Alloys Inconel718 etc.		Titanium Alloys Ti-6Al-4V etc.	
DC mm	DC inch	Hole Depth L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
1.0	.0394	2–30	100(30–165)	.0006(.0004–.0008)	100(65–130)	.0008(.0004–.0012)
1.0	.0394	40, 50	100(30–165)	.0006(.0004–.0008)	100(65–130)	.0008(.0004–.0012)
1.5	.0591	2–30	100(30–165)	.0009(.0006–.0012)	100(65–130)	.0012(.0006–.0018)
1.5	.0591	40, 50	100(30–165)	.0009(.0006–.0012)	100(65–130)	.0012(.0006–.0018)
2.0	.0787	2–30	100(30–165)	.0012(.0008–.0016)	100(65–130)	.0016(.0008–.0024)
2.0	.0787	40, 50	100(30–165)	.0012(.0008–.0016)	100(65–130)	.0016(.0008–.0024)
2.5	.0984	2–30	100(30–165)	.0015(.0010–.0020)	100(65–130)	.0020(.0010–.0030)
2.5	.0984	40, 50	100(30–165)	.0015(.0010–.0020)	100(65–130)	.0020(.0010–.0030)
2.9	.1142	2–30	100(30–165)	.0017(.0011–.0023)	100(65–130)	.0023(.0011–.0034)
2.9	.1142	40, 50	100(30–165)	.0017(.0011–.0023)	100(65–130)	.0023(.0011–.0034)

Workpiece Material			Cobalt Chrome Alloys ASTM F1537, F799 etc.	
DC mm	DC inch	Hole Depth L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
1.0	.0394	2–30	195(100–295)	.0008(.0004–.0012)
1.0	.0394	40, 50	195(100–295)	.0008(.0004–.0012)
1.5	.0591	2–30	195(100–295)	.0012(.0006–.0018)
1.5	.0591	40, 50	195(100–295)	.0012(.0006–.0018)
2.0	.0787	2–30	195(100–295)	.0016(.0008–.0024)
2.0	.0787	40, 50	195(100–295)	.0016(.0008–.0024)
2.5	.0984	2–30	195(100–295)	.0020(.0010–.0030)
2.5	.0984	40, 50	195(100–295)	.0020(.0010–.0030)
2.9	.1142	2–30	195(100–295)	.0023(.0011–.0034)
2.9	.1142	40, 50	195(100–295)	.0023(.0011–.0034)

Note 1) This recommended condition is only when using internal coolant.
Note 2) Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
Note 3) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 4) Machining depths exceeding flute length (LU) are not recommend.
Note 5) Clamp the drill so that the drill runout is within .00012 inch.
Note 6) Do not clamp the flute part of the drill.

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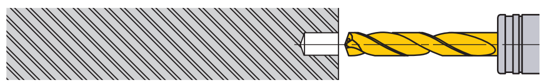
DRILLING

Operational Guidance

Operational Guidance for the DVAS L/D=2–40

Flat Face Drilling ●Drilling a Blind Hole

1. Drilling a Pilot Hole

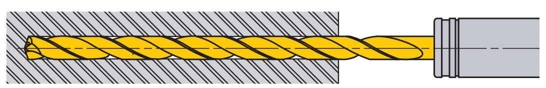


①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
A DVAS drill with L/D = 2 can be machined up to L/D = 3 when drilling pilot holes.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×3.
(Adjust the pilot hole depth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

2. Initial Cutting with the Long Type Drill

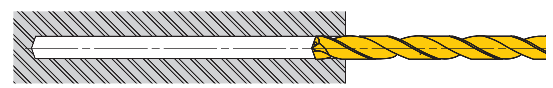
①Penetrate the guide hole at low revolution. (Revolution 500–1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill .039- .118 inch short of the guide hole bottom.

3. Drill the Deep Hole



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

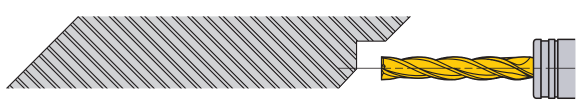
4. Drill Retraction



①After drilling, lower the cutting revolution about 0.5–1mm short of the hole end. (Revolution of around 500–1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.
③Finally, clear the hole at a cutting speed of 65 - 100 SFM and feed rate of .0079 - .0118 IPR.

Interruped Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

1. Spot Facing

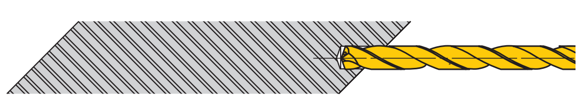


①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a Pilot Hole

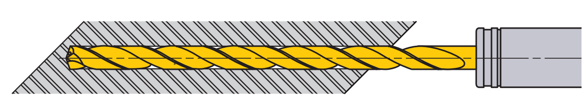
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×2.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial Cutting with the Long Type Drill



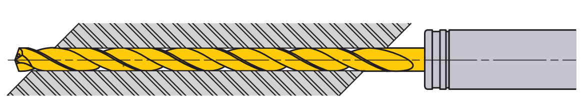
①Penetrate the guide hole at a low revolution. (Revolution 500–1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill .0197 - .0394 inch short of the guide hole bottom.

4. Drill the Deep Hole



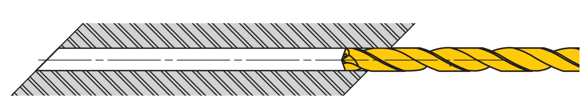
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking Through



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

6. Drill Retraction

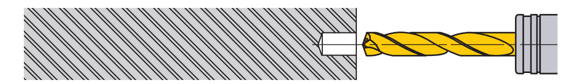


①Finally clear the hole at a feed rate of .0079 - .0118 IPR. (Revolution of around 500–1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.

Operational Guidance for the DVAS L/D=50

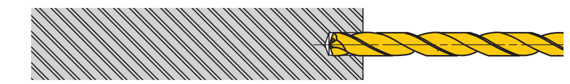
Flat Face Drilling ●Drilling a Blind Hole

1. Drilling a Pilot Hole



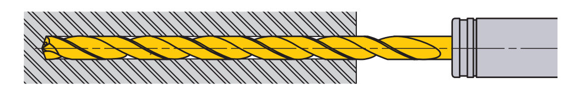
①Use a drill with a larger (flatter) point angle than the super long type. Use a DVAS drill with L/D = 7.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial Cutting with the Long Type Drill



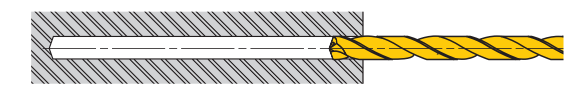
①Penetrate the guide hole at low revolution. (Revolution 500–1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill 1–3mm short of the guide hole bottom.

3. Drill the Deep Hole



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

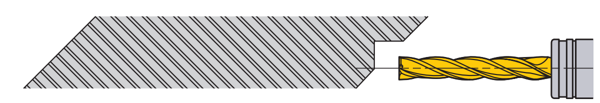
4. Drill Retraction



①After drilling, lower the cutting revolution about .0197 - .0394 inch short of the hole end. (Revolution of around 500–1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.
③Finally, clear the hole at a cutting speed of 65 - 100 SFM and feed rate of .0079 - .0118 IPR.

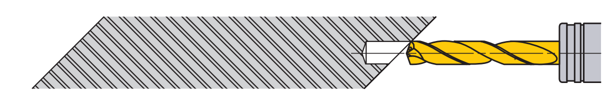
Interruped Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

1. Spot Facing



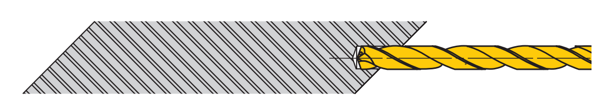
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a Pilot Hole



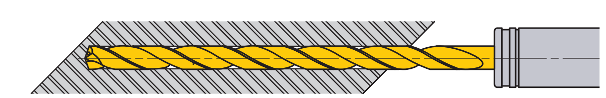
①Use a drill with a larger (flatter) point angle than the super long type. Use a DVAS drill with L/D = 7.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial Cutting with the Long Type Drill



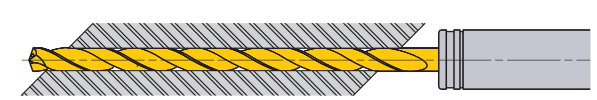
①Penetrate the guide hole at a low revolution. (Revolution 500–1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill 0.5–1mm short of the guide hole bottom.

4. Drill the Deep Hole



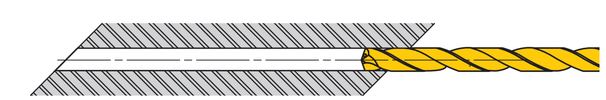
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking Through



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

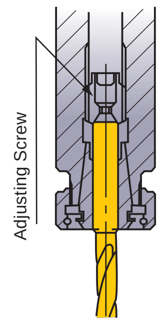
6. Drill Retraction



①Finally clear the hole at a feed rate of .0079 - .0118 IPR. (Revolution of around 500–1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.

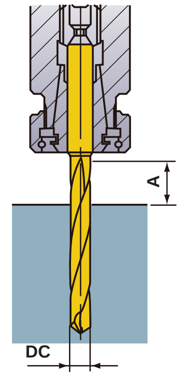
■ Operational Guidance

Drill Holding



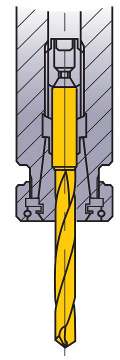
Thrust bearing type collet chuck holds the drill securely.

Drill Length



A ≥ DC x 2

Drill Installation



NG

Do not clamp on the flutes.

Coolant Pressure

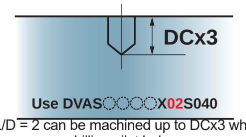
Adjust the coolant pressure according to the type and concentration of coolant.

Drill Dia. **DC**	Water-soluble	Water-insoluble
DC<.0787"	≥ 3MPa	≥ 7MPa
DC<.1181"	≥ 2MPa	≥ 5MPa

Pilot Drill

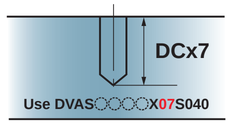
For deep hole drilling, refer to the figure below.

L/D≤40



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

L/D>40

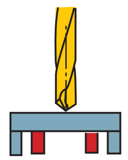


Coolant Handling

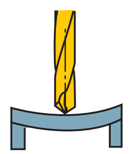
Small particles of swarf will jam in the oil hole of small diameter drills.
Always use a fine mesh filter as a preventive measure.

Drill Dia. **DC**	Fine Mesh Filter
DC<.0787"	≤ .394 μ-inch
DC<.1181"	≤ .787 μ-inch

Thin Workpiece

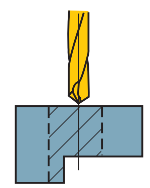


Support the Workpiece
OK

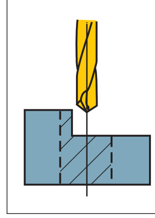


If Bending Occurs
NG

Interrupted Cutting

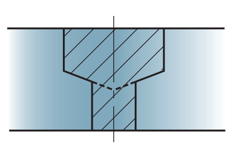


One Process
OK
①Lower the feed when drilling the interrupted part.



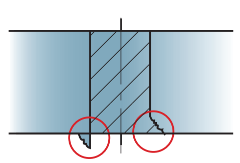
Requires Prior Machining
①Spot face with an end mill prior to drilling.

Stepped Holes



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

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

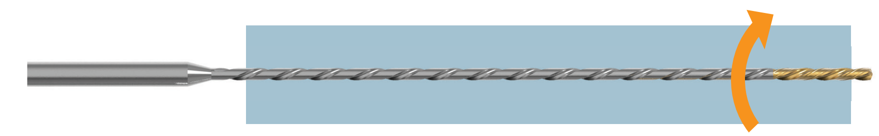
Tips for drilling a deep hole exceeding L/D = 40

Workpiece rotation method: small lathes, automatic lathes, etc.

(1) Face countersink (DLE drill is recommended)

(2) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)

(3) Drill the deep hole using DVAS◌◌◌◌X50S040.

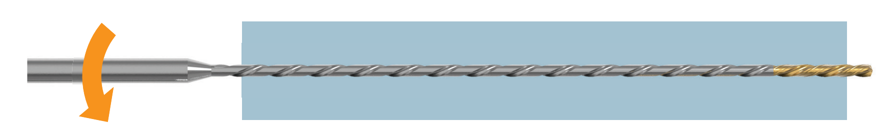


Tool rotation method: Machining centres, composite machines, etc.

(1) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)

(2) Drill the guide hole deeper to a approx. 7D
If more stability is required, drill a guide hole deeper than 7D.

(3) Drill the deep hole using DVAS◌◌◌◌X50S040.



Cutting Example

Comparison of Drilling Efficiency on Automatic Lathe

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

Drilling for AISI 4135

General Cutting Conditions for Gun Drills

<Cutting Conditions>

Tool	: DC=ø.0787 inch, L/D=50
Cutting Speed	: vc= 165 SFM
Feed per Rev.	: fr= .0003 IPR
Hole Depth	: 3.937 inch
Cutting Mode	: Wet Cutting, Oil, 15MPa

Cutting Time 107.8 sec./hole

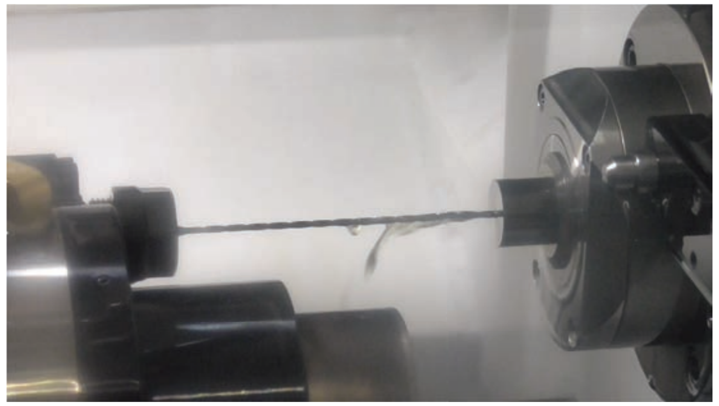
DVAS **Cutting Conditions**

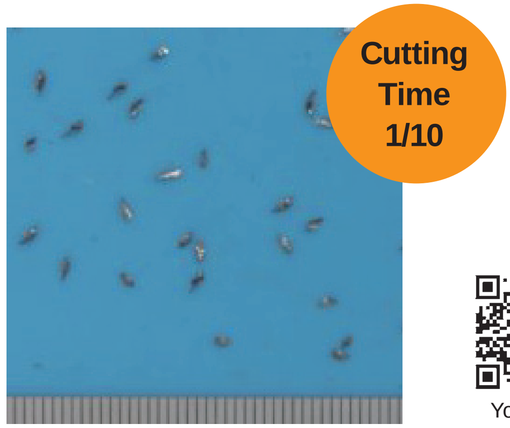
<Cutting Conditions>

Tool	: DC=ø.0787 inch, L/D=50
Cutting Speed	: vc= 165 SFM
Feed per Rev.	: fr= .0028 IPR
Hole Depth	: 3.937 inch
Cutting Mode	: Wet Cutting, Oil, 15MPa

Cutting Time 10.8 sec./hole

DVAS **Drill Turning Video**





YouTube

Drilling for AISI 304

General Cutting Conditions for Gun Drills

<Cutting Conditions>

Tool	: DC=ø.0787 inch, L/D=50
Cutting Speed	: vc= 130 SFM
Feed per Rev.	: fr= .0002 IPR
Hole Depth	: 3.937 inch
Cutting Mode	: Wet Cutting, Oil, 15MPa

Cutting Time 188.4 sec./hole

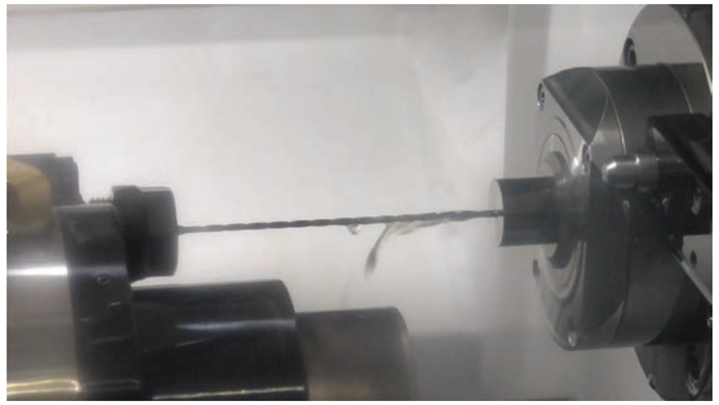
DVAS **Cutting Conditions**

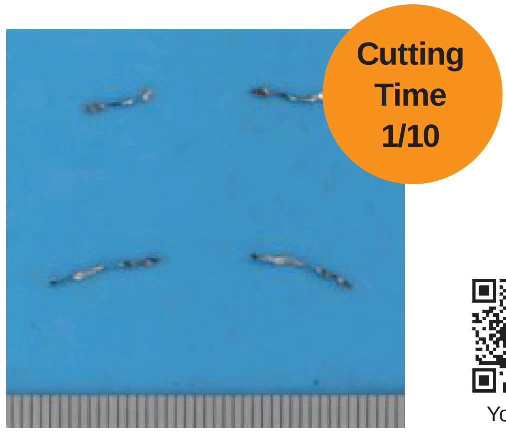
<Cutting Conditions>

Tool	: DC=ø.0787 inch, L/D=50
Cutting Speed	: vc= 130 SFM
Feed per Rev.	: fr= .0020 IPR
Hole Depth	: 3.937 inch
Cutting Mode	: Wet Cutting, Oil, 15MPa

Cutting Time 18.8 sec./hole

DVAS **Drill Turning Video**





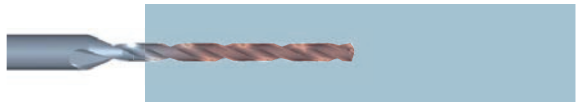
YouTube

Example of Improved Drilling Efficiency on Automatic Lathe

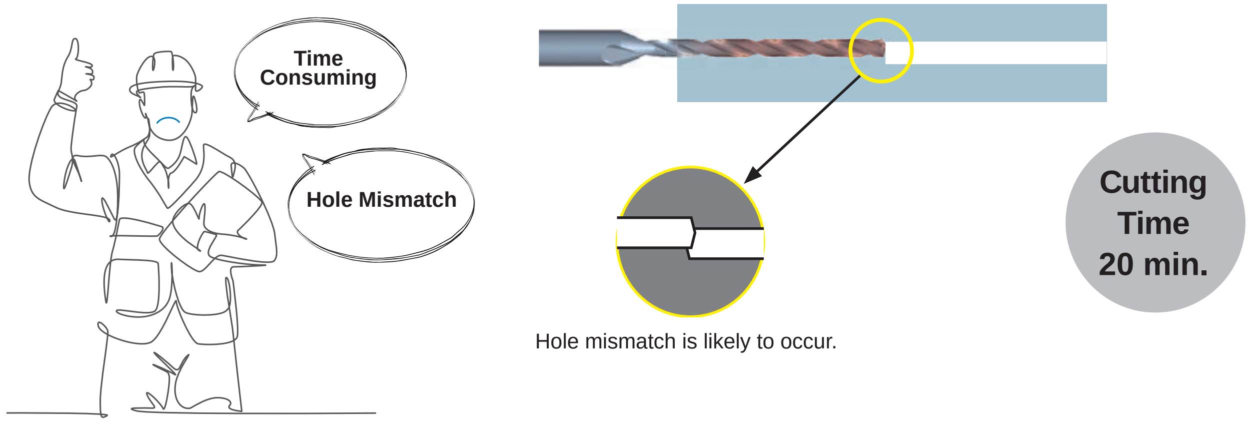
DVAS significantly reduces cycle times and ensures consistent drilling.

Drilling process of Both ends machining

First step: One side drilled with blind hole.

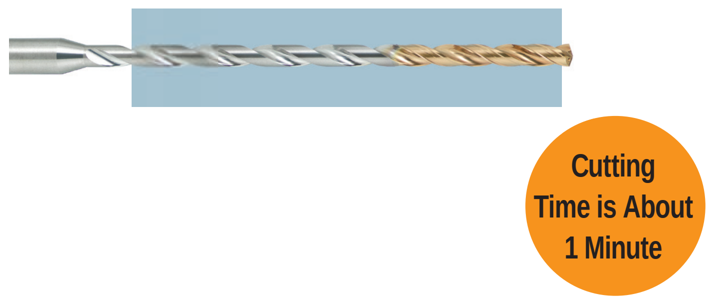


Second step: Workpiece is inverted for a through hole.



Drilling Process with DVAS drill

First step: Drilling a through hole from one side at a time.



DVAS

<Cutting Conditions>

Workpiece Material	: AISI 1045
Tool	: .0984 inch, L/D=50
Cutting Speed	: vc= 230 SFM
Feed per Rev.	: fr= .0035 - .0047 IPR
Hole Depth	: 4.606 inch
Cutting Mode	: Wet Cutting, Oil, 7MPa

Mitsubishi Materials New Drill Series

TRISTAR Drill Series

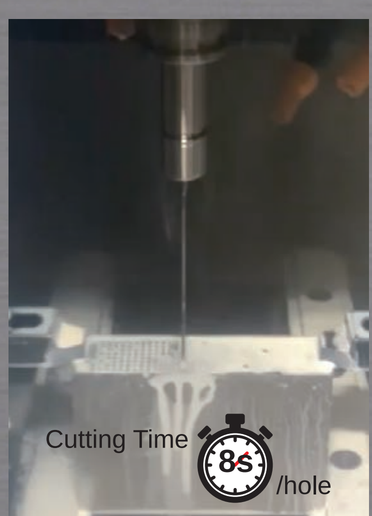
High Efficiency - Long Tool Life - High Precision

TRISTAR, a new generation drill series from Mitsubishi Materials provides 3 strong advantages.

The first of the TRISTAR series is a small diameter drill with "Five New Technologies" features for FAST, RELIABLE and ACCURATE drilling.

FAST

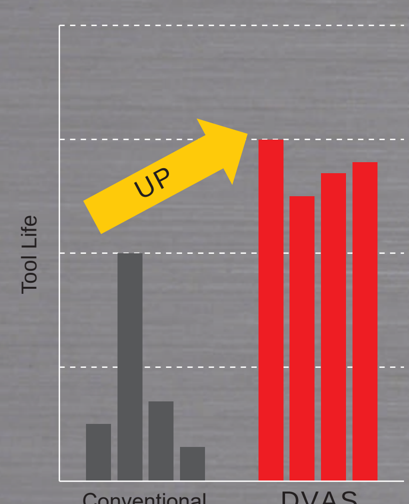
"Deep hole drilling is usually a slow process."



Deep holes can be drilled quickly and efficiently.

RELIABLE

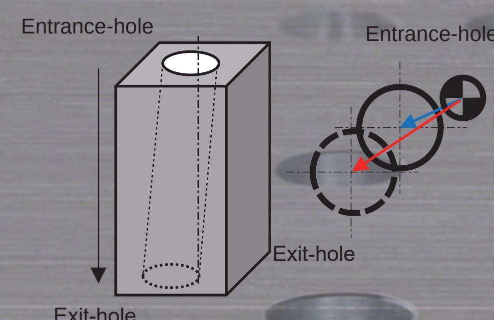
"Breakages, short tool life and lack of coolant can be common."

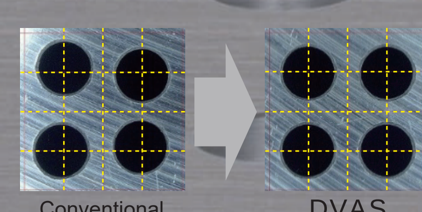


Tool life exceeds all normal expectations.

ACCURATE

"Holes can wander considerably and have poor positioning."





Straighter holes and improved dimensional accuracy.

Solid Carbide Drill

TRISTAR Drill Series

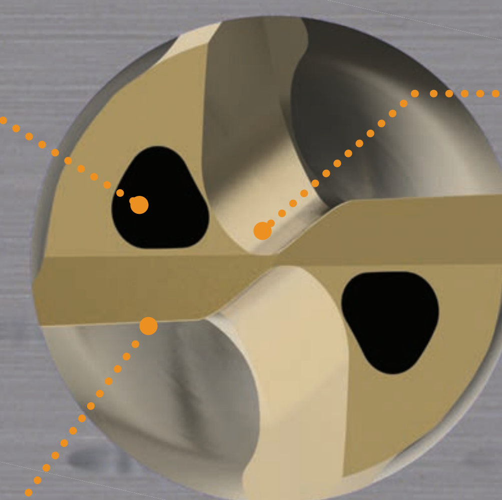
DVAS

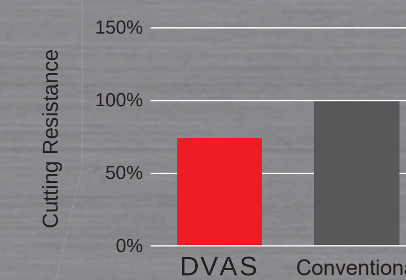
Mini Size 1.0mm – 2.9mm (.0394" – .1142")
L/D = 2 – 50

FAST, RELIABLE and ACCURATE.
New standards enabled by the "Five New Technologies"

Advanced Coolant Hole

New XR Point Thinning

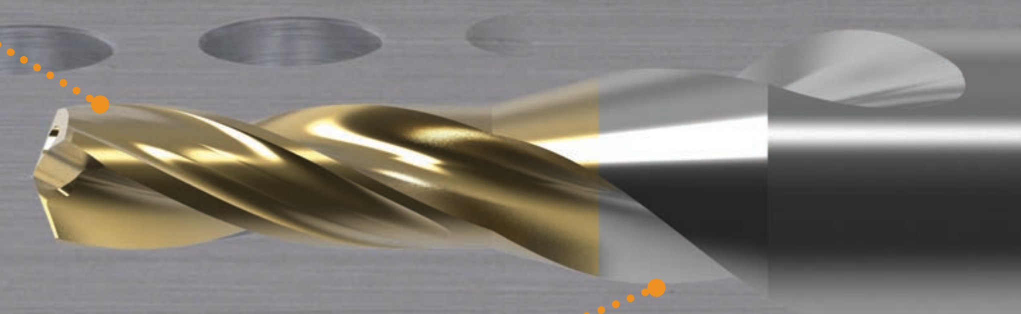




<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0394 inch, L/D=20
Cutting Speed : vc= 230 SFM
Feed per Rev. : fr= .0016 IPR

Tough and Sharp Cutting Edge Design

New Coated Grade DP1120



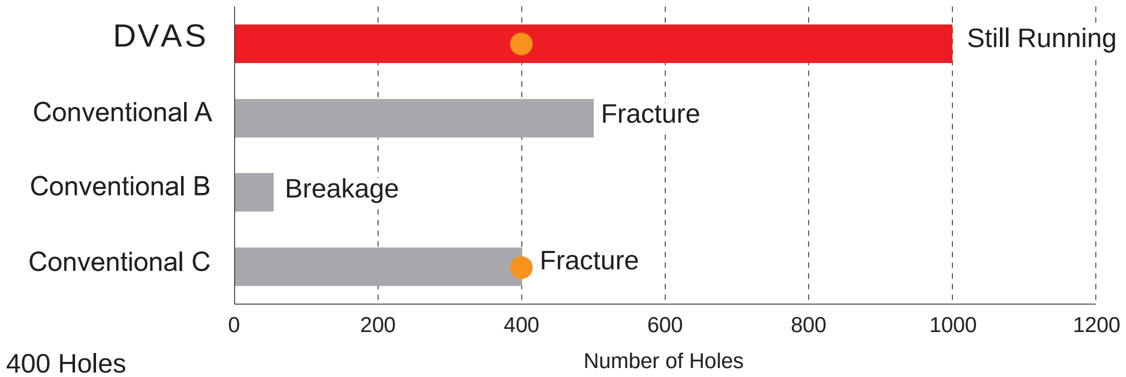
Unique Rigid Form

*By CG image

Cutting Performance

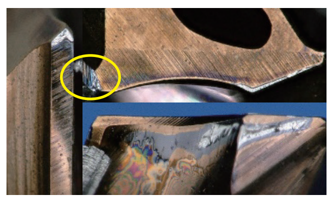
AISI 4140 Comparison of Fracture Resistance

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



After 400 Holes

DVAS

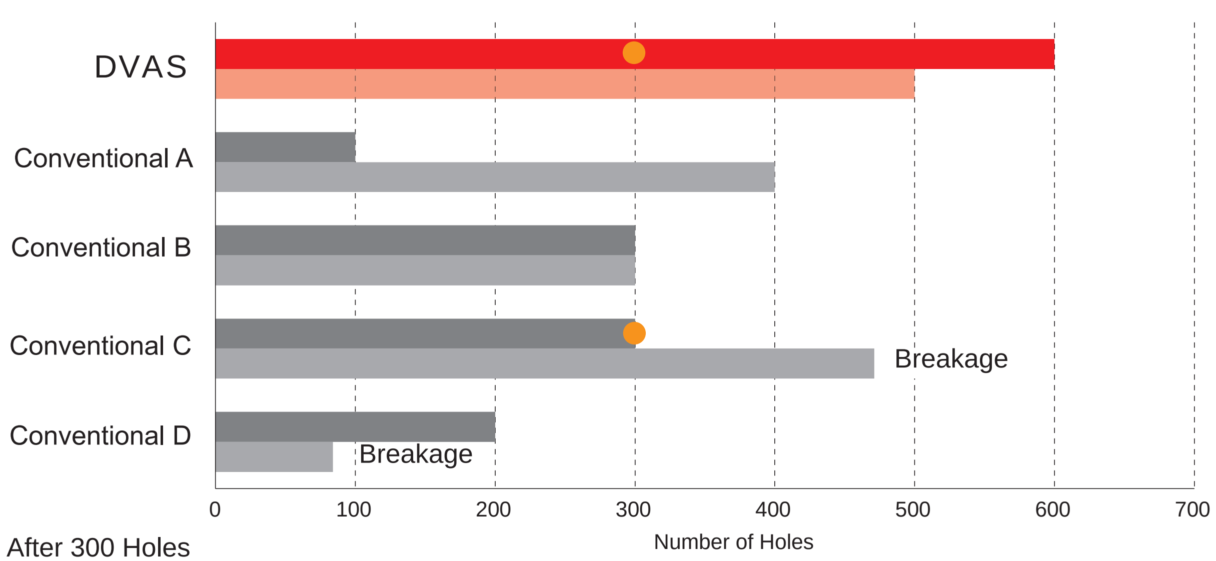


Conventional C

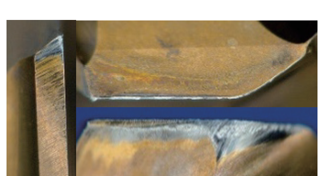
<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0787 inch, L/D=20
Cutting Speed : vc= 165 SFM
Feed per Rev. : fr= .0024 IPR
Hole Depth : 1.575 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa
Pilot Drills : DC=ø.0787 inch, L/D=2
Hole Depth .157 inch/holes

AISI 4140 Comparison of Fracture Resistance in High-efficiency Cutting

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



After 300 Holes



DVAS

Conventional C

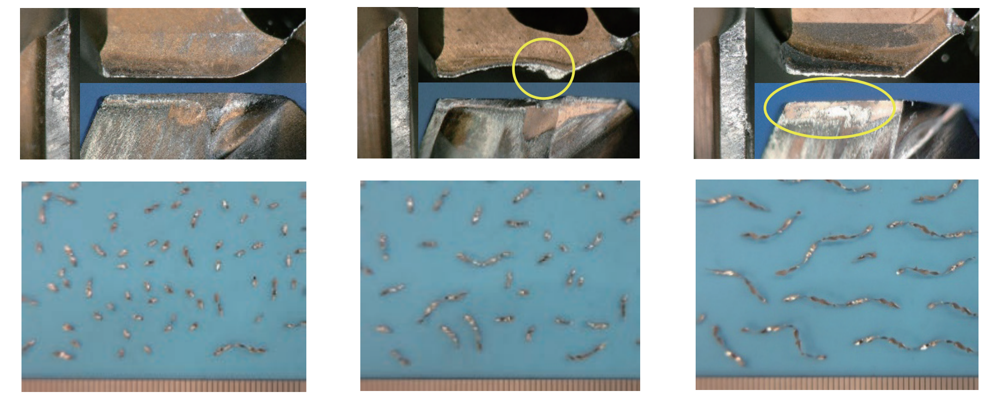
<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0787 inch, L/D=20
Cutting Speed : vc= 230 SFM
Feed per Rev. : fr= .0028 IPR
Hole Depth : 1.575 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa
Pilot Drills : DC=ø.0787 inch, L/D=2
Hole Depth .157 inch/holes

AISI 304 Comparison of Welding Resistance and Chip Disposal under High-efficiency Cutting

It achieves excellent welding resistance and chip control for drilling stainless steels.

After 1200 Holes

DVAS | Conventional A | Conventional B

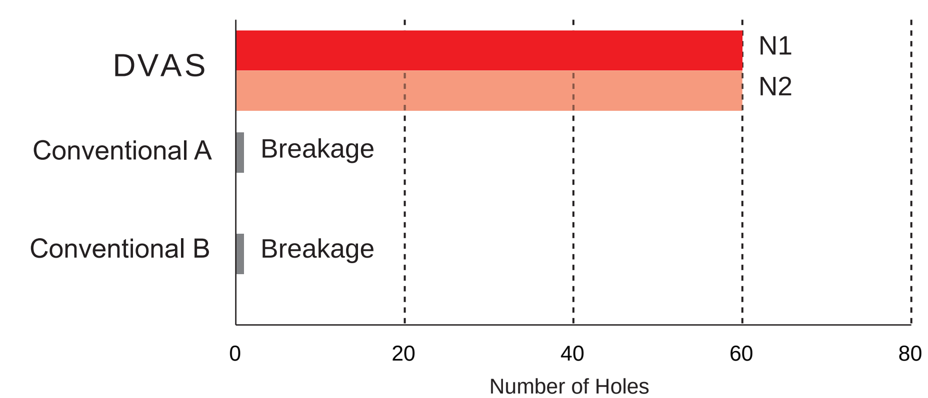


Continuous Chips is Mix | Continuous Chips

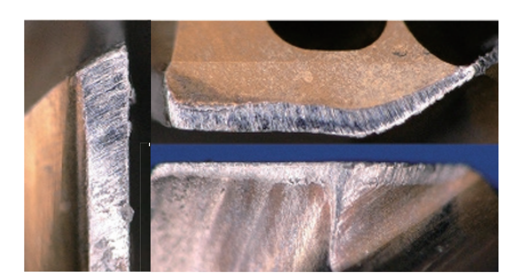
<Cutting Conditions>
Workpiece Material : AISI 304
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .157 inch
Long Drill
DC=ø.0787 inch, L/D=20
Hole Depth 1.575 inch
Cutting Speed : vc= 165 SFM
Feed per Rev. : fr= .0024 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants
2MPa

Inconel718 Comparison of Breakage Resistance

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



After 60 Holes



DVAS

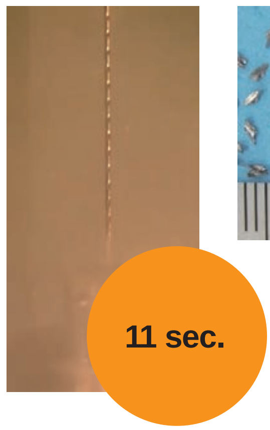
<Cutting Conditions>
Workpiece Material : Inconel718
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .157 inch
Long Drill
DC=ø.0787 inch, L/D=12
Hole Depth .787 inch
Cutting Speed : vc= 100 SFM
Feed per Rev. : fr= .0012 IPR
Hole Depth : .787 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants
2MPa

Cutting Performance

AISI 304 L/D =50 High-efficiency Cutting Example

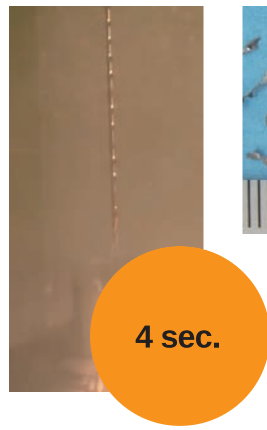
Achieves excellent chip disposal and high efficiency in deep hole drilling of stainless steels.

Cutting Speed : vc= 195 SFM
Feed per Rev. : fr= .0020 IPR



YouTube

Cutting Speed : vc= 330 SFM
Feed per Rev. : fr= .0031 IPR

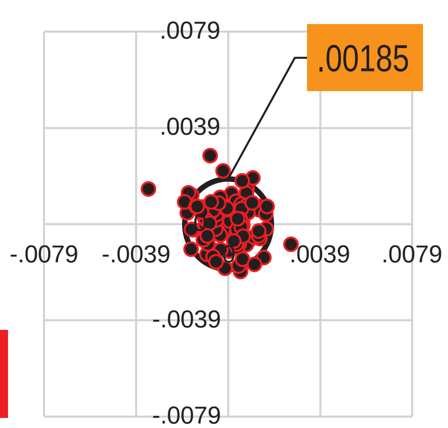


YouTube

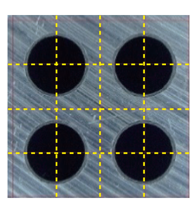
<Cutting Conditions>
Workpiece Material : AISI 304
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .236 inch
Short Drill
DC=ø.0787 inch, L/D=7
Hole Depth .551 inch
Long Drill
DC=ø.0787 inch, L/D=12
Hole Depth 3.937 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants
7Mpa

AISI 4140 L/D=40 Comparison of True Straightness

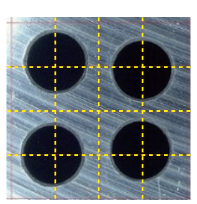
Hole wandering is greatly reduced when compared to conventional products.



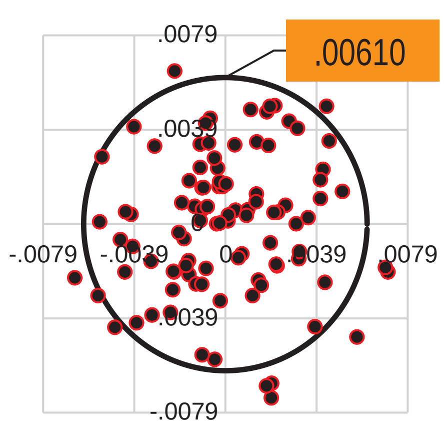
DVAS



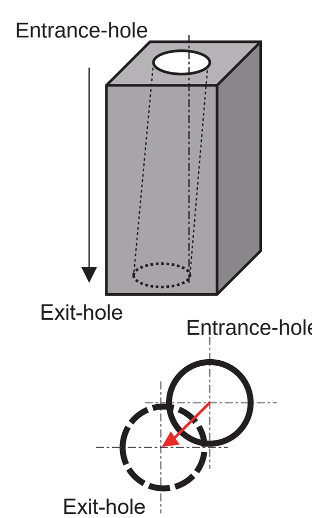
DVAS



Conventional



Conventional



<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .236 inch
Long Drill
DC=ø.0787 inch, L/D= 40
Hole Depth 3.150 inch
Feed per Rev.: fr= .0028 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants, 7Mpa

Memo

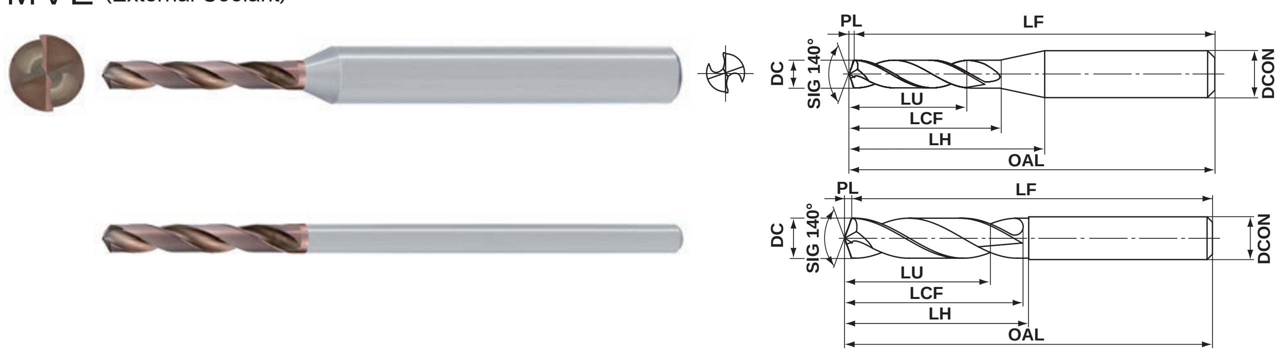
MVE/MVS

- New DP1020 grade provides excellent wear resistance with a unique wavy cutting edge sharpness and "TRI-Cooling technology" coolant holes which provides excellent chip evacuation.
- Double margin available in 10×D, 15×D, 20×D, 25×D, 30×D, 35×D and 40×D for excellent straightness and surface finish.

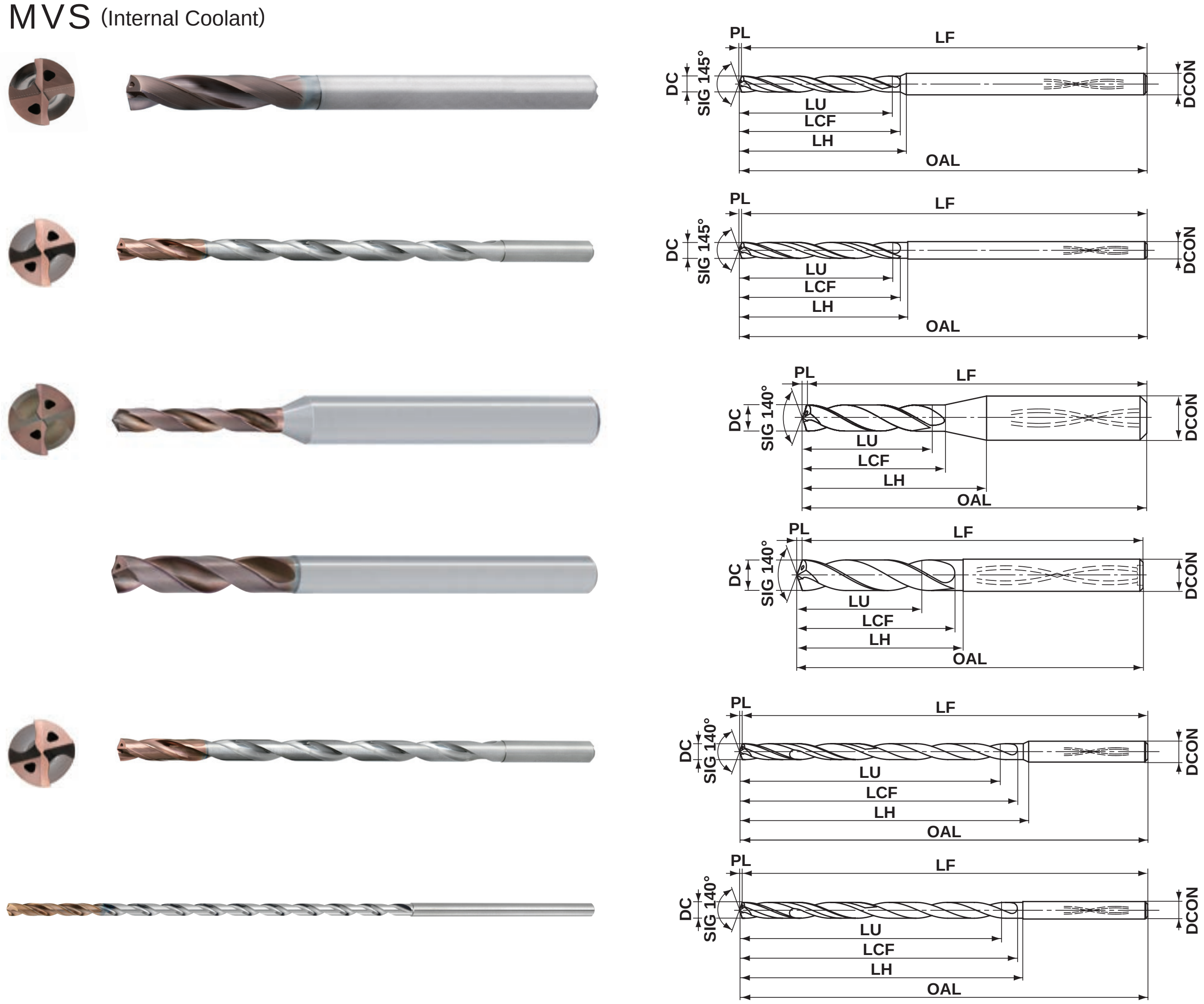
UWC DP1 140° only MVS · only MVS

P M K N S H
only MVE

MVE (External Coolant)



MVS (Internal Coolant)



(inch)

Type	DC=.1181	.1181<DC≤.2362	.2362<DC≤.3937	.3937<DC≤.7087	.7087<DC≤.7874
Type1,2,3,4,5,6	0 / −.00055	0 / −.00071	0 / −.00087	0 / −.00106	0 / −.00130
Type7,8	−.00067 / −.00122	−.00098 / −.00169	−.00130 / −.00217	−.00161 / −.00268	–
h6	DCON=.1181	.1181<DCON≤.2362	.2362<DCON≤.3937	.3937<DCON≤.7087	.7087<DCON≤.7874
	0 / −.00024	0 / −.00031	0 / −.00035	0 / −.00043	0 / −.00051

(mm)

Type	DC=3	3<DC≤6	6<DC≤10	10<DC≤18	18 <DC≤20
Type1,2,3,4,5,6	0 / −0.014	0 / −0.018	0 / −0.022	0 / −0.027	0 / −0.033
Type7,8	−0.017 / −0.031	−0.025 / −0.043	−0.033 / −0.055	−0.041 / −0.068	–
h6	DCON=3	3<DCON≤6	6<DCON≤10	10<DCON≤18	18 <DCON≤20
	0 / −0.006	0 / −0.008	0 / −0.009	0 / −0.011	0 / −0.013

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.000	.1181				2	Ext.	★	MVE0300X02S030	6.5	.256	16.5	.650	16.5	.650	55.5	2.185	55	2.165	0.5	.020	3	.118	2
					2	Ext.	●	MVE0300X02S060	6.5	.256	16.5	.650	19.7	.776	55.5	2.185	55	2.165	0.5	.020	6	.236	1
					2	Int.	★	MVS0300X02S030PL	6.5	.256	16.5	.650	16.5	.650	55.5	2.185	55	2.165	0.5	.020	3	.118	4
					2	Int.	●	MVS0300X02S060PL	6.5	.256	16.5	.650	19.7	.776	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Ext.	★	MVE0300X03S030	9.5	.374	21.5	.850	21.5	.850	60.5	2.386	60	2.362	0.5	.024	3	.118	2
					3	Ext.	★	MVE0300X03S060	9.5	.374	21.5	.850	24.7	.976	60.5	2.386	60	2.362	0.5	.024	6	.236	1
					3	Int.	★	MVS0300X03S030	9.5	.374	21.5	.850	21.5	.850	72.5	2.858	72	2.835	0.5	.024	3	.118	6
					3	Int.	●	MVS0300X03S060	9.5	.374	21.5	.850	24.7	.976	72.5	2.858	72	2.835	0.5	.024	6	.236	5
					5	Int.	★	MVS0300X05S030	15.5	.610	28.5	1.126	28.5	1.126	81.5	3.213	81	3.189	0.5	.024	3	.118	6
					5	Int.	●	MVS0300X05S060	15.5	.610	28.5	1.126	31.7	1.252	81.5	3.213	81	3.189	0.5	.024	6	.236	5
					8	Int.	★	MVS0300X08S030	24.5	.965	35.5	1.402	35.5	1.402	81.5	3.213	81	3.189	0.5	.024	3	.118	6
					8	Int.	●	MVS0300X08S060	24.5	.965	35.5	1.402	38.7	1.528	81.5	3.213	81	3.189	0.5	.024	6	.236	5
					10	Int.	★	MVS0300X10S030	30.5	1.201	39.5	1.555	42.5	1.677	90.5	3.563	90	3.543	0.5	.020	3	.118	8
					10	Int.	●	MVS0300X10S060	30.5	1.201	39.5	1.555	45.8	1.803	90.5	3.563	90	3.543	0.5	.020	6	.236	7
					15	Int.	★	MVS0300X15S030	45.5	1.791	54.5	2.146	57.5	2.268	105.5	4.154	105	4.134	0.5	.020	3	.118	8
					15	Int.	●	MVS0300X15S060	45.5	1.791	54.5	2.146	60.8	2.394	105.5	4.154	105	4.134	0.5	.020	6	.236	7
					20	Int.	★	MVS0300X20S030	60.5	2.382	69.5	2.736	72.5	2.858	120.5	4.744	120	4.724	0.5	.020	3	.118	8
					20	Int.	●	MVS0300X20S060	60.5	2.382	69.5	2.736	75.8	2.984	120.5	4.744	120	4.724	0.5	.020	6	.236	7
					25	Int.	★	MVS0300X25S030	75.5	2.972	84.5	3.327	87.5	3.449	135.5	5.335	135	5.315	0.5	.020	3	.118	8
					25	Int.	●	MVS0300X25S060	75.5	2.972	84.5	3.327	90.8	3.575	135.5	5.335	135	5.315	0.5	.020	6	.236	7
					30	Int.	★	MVS0300X30S030	90.5	3.563	99.5	3.917	102.5	4.039	150.5	5.925	150	5.906	0.5	.020	3	.118	8
					30	Int.	●	MVS0300X30S060	90.5	3.563	99.5	3.917	105.8	4.165	150.5	5.925	150	5.906	0.5	.020	6	.236	7
					35	Int.	★	MVS0300X35S030	105.5	4.154	115.5	4.547	118.5	4.669	166.5	6.555	166	6.535	0.5	.020	3	.118	8
					35	Int.	●	MVS0300X35S060	105.5	4.154	115.5	4.547	121.8	4.795	166.5	6.555	166	6.535	0.5	.020	6	.236	7
					40	Int.	★	MVS0300X40S030	120.5	4.744	130.5	5.138	133.5	5.260	181.5	7.146	181	7.126	0.5	.020	3	.118	8
					40	Int.	●	MVS0300X40S060	120.5	4.744	130.5	5.138	136.8	5.386	181.5	7.146	181	7.126	0.5	.020	6	.236	7
3.048	.1200		31		2	Ext.	●	MVE0305X02S060	6.6	.260	18.6	.732	21.8	.858	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	●	MVS0305X02S060PL	6.6	.260	18.5	.728	21.6	.854	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Int.	●	MVS0305X03S060	9.7	.382	21.6	.850	24.8	.976	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	●	MVS0305X05S060	15.8	.622	32.6	1.283	35.8	1.409	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	●	MVS0305X08S060	24.9	.980	41.6	1.638	44.8	1.764	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	●	MVS0305X10S060	31.0	1.220	46.6	1.835	52.7	2.079	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	●	MVS0305X15S060	46.3	1.823	63.6	2.504	69.7	2.748	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	●	MVS0305X20S060	61.5	2.421	81.6	3.213	87.7	3.457	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	●	MVS0305X25S060	76.7	3.020	98.6	3.882	104.7	4.126	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	●	MVS0305X30S060	92.0	3.622	116.6	4.591	119.6	4.835	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	●	MVS0305X35S060	107.2	4.220	134.6	5.299	137.6	5.543	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	●	MVS0305X40S060	122.5	4.823	150.6	5.929	153.6	6.173	201.6	7.937	201	7.913	0.6	.024	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan

M DRILLING

M DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.100	.1220				2	Ext.	★	MVE0310X02S040	6.8	.268	18.6	.732	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	2
					2	Ext.	●	MVE0310X02S060	6.8	.268	18.6	.732	21.7	.854	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	★	MVS0310X02S040PL	6.7	.264	18.5	.728	20.5	.807	55.5	2.185	55	2.165	0.5	.020	4	.157	4
					2	Int.	●	MVS0310X02S060PL	6.7	.264	18.5	.728	21.6	.850	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Ext.	★	MVE0310X03S040	9.9	.390	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	2
					3	Ext.	★	MVE0310X03S060	9.9	.390	24.6	.969	27.7	1.091	60.6	2.386	60	2.362	0.6	.024	6	.236	1
					3	Int.	★	MVS0310X03S040	9.9	.390	21.6	.850	23.6	.929	76.6	3.016	76	2.992	0.6	.024	4	.157	6
					3	Int.	●	MVS0310X03S060	9.9	.390	21.6	.850	24.7	.972	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	★	MVS0310X05S040	16.1	.634	32.6	1.283	32.6	1.283	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					5	Int.	●	MVS0310X05S060	16.1	.634	32.6	1.283	35.7	1.406	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	★	MVS0310X08S040	25.4	1.000	41.6	1.638	41.6	1.638	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					8	Int.	●	MVS0310X08S060	25.4	1.000	41.6	1.638	44.7	1.760	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	★	MVS0310X10S040	31.6	1.244	46.6	1.835	49.6	1.953	97.6	3.843	97	3.819	0.6	.024	4	.157	8
					10	Int.	●	MVS0310X10S060	31.6	1.244	46.6	1.835	52.7	2.075	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	★	MVS0310X15S040	47.1	1.854	63.6	2.504	66.6	2.622	114.6	4.512	114	4.488	0.6	.024	4	.157	8
					15	Int.	●	MVS0310X15S060	47.1	1.854	63.6	2.504	69.7	2.744	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	★	MVS0310X20S040	62.6	2.465	81.6	3.213	84.6	3.331	132.6	5.220	132	5.197	0.6	.024	4	.157	8
					20	Int.	●	MVS0310X20S060	62.6	2.465	81.6	3.213	87.7	3.453	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	★	MVS0310X25S040	78.1	3.075	98.6	3.882	101.6	4.000	149.6	5.890	149	5.866	0.6	.024	4	.157	8
					25	Int.	●	MVS0310X25S060	78.1	3.075	98.6	3.882	104.7	4.122	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	★	MVS0310X30S040	93.6	3.685	116.6	4.591	119.6	4.709	167.6	6.598	167	6.575	0.6	.024	4	.157	8
					30	Int.	●	MVS0310X30S060	93.6	3.685	116.6	4.591	122.7	4.831	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	□	MVS0310X35S040	109.1	4.295	134.6	5.299	137.6	5.417	185.6	7.307	185	7.283	0.6	.024	4	.157	8
					35	Int.	□	MVS0310X35S060	109.1	4.295	134.6	5.299	140.7	5.539	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	□	MVS0310X40S040	124.6	4.906	150.6	5.929	153.6	6.047	201.6	7.937	201	7.913	0.6	.024	4	.157	8
					40	Int.	□	MVS0310X40S060	124.6	4.906	150.6	5.929	156.7	6.169	201.6	7.937	201	7.913	0.6	.024	6	.236	7
3.175	.1250	1/8			2	Ext.	●	MVE0318X02S060	6.9	.272	18.6	.732	21.6	.850	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	●	MVS0318X02S060PL	6.9	.272	18.5	.728	21.5	.846	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Int.	●	MVS0318X03S060	10.1	.398	21.6	.850	24.6	.969	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	●	MVS0318X05S060	16.4	.646	32.6	1.283	35.6	1.402	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	●	MVS0318X08S060	26.0	1.024	41.6	1.638	44.6	1.756	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	●	MVS0318X10S060	32.3	1.272	46.6	1.835	52.6	2.071	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	●	MVS0318X15S060	48.2	1.898	63.6	2.504	69.6	2.740	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	●	MVS0318X20S060	64.1	2.524	81.6	3.213	87.6	3.449	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	●	MVS0318X25S060	79.9	3.146	98.6	3.882	104.6	4.118	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	●	MVS0318X30S060	95.8	3.772	116.6	4.591	119.6	4.827	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	●	MVS0318X35S060	111.7	4.398	134.6	5.299	137.6	5.535	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	●	MVS0318X40S060	127.6	5.024	150.6	5.929	153.6	6.165	201.6	7.937	201	7.913	0.6	.024	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

M

DRILLING

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.200	.1260				2	Ext.	★	MVE0320X02S040	7.0	.276	18.6	.732	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	2
					2	Ext.	●	MVE0320X02S060	7.0	.276	18.6	.732	21.6	.850	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	★	MVS0320X02S040PL	6.9	.272	18.5	.728	20.5	.807	55.5	2.185	55	2.165	0.5	.020	4	.157	4
					2	Int.	●	MVS0320X02S060PL	6.9	.272	18.5	.728	21.5	.846	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Ext.	★	MVE0320X03S040	10.2	.402	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	2
					3	Ext.	★	MVE0320X03S060	10.2	.402	24.6	.969	27.6	1.087	60.6	2.386	60	2.362	0.6	.024	6	.236	1
					3	Int.	★	MVS0320X03S040	10.2	.402	21.6	.850	23.6	.929	76.6	3.016	76	2.992	0.6	.024	4	.157	6
					3	Int.	●	MVS0320X03S060	10.2	.402	21.6	.850	24.6	.969	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	★	MVS0320X05S040	16.6	.654	32.6	1.283	32.6	1.283	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					5	Int.	●	MVS0320X05S060	16.6	.654	32.6	1.283	35.6	1.402	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	★	MVS0320X08S040	26.2	1.031	41.6	1.638	41.6	1.638	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					8	Int.	●	MVS0320X08S060	26.2	1.031	41.6	1.638	44.6	1.756	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	★	MVS0320X10S040	32.6	1.283	46.6	1.835	49.6	1.953	97.6	3.843	97	3.819	0.6	.024	4	.157	8
					10	Int.	●	MVS0320X10S060	32.6	1.283	46.6	1.835	52.6	2.071	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	★	MVS0320X15S040	48.6	1.913	63.6	2.504	66.6	2.622	114.6	4.512	114	4.488	0.6	.024	4	.157	8
					15	Int.	●	MVS0320X15S060	48.6	1.913	63.6	2.504	69.6	2.740	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	★	MVS0320X20S040	64.6	2.543	81.6	3.213	84.6	3.331	132.6	5.220	132	5.197	0.6	.024	4	.157	8
					20	Int.	●	MVS0320X20S060	64.6	2.543	81.6	3.213	87.6	3.449	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	★	MVS0320X25S040	80.6	3.173	98.6	3.882	101.6	4.000	149.6	5.890	149	5.866	0.6	.024	4	.157	8
					25	Int.	●	MVS0320X25S060	80.6	3.173	98.6	3.882	104.6	4.118	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	★	MVS0320X30S040	96.6	3.803	116.6	4.591	119.6	4.709	167.6	6.598	167	6.575	0.6	.024	4	.157	8
					30	Int.	●	MVS0320X30S060	96.6	3.803	116.6	4.591	122.6	4.827	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	□	MVS0320X35S040	112.6	4.433	134.6	5.299	137.6	5.417	185.6	7.307	185	7.283	0.6	.024	4	.157	8
					35	Int.	□	MVS0320X35S060	112.6	4.433	134.6	5.299	140.6	5.539	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	□	MVS0320X40S040	128.6	5.063	150.6	5.929	153.6	6.047	201.6	7.937	201	7.913	0.6	.024	4	.157	8
					40	Int.	□	MVS0320X40S060	128.6	5.063	150.6	5.929	156.6	6.165	201.6	7.937	201	7.913	0.6	.024	6	.236	7
3.300	.1299			M4x.7	2	Ext.	★	MVE0330X02S040	7.2	.283	18.6	.732	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	2
					2	Ext.	●	MVE0330X02S060	7.2	.283	18.6	.732	21.5	.846	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	★	MVS0330X02S040PL	7.1	.280	18.5	.728	20.5	.807	55.5	2.185	55	2.165	0.5	.020	4	.157	4
					2	Int.	●	MVS0330X02S060PL	7.1	.280	18.5	.728	21.4	.843	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Ext.	★	MVE0330X03S040	10.5	.413	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	2
					3	Ext.	★	MVE0330X03S060	10.5	.413	24.6	.969	27.5	1.083	60.6	2.386	60	2.362	0.6	.024	6	.236	1
					3	Int.	★	MVS0330X03S040	10.5	.413	21.6	.850	23.6	.929	76.6	3.016	76	2.992	0.6	.024	4	.157	6
					3	Int.	●	MVS0330X03S060	10.5	.413	21.6	.850	24.5	.965	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	★	MVS0330X05S040	17.1	.673	32.6	1.283	32.6	1.283	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					5	Int.	●	MVS0330X05S060	17.1	.673	32.6	1.283	35.5	1.398	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	★	MVS0330X08S040	27.0	1.063	41.6	1.638	41.6	1.638	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					8	Int.	●	MVS0330X08S060	27.0	1.063	41.6	1.638	44.5	1.752	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	★	MVS0330X10S040	33.6	1.323	46.6	1.835	49.6	1.953	97.6	3.843	97	3.819	0.6	.024	4	.157	8
					10	Int.	●	MVS0330X10S060	33.6	1.323	46.6	1.835	52.5	2.067	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	★	MVS0330X15S040	50.1	1.972	63.6	2.504	66.6	2.622	114.6	4.512	114	4.488	0.6	.024	4	.157	8
					15	Int.	●	MVS0330X15S060	50.1	1.972	63.6	2.504	69.5	2.736	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	★	MVS0330X20S040	66.6	2.622	81.6	3.213	84.6	3.331	132.6	5.220	132	5.197	0.6	.024	4	.157	8
					20	Int.	●	MVS0330X20S060	66.6	2.622	81.6	3.213	87.5	3.445	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	★	MVS0330X25S040	83.1	3.272	98.6	3.882	101.6	4.000	149.6	5.890	149	5.866	0.6	.024	4	.157	8
					25	Int.	●	MVS0330X25S060	83.1	3.272	98.6	3.882	104.5	4.114	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	★	MVS0330X30S040	99.6	3.921	116.6	4.591	119.6	4.709	167.6	6.598	167	6.575	0.6	.024	4	.157	8
					30	Int.	●	MVS0330X30S060	99.6	3.921	116.6	4.591	122.5	4.823	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	□	MVS0330X35S040	116.1	4.571	134.6	5.299	137.6	5.417	185.6	7.307	185	7.283	0.6	.024	4	.157	8
					35	Int.	□	MVS0330X35S060	116.1	4.571	134.6	5.299	140.5	5.531	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	□	MVS0330X40S040	132.6	5.220	150.6	5.929	153.6	6.047	201.6	7.937	201	7.913	0.6	.024	4	.157	8
					40	Int.	□	MVS0330X40S060	132.6	5.220	150.6	5.929	156.5	6.161	201.6	7.937	201	7.913	0.6	.024	6	.236	7

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.400	.1339				2	Ext.	★	MVE0340X02S040	7.4	.291	18.6	.732	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	2
					2	Ext.	●	MVE0340X02S060	7.4	.291	18.6	.732	21.4	.843	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	★	MVS0340X02S040PL	7.3	.287	18.5	.728	20.5	.807	55.5	2.185	55	2.165	0.5	.020	4	.157	4
					2	Int.	●	MVS0340X02S060PL	7.3	.287	18.5	.728	21.3	.839	55.5	2.185	55	2.165	0.5	.020	6	.236	3
					3	Ext.	★	MVE0340X03S040	10.8	.425	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	2
					3	Ext.	★	MVE0340X03S060	10.8	.425	24.6	.969	27.4	1.079	60.6	2.386	60	2.362	0.6	.024	6	.236	1
					3	Int.	★	MVS0340X03S040	10.8	.425	21.6	.850	23.6	.929	76.6	3.016	76	2.992	0.6	.024	4	.157	6
					3	Int.	●	MVS0340X03S060	10.8	.425	21.6	.850	24.4	.961	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	★	MVS0340X05S040	17.6	.693	32.6	1.283	32.6	1.283	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					5	Int.	●	MVS0340X05S060	17.6	.693	32.6	1.283	35.4	1.394	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	★	MVS0340X08S040	27.8	1.094	41.6	1.638	41.6	1.638	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					8	Int.	●	MVS0340X08S060	27.8	1.094	41.6	1.638	44.4	1.748	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	★	MVS0340X10S040	34.6	1.362	46.6	1.835	49.6	1.953	97.6	3.843	97	3.819	0.6	.024	4	.157	8
					10	Int.	●	MVS0340X10S060	34.6	1.362	46.6	1.835	52.4	2.063	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	★	MVS0340X15S040	51.6	2.031	63.6	2.504	66.6	2.622	114.6	4.512	114	4.488	0.6	.024	4	.157	8
					15	Int.	●	MVS0340X15S060	51.6	2.031	63.6	2.504	69.4	2.732	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	★	MVS0340X20S040	68.6	2.701	81.6	3.213	84.6	3.331	132.6	5.220	132	5.197	0.6	.024	4	.157	8
					20	Int.	●	MVS0340X20S060	68.6	2.701	81.6	3.213	87.4	3.441	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	★	MVS0340X25S040	85.6	3.370	98.6	3.882	101.6	4.000	149.6	5.890	149	5.866	0.6	.024	4	.157	8
					25	Int.	●	MVS0340X25S060	85.6	3.370	98.6	3.882	104.4	4.110	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	★	MVS0340X30S040	102.6	4.039	116.6	4.591	119.6	4.709	167.6	6.598	167	6.575	0.6	.024	4	.157	8
					30	Int.	●	MVS0340X30S060	102.6	4.039	116.6	4.591	122.4	4.819	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	□	MVS0340X35S040	119.6	4.709	134.6	5.299	137.6	5.417	185.6	7.307	185	7.283	0.6	.024	4	.157	8
					35	Int.	□	MVS0340X35S060	119.6	4.709	134.6	5.299	140.4	5.528	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	□	MVS0340X40S040	136.6	5.378	150.6	5.929	153.6	6.047	201.6	7.937	201	7.913	0.6	.024	4	.157	8
					40	Int.	□	MVS0340X40S060	136.6	5.378	150.6	5.929	156.4	6.157	201.6	7.937	201	7.913	0.6	.024	6	.236	7
3.500	.1378				2	Ext.	★	MVE0350X02S040	7.6	.299	18.6	.732	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	2
					2	Ext.	●	MVE0350X02S060	7.6	.299	18.6	.732	21.3	.839	55.6	2.189	55	2.165	0.6	.024	6	.236	1
					2	Int.	★	MVS0350X02S040PL	7.6	.299	18.5	.728	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0350X02S060PL	7.6	.299	18.5	.728	21.2	.835	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0350X03S040	11.1	.437	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	2
					3	Ext.	★	MVE0350X03S060	11.1	.437	24.6	.969	27.3	1.075	60.6	2.386	60	2.362	0.6	.024	6	.236	1
					3	Int.	★	MVS0350X03S040	11.1	.437	21.6	.850	23.6	.929	76.6	3.016	76	2.992	0.6	.024	4	.157	6
					3	Int.	●	MVS0350X03S060	11.1	.437	21.6	.850	24.3	.957	76.6	3.016	76	2.992	0.6	.024	6	.236	5
					5	Int.	★	MVS0350X05S040	18.1	.713	32.6	1.283	32.6	1.283	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					5	Int.	●	MVS0350X05S060	18.1	.713	32.6	1.283	35.3	1.390	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					8	Int.	★	MVS0350X08S040	28.6	1.126	41.6	1.638	41.6	1.638	87.6	3.449	87	3.425	0.6	.024	4	.157	6
					8	Int.	●	MVS0350X08S060	28.6	1.126	41.6	1.638	44.3	1.744	87.6	3.449	87	3.425	0.6	.024	6	.236	5
					10	Int.	★	MVS0350X10S040	35.6	1.402	46.6	1.835	49.6	1.953	97.6	3.843	97	3.819	0.6	.024	4	.157	8
					10	Int.	●	MVS0350X10S060	35.6	1.402	46.6	1.835	52.3	2.059	97.6	3.843	97	3.819	0.6	.024	6	.236	7
					15	Int.	★	MVS0350X15S040	53.1	2.091	63.6	2.504	66.6	2.622	114.6	4.512	114	4.488	0.6	.024	4	.157	8
					15	Int.	●	MVS0350X15S060	53.1	2.091	63.6	2.504	69.3	2.728	114.6	4.512	114	4.488	0.6	.024	6	.236	7
					20	Int.	★	MVS0350X20S040	70.6	2.780	81.6	3.213	84.6	3.331	132.6	5.220	132	5.197	0.6	.024	4	.157	8
					20	Int.	●	MVS0350X20S060	70.6	2.780	81.6	3.213	87.3	3.437	132.6	5.220	132	5.197	0.6	.024	6	.236	7
					25	Int.	★	MVS0350X25S040	88.1	3.469	98.6	3.882	101.6	4.000	149.6	5.890	149	5.866	0.6	.024	4	.157	8
					25	Int.	●	MVS0350X25S060	88.1	3.469	98.6	3.882	104.3	4.106	149.6	5.890	149	5.866	0.6	.024	6	.236	7
					30	Int.	★	MVS0350X30S040	105.6	4.157	116.6	4.591	119.6	4.709	167.6	6.598	167	6.575	0.6	.024	4	.157	8
					30	Int.	●	MVS0350X30S060	105.6	4.157	116.6	4.591	122.3	4.815	167.6	6.598	167	6.575	0.6	.024	6	.236	7
					35	Int.	★	MVS0350X35S040	123.1	4.846	134.6	5.299	137.6	5.417	185.6	7.307	185	7.283	0.6	.024	4	.157	8
					35	Int.	●	MVS0350X35S060	123.1	4.846	134.6	5.299	140.3	5.524	185.6	7.307	185	7.283	0.6	.024	6	.236	7
					40	Int.	★	MVS0350X40S040	140.6	5.535	150.6	5.929	153.6	6.047	201.6	7.937	201	7.913	0.6	.024	4	.157	8
					40	Int.	●	MVS0350X40S060	140.6	5.535	150.6	5.929	156.3	6.154	201.6	7.937	201	7.913	0.6	.024	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.572	.1407	9/64			2	Ext.	●	MVE0357X02S060	7.7	.303	20.7	.815	23.3	.917	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	●	MVS0357X02S060PL	7.7	.303	20.6	.811	23.2	.913	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Int.	●	MVS0357X03S060	11.4	.449	23.7	.933	26.3	1.035	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	●	MVS0357X05S060	18.5	.728	36.7	1.445	39.3	1.547	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	●	MVS0357X08S060	29.2	1.150	46.7	1.839	49.3	1.941	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	●	MVS0357X10S060	36.4	1.433	52.7	2.075	58.3	2.295	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	●	MVS0357X15S060	54.2	2.134	72.7	2.862	78.3	3.083	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	●	MVS0357X20S060	72.1	2.839	92.7	3.650	98.3	3.870	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	●	MVS0357X25S060	89.9	3.539	112.7	4.437	118.3	4.657	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	●	MVS0357X30S060	107.8	4.244	132.7	5.224	135.7	5.445	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	●	MVS0357X35S060	125.6	4.945	152.7	6.012	155.7	6.232	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	●	MVS0357X40S060	143.5	5.650	172.7	6.799	175.7	7.020	223.7	8.807	223	8.780	0.7	.028	6	.236	7
3.600	.1417				2	Ext.	★	MVE0360X02S040	7.9	.311	20.7	.815	20.7	.815	55.7	2.193	55	2.165	0.7	.028	4	.157	2
					2	Ext.	●	MVE0360X02S060	7.9	.311	20.7	.815	23.3	.917	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	★	MVS0360X02S040PL	7.8	.307	20.6	.811	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0360X02S060PL	7.8	.307	20.6	.811	23.1	.909	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0360X03S040	11.5	.453	27.7	1.091	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	2
					3	Ext.	★	MVE0360X03S060	11.5	.453	27.7	1.091	30.3	1.193	60.7	2.390	60	2.362	0.7	.028	6	.236	1
					3	Int.	★	MVS0360X03S040	11.5	.453	23.7	.933	23.7	.933	80.7	3.177	80	3.150	0.7	.028	4	.157	6
					3	Int.	●	MVS0360X03S060	11.5	.453	23.7	.933	26.3	1.035	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	★	MVS0360X05S040	18.7	.736	36.7	1.445	36.7	1.445	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					5	Int.	●	MVS0360X05S060	18.7	.736	36.7	1.445	39.3	1.547	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	★	MVS0360X08S040	29.5	1.161	46.7	1.839	46.7	1.839	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					8	Int.	●	MVS0360X08S060	29.5	1.161	46.7	1.839	49.3	1.941	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	★	MVS0360X10S040	36.7	1.445	52.7	2.075	55.7	2.193	103.7	4.083	103	4.055	0.7	.028	4	.157	8
					10	Int.	●	MVS0360X10S060	36.7	1.445	52.7	2.075	58.2	2.291	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	★	MVS0360X15S040	54.7	2.154	72.7	2.862	75.7	2.980	123.7	4.870	123	4.843	0.7	.028	4	.157	8
					15	Int.	●	MVS0360X15S060	54.7	2.154	72.7	2.862	78.2	3.079	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	★	MVS0360X20S040	72.7	2.862	92.7	3.650	95.7	3.768	143.7	5.657	143	5.630	0.7	.028	4	.157	8
					20	Int.	●	MVS0360X20S060	72.7	2.862	92.7	3.650	98.2	3.866	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	★	MVS0360X25S040	90.7	3.571	112.7	4.437	115.7	4.555	163.7	6.445	163	6.417	0.7	.028	4	.157	8
					25	Int.	●	MVS0360X25S060	90.7	3.571	112.7	4.437	118.2	4.654	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	★	MVS0360X30S040	108.7	4.280	132.7	5.224	135.7	5.343	183.7	7.232	183	7.205	0.7	.028	4	.157	8
					30	Int.	●	MVS0360X30S060	108.7	4.280	132.7	5.224	138.2	5.441	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	□	MVS0360X35S040	126.7	4.988	152.7	6.012	155.7	6.130	203.7	8.020	203	7.992	0.7	.028	4	.157	8
					35	Int.	□	MVS0360X35S060	126.7	4.988	152.7	6.012	158.2	6.232	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	□	MVS0360X40S040	144.7	5.697	172.7	6.799	175.7	6.917	223.7	8.807	223	8.780	0.7	.028	4	.157	8
					40	Int.	□	MVS0360X40S060	144.7	5.697	172.7	6.799	178.2	7.020	223.7	8.807	223	8.780	0.7	.028	6	.236	7

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.700	.1457			M4.5x.75	2	Ext.	★	MVE0370X02S040	8.1	.319	20.7	.815	20.7	.815	55.7	2.193	55	2.165	0.7	.028	4	.157	2
					2	Ext.	●	MVE0370X02S060	8.1	.319	20.7	.815	23.2	.913	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	★	MVS0370X02S040PL	8.0	.315	20.6	.811	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0370X02S060PL	8.0	.315	20.6	.811	23.0	.906	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0370X03S040	11.8	.465	27.7	1.091	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	2
					3	Ext.	★	MVE0370X03S060	11.8	.465	27.7	1.091	30.2	1.189	60.7	2.390	60	2.362	0.7	.028	6	.236	1
					3	Int.	★	MVS0370X03S040	11.8	.465	23.7	.933	23.7	.933	80.7	3.177	80	3.150	0.7	.028	4	.157	6
					3	Int.	●	MVS0370X03S060	11.8	.465	23.7	.933	26.2	1.031	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	★	MVS0370X05S040	19.2	.756	36.7	1.445	36.7	1.445	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					5	Int.	●	MVS0370X05S060	19.2	.756	36.7	1.445	39.2	1.543	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	★	MVS0370X08S040	30.3	1.193	46.7	1.839	46.7	1.839	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					8	Int.	●	MVS0370X08S060	30.3	1.193	46.7	1.839	49.2	1.937	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	★	MVS0370X10S040	37.7	1.484	52.7	2.075	55.7	2.193	103.7	4.083	103	4.055	0.7	.028	4	.157	8
					10	Int.	●	MVS0370X10S060	37.7	1.484	52.7	2.075	58.1	2.287	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	★	MVS0370X15S040	56.2	2.213	72.7	2.862	75.7	2.980	123.7	4.870	123	4.843	0.7	.028	4	.157	8
					15	Int.	●	MVS0370X15S060	56.2	2.213	72.7	2.862	78.1	3.075	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	★	MVS0370X20S040	74.7	2.941	92.7	3.650	95.7	3.768	143.7	5.657	143	5.630	0.7	.028	4	.157	8
					20	Int.	●	MVS0370X20S060	74.7	2.941	92.7	3.650	98.1	3.862	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	★	MVS0370X25S040	93.2	3.669	112.7	4.437	115.7	4.555	163.7	6.445	163	6.417	0.7	.028	4	.157	8
					25	Int.	●	MVS0370X25S060	93.2	3.669	112.7	4.437	118.1	4.650	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	★	MVS0370X30S040	111.7	4.398	132.7	5.224	135.7	5.343	183.7	7.232	183	7.205	0.7	.028	4	.157	8
					30	Int.	●	MVS0370X30S060	111.7	4.398	132.7	5.224	138.1	5.437	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	□	MVS0370X35S040	130.2	5.126	152.7	6.012	155.7	6.130	203.7	8.020	203	7.992	0.7	.028	4	.157	8
					35	Int.	□	MVS0370X35S060	130.2	5.126	152.7	6.012	158.1	6.228	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	□	MVS0370X40S040	148.7	5.854	172.7	6.799	175.7	6.917	223.7	8.807	223	8.780	0.7	.028	4	.157	8
					40	Int.	□	MVS0370X40S060	148.7	5.854	172.7	6.799	178.1	7.016	223.7	8.807	223	8.780	0.7	.028	6	.236	7
3.800	.1496		25	#10-24	2	Ext.	★	MVE0380X02S040	8.3	.327	20.7	.815	20.7	.815	55.7	2.193	55	2.165	0.7	.028	4	.157	2
					2	Ext.	●	MVE0380X02S060	8.3	.327	20.7	.815	23.1	.909	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	★	MVS0380X02S040PL	8.2	.323	20.6	.811	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0380X02S060PL	8.2	.323	20.6	.811	23.0	.906	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0380X03S040	12.1	.476	27.7	1.091	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	2
					3	Ext.	★	MVE0380X03S060	12.1	.476	27.7	1.091	30.1	1.185	60.7	2.390	60	2.362	0.7	.028	6	.236	1
					3	Int.	★	MVS0380X03S040	12.1	.476	23.7	.933	23.7	.933	80.7	3.177	80	3.150	0.7	.028	4	.157	6
					3	Int.	●	MVS0380X03S060	12.1	.476	23.7	.933	26.1	1.028	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	★	MVS0380X05S040	19.7	.776	36.7	1.445	36.7	1.445	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					5	Int.	●	MVS0380X05S060	19.7	.776	36.7	1.445	39.1	1.539	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	★	MVS0380X08S040	31.1	1.224	46.7	1.839	46.7	1.839	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					8	Int.	●	MVS0380X08S060	31.1	1.224	46.7	1.839	49.1	1.933	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	★	MVS0380X10S040	38.7	1.524	52.7	2.075	55.7	2.193	103.7	4.083	103	4.055	0.7	.028	4	.157	8
					10	Int.	●	MVS0380X10S060	38.7	1.524	52.7	2.075	58.1	2.287	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	★	MVS0380X15S040	57.7	2.272	72.7	2.862	75.7	2.980	123.7	4.870	123	4.843	0.7	.028	4	.157	8
					15	Int.	●	MVS0380X15S060	57.7	2.272	72.7	2.862	78.1	3.075	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	★	MVS0380X20S040	76.7	3.020	92.7	3.650	95.7	3.768	143.7	5.657	143	5.630	0.7	.028	4	.157	8
					20	Int.	●	MVS0380X20S060	76.7	3.020	92.7	3.650	98.1	3.862	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	★	MVS0380X25S040	95.7	3.768	112.7	4.437	115.7	4.555	163.7	6.445	163	6.417	0.7	.028	4	.157	8
					25	Int.	●	MVS0380X25S060	95.7	3.768	112.7	4.437	118.1	4.650	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	★	MVS0380X30S040	114.7	4.516	132.7	5.224	135.7	5.343	183.7	7.232	183	7.205	0.7	.028	4	.157	8
					30	Int.	●	MVS0380X30S060	114.7	4.516	132.7	5.224	138.1	5.437	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	□	MVS0380X35S040	133.7	5.264	152.7	6.012	155.7	6.130	203.7	8.020	203	7.992	0.7	.028	4	.157	8
					35	Int.	□	MVS0380X35S060	133.7	5.264	152.7	6.012	158.1	6.224	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	□	MVS0380X40S040	152.7	6.012	172.7	6.799	175.7	6.917	223.7	8.807	223	8.780	0.7	.028	4	.157	8
					40	Int.	□	MVS0380X40S060	152.7	6.012	172.7	6.799	178.1	7.012	223.7	8.807	223	8.780	0.7	.028	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.900	.1535				2	Ext.	★	MVE0390X02S040	8.5	.335	20.7	.815	20.7	.815	55.7	2.193	55	2.165	0.7	.028	4	.157	2
					2	Ext.	●	MVE0390X02S060	8.5	.335	20.7	.815	23.0	.906	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	★	MVS0390X02S040PL	8.4	.331	20.6	.811	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0390X02S060PL	8.4	.331	20.6	.811	22.9	.902	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0390X03S040	12.4	.488	27.7	1.091	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	2
					3	Ext.	★	MVE0390X03S060	12.4	.488	27.7	1.091	30.0	1.181	60.7	2.390	60	2.362	0.7	.028	6	.236	1
					3	Int.	★	MVS0390X03S040	12.4	.488	23.7	.933	23.7	.933	80.7	3.177	80	3.150	0.7	.028	4	.157	6
					3	Int.	●	MVS0390X03S060	12.4	.488	23.7	.933	26.0	1.024	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	★	MVS0390X05S040	20.2	.795	36.7	1.445	36.7	1.445	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					5	Int.	●	MVS0390X05S060	20.2	.795	36.7	1.445	39.0	1.535	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	★	MVS0390X08S040	31.9	1.256	46.7	1.839	46.7	1.839	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					8	Int.	●	MVS0390X08S060	31.9	1.256	46.7	1.839	49.0	1.929	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	★	MVS0390X10S040	39.7	1.563	52.7	2.075	55.7	2.193	103.7	4.083	103	4.055	0.7	.028	4	.157	8
					10	Int.	●	MVS0390X10S060	39.7	1.563	52.7	2.075	58.0	2.283	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	★	MVS0390X15S040	59.2	2.331	72.7	2.862	75.7	2.980	123.7	4.870	123	4.843	0.7	.028	4	.157	8
					15	Int.	●	MVS0390X15S060	59.2	2.331	72.7	2.862	78.0	3.071	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	★	MVS0390X20S040	78.7	3.098	92.7	3.650	95.7	3.768	143.7	5.657	143	5.630	0.7	.028	4	.157	8
					20	Int.	●	MVS0390X20S060	78.7	3.098	92.7	3.650	98.0	3.858	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	★	MVS0390X25S040	98.2	3.866	112.7	4.437	115.7	4.555	163.7	6.445	163	6.417	0.7	.028	4	.157	8
					25	Int.	●	MVS0390X25S060	98.2	3.866	112.7	4.437	118.0	4.646	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	★	MVS0390X30S040	117.7	4.634	132.7	5.224	135.7	5.343	183.7	7.232	183	7.205	0.7	.028	4	.157	8
					30	Int.	●	MVS0390X30S060	117.7	4.634	132.7	5.224	138.0	5.433	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	□	MVS0390X35S040	137.2	5.402	152.7	6.012	155.7	6.130	203.7	8.020	203	7.992	0.7	.028	4	.157	8
					35	Int.	□	MVS0390X35S060	137.2	5.402	152.7	6.012	158.0	6.220	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	□	MVS0390X40S040	156.7	6.169	172.7	6.799	175.7	6.917	223.7	8.807	223	8.780	0.7	.028	4	.157	8
					40	Int.	□	MVS0390X40S060	156.7	6.169	172.7	6.799	178.0	7.008	223.7	8.807	223	8.780	0.7	.028	6	.236	7
3.969	.1563	5/32			2	Ext.	●	MVE0397X02S060	8.6	.339	20.7	.815	22.9	.902	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	●	MVS0397X02S060PL	8.6	.339	20.6	.811	22.8	.898	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Int.	●	MVS0397X03S060	12.6	.496	23.7	.933	25.9	1.020	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	●	MVS0397X05S060	20.5	.807	36.7	1.445	38.9	1.531	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	●	MVS0397X08S060	32.5	1.280	46.7	1.839	48.9	1.925	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	●	MVS0397X10S060	40.4	1.591	52.7	2.075	57.9	2.280	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	●	MVS0397X15S060	60.2	2.370	72.7	2.862	77.9	3.067	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	●	MVS0397X20S060	80.1	3.154	92.7	3.650	97.9	3.854	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	●	MVS0397X25S060	99.9	3.933	112.7	4.437	117.9	4.642	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	●	MVS0397X30S060	119.7	4.713	132.7	5.224	135.7	5.429	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	●	MVS0397X35S060	139.6	5.496	152.7	6.012	155.7	6.217	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	●	MVS0397X40S060	159.4	6.276	172.7	6.799	175.7	7.004	223.7	8.807	223	8.780	0.7	.028	6	.236	7

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.000	.1575				2	Ext.	★	MVE0400X02S040	8.7	.343	20.7	.815	20.7	.815	55.7	2.193	55	2.165	0.7	.028	4	.157	2
					2	Ext.	●	MVE0400X02S060	8.7	.343	20.7	.815	22.8	.898	55.7	2.193	55	2.165	0.7	.028	6	.236	1
					2	Int.	★	MVS0400X02S040PL	8.6	.339	20.6	.811	20.6	.811	55.6	2.189	55	2.165	0.6	.024	4	.157	4
					2	Int.	●	MVS0400X02S060PL	8.6	.339	20.6	.811	22.8	.898	55.6	2.189	55	2.165	0.6	.024	6	.236	3
					3	Ext.	★	MVE0400X03S040	12.7	.500	27.7	1.091	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	2
					3	Ext.	★	MVE0400X03S060	12.7	.500	27.7	1.091	29.8	1.173	60.7	2.390	60	2.362	0.7	.028	6	.236	1
					3	Int.	★	MVS0400X03S040	12.7	.500	23.7	.933	23.7	.933	80.7	3.177	80	3.150	0.7	.028	4	.157	6
					3	Int.	●	MVS0400X03S060	12.7	.500	23.7	.933	25.8	1.016	80.7	3.177	80	3.150	0.7	.028	6	.236	5
					5	Int.	★	MVS0400X05S040	20.7	.815	36.7	1.445	36.7	1.445	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					5	Int.	●	MVS0400X05S060	20.7	.815	36.7	1.445	38.8	1.528	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					8	Int.	★	MVS0400X08S040	32.7	1.287	46.7	1.839	46.7	1.839	92.7	3.650	92	3.622	0.7	.028	4	.157	6
					8	Int.	●	MVS0400X08S060	32.7	1.287	46.7	1.839	48.8	1.921	92.7	3.650	92	3.622	0.7	.028	6	.236	5
					10	Int.	★	MVS0400X10S040	40.7	1.602	52.7	2.075	55.7	2.193	103.7	4.083	103	4.055	0.7	.028	4	.157	8
					10	Int.	●	MVS0400X10S060	40.7	1.602	52.7	2.075	57.9	2.280	103.7	4.083	103	4.055	0.7	.028	6	.236	7
					15	Int.	★	MVS0400X15S040	60.7	2.390	72.7	2.862	75.7	2.980	123.7	4.870	123	4.843	0.7	.028	4	.157	8
					15	Int.	●	MVS0400X15S060	60.7	2.390	72.7	2.862	77.9	3.067	123.7	4.870	123	4.843	0.7	.028	6	.236	7
					20	Int.	★	MVS0400X20S040	80.7	3.177	92.7	3.650	95.7	3.768	143.7	5.657	143	5.630	0.7	.028	4	.157	8
					20	Int.	●	MVS0400X20S060	80.7	3.177	92.7	3.650	97.9	3.854	143.7	5.657	143	5.630	0.7	.028	6	.236	7
					25	Int.	★	MVS0400X25S040	100.7	3.965	112.7	4.437	115.7	4.555	163.7	6.445	163	6.417	0.7	.028	4	.157	8
					25	Int.	●	MVS0400X25S060	100.7	3.965	112.7	4.437	117.9	4.642	163.7	6.445	163	6.417	0.7	.028	6	.236	7
					30	Int.	★	MVS0400X30S040	120.7	4.752	132.7	5.224	135.7	5.343	183.7	7.232	183	7.205	0.7	.028	4	.157	8
					30	Int.	●	MVS0400X30S060	120.7	4.752	132.7	5.224	137.9	5.429	183.7	7.232	183	7.205	0.7	.028	6	.236	7
					35	Int.	★	MVS0400X35S040	140.7	5.539	152.7	6.012	155.7	6.130	203.7	8.020	203	7.992	0.7	.028	4	.157	8
					35	Int.	●	MVS0400X35S060	140.7	5.539	152.7	6.012	157.9	6.217	203.7	8.020	203	7.992	0.7	.028	6	.236	7
					40	Int.	★	MVS0400X40S040	160.7	6.327	172.7	6.799	175.7	6.917	223.7	8.807	223	8.780	0.7	.028	4	.157	8
					40	Int.	●	MVS0400X40S060	160.7	6.327	172.7	6.799	177.9	7.004	223.7	8.807	223	8.780	0.7	.028	6	.236	7
4.039	.1590		21	#10-32	2	Ext.	●	MVE0404X02S060	8.8	.346	22.7	.894	24.8	.976	62.7	2.469	62	2.441	0.7	.028	6	.236	1
					2	Int.	●	MVS0404X02S060PL	8.8	.346	22.6	.890	24.7	.972	62.6	2.465	62	2.441	0.6	.024	6	.236	3
					3	Int.	●	MVS0404X03S060	12.8	.504	25.7	1.012	27.8	1.094	86.7	3.413	86	3.386	0.7	.028	6	.236	5
					5	Int.	●	MVS0404X05S060	20.9	.823	40.7	1.602	42.8	1.685	100.7	3.965	100	3.937	0.7	.028	6	.236	5
					8	Int.	●	MVS0404X08S060	33.0	1.299	52.7	2.075	54.8	2.157	100.7	3.965	100	3.937	0.7	.028	6	.236	5
					10	Int.	●	MVS0404X10S060	41.1	1.618	59.7	2.350	64.8	2.551	112.7	4.437	112	4.409	0.7	.028	6	.236	7
					15	Int.	●	MVS0404X15S060	61.3	2.413	81.7	3.217	86.8	3.417	134.7	5.303	134	5.276	0.7	.028	6	.236	7
					20	Int.	●	MVS0404X20S060	81.5	3.209	104.7	4.122	109.8	4.323	157.7	6.209	157	6.181	0.7	.028	6	.236	7
					25	Int.	●	MVS0404X25S060	101.7	4.004	126.7	4.988	131.8	5.189	179.7	7.075	179	7.047	0.7	.028	6	.236	7
					30	Int.	●	MVS0404X30S060	121.9	4.799	149.7	5.894	152.7	6.094	202.7	7.980	202	7.953	0.7	.028	6	.236	7
					35	Int.	●	MVS0404X35S060	142.1	5.594	171.7	6.760	174.7	6.961	224.7	8.846	224	8.819	0.7	.028	6	.236	7
					40	Int.	●	MVS0404X40S060	162.3	6.390	195.7	7.705	198.7	7.906	248.7	9.791	248	9.764	0.7	.028	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.100	.1614				2	Ext.	★	MVE0410X02S050	8.9	.350	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	2
					2	Ext.	●	MVE0410X02S060	8.9	.350	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	6	.236	1
					2	Int.	★	MVS0410X02S050PL	8.8	.346	22.6	.890	24.6	.969	62.6	2.465	62	2.441	0.6	.024	5	.197	4
					2	Int.	●	MVS0410X02S060PL	8.8	.346	22.6	.890	24.7	.972	62.6	2.465	62	2.441	0.6	.024	6	.236	3
					3	Ext.	★	MVE0410X03S050	13.0	.512	29.7	1.169	31.7	1.248	68.7	2.705	68	2.677	0.7	.028	5	.197	2
					3	Ext.	★	MVE0410X03S060	13.0	.512	29.7	1.169	31.7	1.248	68.7	2.705	68	2.677	0.7	.028	6	.236	1
					3	Int.	★	MVS0410X03S050	13.0	.512	25.7	1.012	25.7	1.012	86.7	3.413	86	3.386	0.7	.028	5	.197	6
					3	Int.	●	MVS0410X03S060	13.0	.512	25.7	1.012	27.7	1.091	86.7	3.413	86	3.386	0.7	.028	6	.236	5
					5	Int.	★	MVS0410X05S050	21.2	.835	40.7	1.602	40.7	1.602	100.7	3.965	100	3.937	0.7	.028	5	.197	6
					5	Int.	●	MVS0410X05S060	21.2	.835	40.7	1.602	42.7	1.681	100.7	3.965	100	3.937	0.7	.028	6	.236	5
					8	Int.	★	MVS0410X08S050	33.5	1.319	52.7	2.075	52.7	2.075	100.7	3.965	100	3.937	0.7	.028	5	.197	6
					8	Int.	●	MVS0410X08S060	33.5	1.319	52.7	2.075	54.7	2.154	100.7	3.965	100	3.937	0.7	.028	6	.236	5
					10	Int.	★	MVS0410X10S050	41.7	1.642	59.7	2.350	62.7	2.472	112.7	4.437	112	4.409	0.7	.028	5	.197	8
					10	Int.	●	MVS0410X10S060	41.7	1.642	59.7	2.350	64.8	2.551	112.7	4.437	112	4.409	0.7	.028	6	.236	7
					15	Int.	★	MVS0410X15S050	62.2	2.449	81.7	3.217	84.7	3.339	134.7	5.303	134	5.276	0.7	.028	5	.197	8
					15	Int.	●	MVS0410X15S060	62.2	2.449	81.7	3.217	86.8	3.417	134.7	5.303	134	5.276	0.7	.028	6	.236	7
					20	Int.	★	MVS0410X20S050	82.7	3.256	104.7	4.122	107.7	4.244	157.7	6.209	157	6.181	0.7	.028	5	.197	8
					20	Int.	●	MVS0410X20S060	82.7	3.256	104.7	4.122	109.8	4.323	157.7	6.209	157	6.181	0.7	.028	6	.236	7
					25	Int.	★	MVS0410X25S050	103.2	4.063	126.7	4.988	129.7	5.110	179.7	7.075	179	7.047	0.7	.028	5	.197	8
					25	Int.	●	MVS0410X25S060	103.2	4.063	126.7	4.988	131.8	5.189	179.7	7.075	179	7.047	0.7	.028	6	.236	7
					30	Int.	★	MVS0410X30S050	123.7	4.870	149.7	5.894	152.7	6.016	202.7	7.980	202	7.953	0.7	.028	5	.197	8
					30	Int.	●	MVS0410X30S060	123.7	4.870	149.7	5.894	154.8	6.094	202.7	7.980	202	7.953	0.7	.028	6	.236	7
					35	Int.	□	MVS0410X35S050	144.2	5.677	171.7	6.760	174.7	6.882	224.7	8.846	224	8.819	0.7	.028	5	.197	8
					35	Int.	□	MVS0410X35S060	144.2	5.677	171.7	6.760	176.8	6.961	224.7	8.846	224	8.819	0.7	.028	6	.236	7
					40	Int.	□	MVS0410X40S050	164.7	6.484	195.7	7.705	198.7	7.827	248.7	9.791	248	9.764	0.7	.028	5	.197	8
					40	Int.	□	MVS0410X40S060	164.7	6.484	195.7	7.705	200.8	7.906	248.7	9.791	248	9.764	0.7	.028	6	.236	7
4.200	.1654			M5x8	2	Ext.	★	MVE0420X02S050	9.2	.362	22.8	.898	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	2
					2	Ext.	●	MVE0420X02S060	9.2	.362	22.8	.898	24.7	.972	62.8	2.472	62	2.441	0.8	.031	6	.236	1
					2	Int.	★	MVS0420X02S050PL	9.1	.358	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0420X02S060PL	9.1	.358	22.7	.894	24.6	.969	62.7	2.469	62	2.441	0.7	.028	6	.236	3
					3	Ext.	★	MVE0420X03S050	13.4	.528	29.8	1.173	31.8	1.252	68.8	2.709	68	2.677	0.8	.031	5	.197	2
					3	Ext.	★	MVE0420X03S060	13.4	.528	29.8	1.173	31.7	1.248	68.8	2.709	68	2.677	0.8	.031	6	.236	1
					3	Int.	★	MVS0420X03S050	13.4	.528	25.8	1.016	25.8	1.016	86.8	3.417	86	3.386	0.8	.031	5	.197	6
					3	Int.	●	MVS0420X03S060	13.4	.528	25.8	1.016	27.7	1.091	86.8	3.417	86	3.386	0.8	.031	6	.236	5
					5	Int.	★	MVS0420X05S050	21.8	.858	40.8	1.606	40.8	1.606	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					5	Int.	●	MVS0420X05S060	21.8	.858	40.8	1.606	42.7	1.681	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					8	Int.	★	MVS0420X08S050	34.4	1.354	52.8	2.079	52.8	2.079	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					8	Int.	●	MVS0420X08S060	34.4	1.354	52.8	2.079	54.7	2.154	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					10	Int.	★	MVS0420X10S050	42.8	1.685	59.8	2.354	62.8	2.472	112.8	4.441	112	4.409	0.8	.031	5	.197	8
					10	Int.	●	MVS0420X10S060	42.8	1.685	59.8	2.354	64.7	2.547	112.8	4.441	112	4.409	0.8	.031	6	.236	7
					15	Int.	★	MVS0420X15S050	63.8	2.512	81.8	3.220	84.8	3.339	134.8	5.307	134	5.276	0.8	.031	5	.197	8
					15	Int.	●	MVS0420X15S060	63.8	2.512	81.8	3.220	86.7	3.413	134.8	5.307	134	5.276	0.8	.031	6	.236	7
					20	Int.	★	MVS0420X20S050	84.8	3.339	104.8	4.126	107.8	4.244	157.8	6.213	157	6.181	0.8	.031	5	.197	8
					20	Int.	●	MVS0420X20S060	84.8	3.339	104.8	4.126	109.7	4.319	157.8	6.213	157	6.181	0.8	.031	6	.236	7
					25	Int.	★	MVS0420X25S050	105.8	4.165	126.8	4.992	129.8	5.110	179.8	7.079	179	7.047	0.8	.031	5	.197	8
					25	Int.	●	MVS0420X25S060	105.8	4.165	126.8	4.992	131.7	5.185	179.8	7.079	179	7.047	0.8	.031	6	.236	7
					30	Int.	★	MVS0420X30S050	126.8	4.992	149.8	5.898	152.8	6.016	202.8	7.984	202	7.953	0.8	.031	5	.197	8
					30	Int.	●	MVS0420X30S060	126.8	4.992	149.8	5.898	154.7	6.091	202.8	7.984	202	7.953	0.8	.031	6	.236	7
					35	Int.	□	MVS0420X35S050	147.8	5.819	171.8	6.764	174.8	6.882	224.8	8.850	224	8.819	0.8	.031	5	.197	8
					35	Int.	□	MVS0420X35S060	147.8	5.819	171.8	6.764	176.7	6.957	224.8	8.850	224	8.819	0.8	.031	6	.236	7
					40	Int.	□	MVS0420X40S050	168.8	6.646	195.8	7.709	198.8	7.827	248.8	9.795	248	9.764	0.8	.031	5	.197	8
					40	Int.	□	MVS0420X40S060	168.8	6.646	195.8	7.709	200.7	7.902	248.8	9.795	248	9.764	0.8	.031	6	.236	7

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.300	.1693				2	Ext.	★	MVE0430X02S050	9.4	.370	22.8	.898	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	2
					2	Ext.	●	MVE0430X02S060	9.4	.370	22.8	.898	24.6	.969	62.8	2.472	62	2.441	0.8	.031	6	.236	1
					2	Int.	★	MVS0430X02S050PL	9.3	.366	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0430X02S060PL	9.3	.366	22.7	.894	24.5	.965	62.7	2.469	62	2.441	0.7	.028	6	.236	3
					3	Ext.	★	MVE0430X03S050	13.7	.539	29.8	1.173	31.8	1.252	68.8	2.709	68	2.677	0.8	.031	5	.197	2
					3	Ext.	★	MVE0430X03S060	13.7	.539	29.8	1.173	31.6	1.244	68.8	2.709	68	2.677	0.8	.031	6	.236	1
					3	Int.	★	MVS0430X03S050	13.7	.539	25.8	1.016	25.8	1.016	86.8	3.417	86	3.386	0.8	.031	5	.197	6
					3	Int.	●	MVS0430X03S060	13.7	.539	25.8	1.016	27.6	1.087	86.8	3.417	86	3.386	0.8	.031	6	.236	5
					5	Int.	★	MVS0430X05S050	22.3	.878	40.8	1.606	40.8	1.606	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					5	Int.	●	MVS0430X05S060	22.3	.878	40.8	1.606	42.6	1.677	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					8	Int.	★	MVS0430X08S050	35.2	1.386	52.8	2.079	52.8	2.079	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					8	Int.	●	MVS0430X08S060	35.2	1.386	52.8	2.079	54.6	2.150	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					10	Int.	★	MVS0430X10S050	43.8	1.724	59.8	2.354	62.8	2.472	112.8	4.441	112	4.409	0.8	.031	5	.197	8
					10	Int.	●	MVS0430X10S060	43.8	1.724	59.8	2.354	64.6	2.543	112.8	4.441	112	4.409	0.8	.031	6	.236	7
					15	Int.	★	MVS0430X15S050	65.3	2.571	81.8	3.220	84.8	3.339	134.8	5.307	134	5.276	0.8	.031	5	.197	8
					15	Int.	●	MVS0430X15S060	65.3	2.571	81.8	3.220	86.6	3.409	134.8	5.307	134	5.276	0.8	.031	6	.236	7
					20	Int.	★	MVS0430X20S050	86.8	3.417	104.8	4.126	107.8	4.244	157.8	6.213	157	6.181	0.8	.031	5	.197	8
					20	Int.	●	MVS0430X20S060	86.8	3.417	104.8	4.126	109.6	4.315	157.8	6.213	157	6.181	0.8	.031	6	.236	7
					25	Int.	★	MVS0430X25S050	108.3	4.264	126.8	4.992	129.8	5.110	179.8	7.079	179	7.047	0.8	.031	5	.197	8
					25	Int.	●	MVS0430X25S060	108.3	4.264	126.8	4.992	131.6	5.181	179.8	7.079	179	7.047	0.8	.031	6	.236	7
					30	Int.	★	MVS0430X30S050	129.8	5.110	149.8	5.898	152.8	6.016	202.8	7.984	202	7.953	0.8	.031	5	.197	8
					30	Int.	●	MVS0430X30S060	129.8	5.110	149.8	5.898	154.6	6.087	202.8	7.984	202	7.953	0.8	.031	6	.236	7
					35	Int.	□	MVS0430X35S050	151.3	5.957	171.8	6.764	174.8	6.882	224.8	8.850	224	8.819	0.8	.031	5	.197	8
					35	Int.	□	MVS0430X35S060	151.3	5.957	171.8	6.764	176.6	6.953	224.8	8.850	224	8.819	0.8	.031	6	.236	7
					40	Int.	□	MVS0430X40S050	172.8	6.803	195.8	7.709	198.8	7.827	248.8	9.795	248	9.764	0.8	.031	5	.197	8
					40	Int.	□	MVS0430X40S060	172.8	6.803	195.8	7.709	200.6	7.898	248.8	9.795	248	9.764	0.8	.031	6	.236	7
4.366	.1719	11/64			2	Ext.	●	MVE0437X02S060	9.5	.374	22.8	.898	24.6	.969	62.8	2.472	62	2.441	0.8	.031	6	.236	1
					2	Int.	●	MVS0437X02S060PL	9.5	.374	22.7	.894	24.4	.965	62.7	2.469	62	2.441	0.7	.028	6	.236	3
					3	Int.	●	MVS0437X03S060	13.9	.547	25.8	1.016	27.6	1.087	86.8	3.417	86	3.386	0.8	.031	6	.236	5
					5	Int.	●	MVS0437X05S060	22.6	.890	40.8	1.606	42.6	1.677	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					8	Int.	●	MVS0437X08S060	35.7	1.406	52.8	2.079	54.6	2.150	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					10	Int.	●	MVS0437X10S060	44.4	1.748	59.8	2.354	64.5	2.543	112.8	4.441	112	4.409	0.8	.031	6	.236	7
					15	Int.	●	MVS0437X15S060	66.3	2.610	81.8	3.220	86.5	3.409	134.8	5.307	134	5.276	0.8	.031	6	.236	7
					20	Int.	●	MVS0437X20S060	88.1	3.469	104.8	4.126	109.5	4.315	157.8	6.213	157	6.181	0.8	.031	6	.236	7
					25	Int.	●	MVS0437X25S060	109.9	4.327	126.8	4.992	131.5	5.181	179.8	7.079	179	7.047	0.8	.031	6	.236	7
					30	Int.	●	MVS0437X30S060	131.8	5.189	149.8	5.898	152.8	6.087	202.8	7.984	202	7.953	0.8	.031	6	.236	7
					35	Int.	●	MVS0437X35S060	153.6	6.047	171.8	6.764	174.8	6.953	224.8	8.850	224	8.819	0.8	.031	6	.236	7
					40	Int.	●	MVS0437X40S060	175.4	6.906	195.8	7.709	198.8	7.898	248.8	9.795	248	9.764	0.8	.031	6	.236	7

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

M

DRILLING

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.400	.1732		17		2	Ext.	★	MVE0440X02S050	9.6	.378	22.8	.898	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	2
					2	Ext.	●	MVE0440X02S060	9.6	.378	22.8	.898	24.5	.965	62.8	2.472	62	2.441	0.8	.031	6	.236	1
					2	Int.	★	MVS0440X02S050PL	9.5	.374	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0440X02S060PL	9.5	.374	22.7	.894	24.4	.961	62.7	2.469	62	2.441	0.7	.028	6	.236	3
					3	Ext.	★	MVE0440X03S050	14.0	.551	29.8	1.173	31.8	1.252	68.8	2.709	68	2.677	0.8	.031	5	.197	2
					3	Ext.	★	MVE0440X03S060	14.0	.551	29.8	1.173	31.5	1.240	68.8	2.709	68	2.677	0.8	.031	6	.236	1
					3	Int.	★	MVS0440X03S050	14.0	.551	25.8	1.016	25.8	1.016	86.8	3.417	86	3.386	0.8	.031	5	.197	6
					3	Int.	●	MVS0440X03S060	14.0	.551	25.8	1.016	27.5	1.083	86.8	3.417	86	3.386	0.8	.031	6	.236	5
					5	Int.	★	MVS0440X05S050	22.8	.898	40.8	1.606	40.8	1.606	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					5	Int.	●	MVS0440X05S060	22.8	.898	40.8	1.606	42.5	1.673	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					8	Int.	★	MVS0440X08S050	36.0	1.417	52.8	2.079	52.8	2.079	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					8	Int.	●	MVS0440X08S060	36.0	1.417	52.8	2.079	54.5	2.146	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					10	Int.	★	MVS0440X10S050	44.8	1.764	59.8	2.354	62.8	2.472	112.8	4.441	112	4.409	0.8	.031	5	.197	8
					10	Int.	●	MVS0440X10S060	44.8	1.764	59.8	2.354	64.5	2.539	112.8	4.441	112	4.409	0.8	.031	6	.236	7
					15	Int.	★	MVS0440X15S050	66.8	2.630	81.8	3.220	84.8	3.339	134.8	5.307	134	5.276	0.8	.031	5	.197	8
					15	Int.	●	MVS0440X15S060	66.8	2.630	81.8	3.220	86.5	3.406	134.8	5.307	134	5.276	0.8	.031	6	.236	7
					20	Int.	★	MVS0440X20S050	88.8	3.496	104.8	4.126	107.8	4.244	157.8	6.213	157	6.181	0.8	.031	5	.197	8
					20	Int.	●	MVS0440X20S060	88.8	3.496	104.8	4.126	109.5	4.311	157.8	6.213	157	6.181	0.8	.031	6	.236	7
					25	Int.	★	MVS0440X25S050	110.8	4.362	126.8	4.992	129.8	5.110	179.8	7.079	179	7.047	0.8	.031	5	.197	8
					25	Int.	●	MVS0440X25S060	110.8	4.362	126.8	4.992	131.5	5.177	179.8	7.079	179	7.047	0.8	.031	6	.236	7
					30	Int.	★	MVS0440X30S050	132.8	5.228	149.8	5.898	152.8	6.016	202.8	7.984	202	7.953	0.8	.031	5	.197	8
					30	Int.	●	MVS0440X30S060	132.8	5.228	149.8	5.898	154.5	6.083	202.8	7.984	202	7.953	0.8	.031	6	.236	7
					35	Int.	□	MVS0440X35S050	154.8	6.094	171.8	6.764	174.8	6.882	224.8	8.850	224	8.819	0.8	.031	5	.197	8
					35	Int.	□	MVS0440X35S060	154.8	6.094	171.8	6.764	176.5	6.949	224.8	8.850	224	8.819	0.8	.031	6	.236	7
					40	Int.	□	MVS0440X40S050	176.8	6.961	195.8	7.709	198.8	7.827	248.8	9.795	248	9.764	0.8	.031	5	.197	8
					40	Int.	□	MVS0440X40S060	176.8	6.961	195.8	7.709	200.5	7.894	248.8	9.795	248	9.764	0.8	.031	6	.236	7
4.500	.1772		16	#12-24	2	Ext.	★	MVE0450X02S050	9.8	.386	22.8	.898	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	2
					2	Ext.	●	MVE0450X02S060	9.8	.386	22.8	.898	24.4	.961	62.8	2.472	62	2.441	0.8	.031	6	.236	1
					2	Int.	★	MVS0450X02S050PL	9.7	.382	22.7	.894	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0450X02S060PL	9.7	.382	22.7	.894	24.3	.957	62.7	2.469	62	2.441	0.7	.028	6	.236	3
					3	Ext.	★	MVE0450X03S050	14.3	.563	29.8	1.173	31.8	1.252	68.8	2.709	68	2.677	0.8	.031	5	.197	2
					3	Ext.	★	MVE0450X03S060	14.3	.563	29.8	1.173	31.4	1.236	68.8	2.709	68	2.677	0.8	.031	6	.236	1
					3	Int.	★	MVS0450X03S050	14.3	.563	25.8	1.016	25.8	1.016	86.8	3.417	86	3.386	0.8	.031	5	.197	6
					3	Int.	●	MVS0450X03S060	14.3	.563	25.8	1.016	27.4	1.079	86.8	3.417	86	3.386	0.8	.031	6	.236	5
					5	Int.	★	MVS0450X05S050	23.3	.917	40.8	1.606	40.8	1.606	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					5	Int.	●	MVS0450X05S060	23.3	.917	40.8	1.606	42.4	1.669	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					8	Int.	★	MVS0450X08S050	36.8	1.449	52.8	2.079	52.8	2.079	100.8	3.969	100	3.937	0.8	.031	5	.197	6
					8	Int.	●	MVS0450X08S060	36.8	1.449	52.8	2.079	54.4	2.142	100.8	3.969	100	3.937	0.8	.031	6	.236	5
					10	Int.	★	MVS0450X10S050	45.8	1.803	59.8	2.354	62.8	2.472	112.8	4.441	112	4.409	0.8	.031	5	.197	8
					10	Int.	●	MVS0450X10S060	45.8	1.803	59.8	2.354	64.4	2.535	112.8	4.441	112	4.409	0.8	.031	6	.236	7
					15	Int.	★	MVS0450X15S050	68.3	2.689	81.8	3.220	84.8	3.339	134.8	5.307	134	5.276	0.8	.031	5	.197	8
					15	Int.	●	MVS0450X15S060	68.3	2.689	81.8	3.220	86.4	3.402	134.8	5.307	134	5.276	0.8	.031	6	.236	7
					20	Int.	★	MVS0450X20S050	90.8	3.575	104.8	4.126	107.8	4.244	157.8	6.213	157	6.181	0.8	.031	5	.197	8
					20	Int.	●	MVS0450X20S060	90.8	3.575	104.8	4.126	109.4	4.307	157.8	6.213	157	6.181	0.8	.031	6	.236	7
					25	Int.	★	MVS0450X25S050	113.3	4.461	126.8	4.992	129.8	5.110	179.8	7.079	179	7.047	0.8	.031	5	.197	8
					25	Int.	●	MVS0450X25S060	113.3	4.461	126.8	4.992	131.4	5.173	179.8	7.079	179	7.047	0.8	.031	6	.236	7
					30	Int.	★	MVS0450X30S050	135.8	5.346	149.8	5.898	152.8	6.016	202.8	7.984	202	7.953	0.8	.031	5	.197	8
					30	Int.	●	MVS0450X30S060	135.8	5.346	149.8	5.898	154.4	6.079	202.8	7.984	202	7.953	0.8	.031	6	.236	7
					35	Int.	★	MVS0450X35S050	158.3	6.232	171.8	6.764	174.8	6.882	224.8	8.850	224	8.819	0.8	.031	5	.197	8
					35	Int.	●	MVS0450X35S060	158.3	6.232	171.8	6.764	176.4	6.945	224.8	8.850	224	8.819	0.8	.031	6	.236	7
					40	Int.	★	MVS0450X40S050	180.8	7.118	195.8	7.709	198.8	7.827	248.8	9.795	248	9.764	0.8	.031	5	.197	8
					40	Int.	●	MVS0450X40S060	180.8	7.118	195.8	7.709	200.4	7.890	248.8	9.795	248	9.764	0.8	.031	6	.236	7

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.600	.1811				2	Ext.	★	MVE0460X02S050	10.0	.394	24.8	.976	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	2
					2	Ext.	●	MVE0460X02S060	10.0	.394	24.8	.976	27.8	1.094	62.8	2.472	62	2.441	0.8	.031	6	.236	2
					2	Int.	★	MVS0460X02S050PL	9.9	.390	24.7	.972	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0460X02S060PL	9.9	.390	24.7	.972	27.7	1.091	62.7	2.469	62	2.441	0.7	.028	6	.236	4
					3	Ext.	★	MVE0460X03S050	14.6	.575	32.8	1.291	32.8	1.291	68.8	2.709	68	2.677	0.8	.031	5	.197	2
					3	Ext.	★	MVE0460X03S060	14.6	.575	32.8	1.291	35.8	1.409	68.8	2.709	68	2.677	0.8	.031	6	.236	2
					3	Int.	★	MVS0460X03S050	14.6	.575	28.3	1.114	28.3	1.114	90.8	3.575	90	3.543	0.8	.031	5	.197	6
					3	Int.	●	MVS0460X03S060	14.6	.575	28.3	1.114	31.3	1.232	90.8	3.575	90	3.543	0.8	.031	6	.236	6
					5	Int.	★	MVS0460X05S050	23.8	.937	44.8	1.764	44.8	1.764	105.8	4.165	105	4.134	0.8	.031	5	.197	6
					5	Int.	●	MVS0460X05S060	23.8	.937	44.8	1.764	47.8	1.882	105.8	4.165	105	4.134	0.8	.031	6	.236	6
					8	Int.	★	MVS0460X08S050	37.6	1.480	57.8	2.276	57.8	2.276	105.8	4.165	105	4.134	0.8	.031	5	.197	6
					8	Int.	●	MVS0460X08S060	37.6	1.480	57.8	2.276	60.8	2.394	105.8	4.165	105	4.134	0.8	.031	6	.236	6
					10	Int.	★	MVS0460X10S050	46.8	1.843	65.8	2.591	68.8	2.709	118.8	4.677	118	4.646	0.8	.031	5	.197	8
					10	Int.	●	MVS0460X10S060	46.8	1.843	65.8	2.591	68.8	2.709	118.8	4.677	118	4.646	0.8	.031	6	.236	8
					15	Int.	★	MVS0460X15S050	69.8	2.748	90.8	3.575	93.8	3.693	143.8	5.661	143	5.630	0.8	.031	5	.197	8
					15	Int.	●	MVS0460X15S060	69.8	2.748	90.8	3.575	93.8	3.693	143.8	5.661	143	5.630	0.8	.031	6	.236	8
					20	Int.	★	MVS0460X20S050	92.8	3.654	115.8	4.559	118.8	4.677	168.8	6.646	168	6.614	0.8	.031	5	.197	8
					20	Int.	●	MVS0460X20S060	92.8	3.654	115.8	4.559	118.8	4.677	168.8	6.646	168	6.614	0.8	.031	6	.236	8
					25	Int.	★	MVS0460X25S050	115.8	4.559	140.8	5.543	143.8	5.661	193.8	7.630	193	7.598	0.8	.031	5	.197	8
					25	Int.	●	MVS0460X25S060	115.8	4.559	140.8	5.543	143.8	5.661	193.8	7.630	193	7.598	0.8	.031	6	.236	8
					30	Int.	★	MVS0460X30S050	138.8	5.465	165.8	6.528	168.8	6.646	218.8	8.614	218	8.583	0.8	.031	5	.197	8
					30	Int.	●	MVS0460X30S060	138.8	5.465	165.8	6.528	168.8	6.646	218.8	8.614	218	8.583	0.8	.031	6	.236	8
					35	Int.	□	MVS0460X35S050	161.8	6.370	190.8	7.512	193.8	7.630	243.8	9.598	243	9.567	0.8	.031	5	.197	8
					35	Int.	□	MVS0460X35S060	161.8	6.370	190.8	7.512	193.8	7.630	243.8	9.598	243	9.567	0.8	.031	6	.236	8
					40	Int.	□	MVS0460X40S050	184.8	7.276	215.8	8.496	218.8	8.614	268.8	10.583	268	10.551	0.8	.031	5	.197	8
					40	Int.	□	MVS0460X40S060	184.8	7.276	215.8	8.496	218.8	8.614	268.8	10.583	268	10.551	0.8	.031	6	.236	8
4.700	.1850		13		2	Ext.	★	MVE0470X02S050	10.3	.406	24.9	.980	24.9	.980	62.9	2.476	62	2.441	0.9	.035	5	.197	2
					2	Ext.	●	MVE0470X02S060	10.3	.406	24.9	.980	27.9	1.098	62.9	2.476	62	2.441	0.9	.035	6	.236	2
					2	Int.	★	MVS0470X02S050PL	10.1	.398	24.7	.972	24.7	.972	62.7	2.469	62	2.441	0.7	.028	5	.197	4
					2	Int.	●	MVS0470X02S060PL	10.1	.398	24.7	.972	27.7	1.091	62.7	2.469	62	2.441	0.7	.028	6	.236	4
					3	Ext.	★	MVE0470X03S050	15.0	.591	32.9	1.295	32.9	1.295	68.9	2.713	68	2.677	0.9	.035	5	.197	2
					3	Ext.	★	MVE0470X03S060	15.0	.591	32.9	1.295	35.9	1.413	68.9	2.713	68	2.677	0.9	.035	6	.236	2
					3	Int.	★	MVS0470X03S050	15.0	.591	28.4	1.118	28.4	1.118	90.9	3.579	90	3.543	0.9	.035	5	.197	6
					3	Int.	●	MVS0470X03S060	15.0	.591	28.4	1.118	31.4	1.236	90.9	3.579	90	3.543	0.9	.035	6	.236	6
					5	Int.	★	MVS0470X05S050	24.4	.961	44.9	1.768	44.9	1.768	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					5	Int.	●	MVS0470X05S060	24.4	.961	44.9	1.768	47.9	1.886	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					8	Int.	★	MVS0470X08S050	38.5	1.516	57.9	2.280	57.9	2.280	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					8	Int.	●	MVS0470X08S060	38.5	1.516	57.9	2.280	60.9	2.398	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					10	Int.	★	MVS0470X10S050	47.9	1.886	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	5	.197	8
					10	Int.	●	MVS0470X10S060	47.9	1.886	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	6	.236	8
					15	Int.	★	MVS0470X15S050	71.4	2.811	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	5	.197	8
					15	Int.	●	MVS0470X15S060	71.4	2.811	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	6	.236	8
					20	Int.	★	MVS0470X20S050	94.9	3.736	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	5	.197	8
					20	Int.	●	MVS0470X20S060	94.9	3.736	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	6	.236	8
					25	Int.	★	MVS0470X25S050	118.4	4.661	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	5	.197	8
					25	Int.	●	MVS0470X25S060	118.4	4.661	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	6	.236	8
					30	Int.	★	MVS0470X30S050	141.9	5.587	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	5	.197	8
					30	Int.	●	MVS0470X30S060	141.9	5.587	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	6	.236	8
					35	Int.	□	MVS0470X35S050	165.4	6.512	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	5	.197	8
					35	Int.	□	MVS0470X35S060	165.4	6.512	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	6	.236	8
					40	Int.	□	MVS0470X40S050	188.9	7.437	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	5	.197	8
					40	Int.	□	MVS0470X40S060	188.9	7.437	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	6	.236	8
4.763	.1875	3/16			2	Ext.	●	MVE0476X02S060	10.3	.406	24.9	.980	27.9	1.098	62.9	2.476	62	2.441	0.9	.035	6	.236	2
					2	Int.	●	MVS0476X02S060PL	10.3	.406	24.8	.976	27.8	1.094	62.8	2.472	62	2.441	0.8	.031	6	.236	4
					3	Int.	●	MVS0476X03S060	15.1	.594	28.4	1.118	31.4	1.236	90.9	3.579	90	3.543	0.9	.035	6	.236	6
					5	Int.	●	MVS0476X05S060	24.7	.972	44.9	1.768	47.9	1.886	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					8	Int.	●	MVS0476X08S060	39.0	1.535	57.9	2.280	60.9	2.398	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					10	Int.	●	MVS0476X10S060	48.5	1.909	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	6	.236	8
					15	Int.	●	MVS0476X15S060	72.3	2.846	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	6	.236	8
					20	Int.	●	MVS0476X20S060	96.1	3.783	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	6	.236	8
					25	Int.	●	MVS0476X25S060	119.9	4.720	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	6	.236	8
					30	Int.	●	MVS0476X30S060	143.7	5.657	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	6	.236	8
					35	Int.	●	MVS0476X35S060	167.6	6.598	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	6	.236	8
					40	Int.	●	MVS0476X40S060	191.4	7.535	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	6	.236	8
4.800	.1890		12		2	Ext.	★	MVE0480X02S050	10.5	.413	24.9	.980	24.9	.980	62.9	2.476	62	2.441	0.9	.035	5	.197	2
					2	Ext.	●	MVE0480X02S060	10.5	.413	24.9	.980	27.9	1.098	62.9	2.476	62	2.441	0.9	.035	6	.236	2
					2	Int.	★	MVS0480X02S050PL	10.4	.409	24.8	.976	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	4
					2	Int.	●	MVS0480X02S060PL	10.4	.409	24.8	.976	27.8	1.094	62.8	2.472	62	2.441	0.8	.031	6	.236	4
					3	Ext.	★	MVE0480X03S050	15.3	.602	32.9	1.295	32.9	1.295	68.9	2.713	68	2.677	0.9	.035	5	.197	2
					3	Ext.	★	MVE0480X03S060	15.3	.602	32.9	1.295	35.9	1.413	68.9	2.713	68	2.677	0.9	.035	6	.236	2
					3	Int.	★	MVS0480X03S050	15.3	.602	28.4	1.118	28.4	1.118	90.9	3.579	90	3.543	0.9	.035	5	.197	6
					3	Int.	●	MVS0480X03S060	15.3	.602	28.4	1.118	31.4	1.236	90.9	3.579	90	3.543	0.9	.035	6	.236	6
					5	Int.	★	MVS0480X05S050	24.9	.980	44.9	1.768	44.9	1.768	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					5	Int.	●	MVS0480X05S060	24.9	.980	44.9	1.768	47.9	1.886	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					8	Int.	★	MVS0480X08S050	39.3	1.547	57.9	2.280	57.9	2.280	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					8	Int.	●	MVS0480X08S060	39.3	1.547	57.9	2.280	60.9	2.398	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					10	Int.	★	MVS0480X10S050	48.9	1.925	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	5	.197	8
					10	Int.	●	MVS0480X10S060	48.9	1.925	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	6	.236	8
					15	Int.	★	MVS0480X15S050	72.9	2.870	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	5	.197	8
					15	Int.	●	MVS0480X15S060	72.9	2.870	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	6	.236	8
					20	Int.	★	MVS0480X20S050	96.9	3.815	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	5	.197	8
					20	Int.	●	MVS0480X20S060	96.9	3.815	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	6	.236	8
					25	Int.	★	MVS0480X25S050	120.9	4.760	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	5	.197	8
					25	Int.	●	MVS0480X25S060	120.9	4.760	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	6	.236	8
					30	Int.	★	MVS0480X30S050	144.9	5.705	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	5	.197	8
					30	Int.	●	MVS0480X30S060	144.9	5.705	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	6	.236	8
					35	Int.	□	MVS0480X35S050	168.9	6.650	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	5	.197	8
					35	Int.	□	MVS0480X35S060	168.9	6.650	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	6	.236	8
					40	Int.	□	MVS0480X40S050	192.9	7.594	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	5	.197	8
					40	Int.	□	MVS0480X40S060	192.9	7.594	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	6	.236	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.900	.1929				2	Ext.	★	MVE0490X02S050	10.7	.421	24.9	.980	24.9	.980	62.9	2.476	62	2.441	0.9	.035	5	.197	2
					2	Ext.	●	MVE0490X02S060	10.7	.421	24.9	.980	27.9	1.098	62.9	2.476	62	2.441	0.9	.035	6	.236	2
					2	Int.	★	MVS0490X02S050PL	10.6	.417	24.8	.976	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	4
					2	Int.	●	MVS0490X02S060PL	10.6	.417	24.8	.976	27.8	1.094	62.8	2.472	62	2.441	0.8	.031	6	.236	4
					3	Ext.	★	MVE0490X03S050	15.6	.614	32.9	1.295	32.9	1.295	68.9	2.713	68	2.677	0.9	.035	5	.197	2
					3	Ext.	★	MVE0490X03S060	15.6	.614	32.9	1.295	35.9	1.413	68.9	2.713	68	2.677	0.9	.035	6	.236	2
					3	Int.	★	MVS0490X03S050	15.6	.614	28.4	1.118	28.4	1.118	90.9	3.579	90	3.543	0.9	.035	5	.197	6
					3	Int.	●	MVS0490X03S060	15.6	.614	28.4	1.118	31.4	1.236	90.9	3.579	90	3.543	0.9	.035	6	.236	6
					5	Int.	★	MVS0490X05S050	25.4	1.000	44.9	1.768	44.9	1.768	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					5	Int.	●	MVS0490X05S060	25.4	1.000	44.9	1.768	47.9	1.886	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					8	Int.	★	MVS0490X08S050	40.1	1.579	57.9	2.280	57.9	2.280	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					8	Int.	●	MVS0490X08S060	40.1	1.579	57.9	2.280	60.9	2.398	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					10	Int.	★	MVS0490X10S050	49.9	1.965	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	5	.197	8
					10	Int.	●	MVS0490X10S060	49.9	1.965	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	6	.236	8
					15	Int.	★	MVS0490X15S050	74.4	2.929	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	5	.197	8
					15	Int.	●	MVS0490X15S060	74.4	2.929	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	6	.236	8
					20	Int.	★	MVS0490X20S050	98.9	3.894	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	5	.197	8
					20	Int.	●	MVS0490X20S060	98.9	3.894	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	6	.236	8
					25	Int.	★	MVS0490X25S050	123.4	4.858	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	5	.197	8
					25	Int.	●	MVS0490X25S060	123.4	4.858	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	6	.236	8
					30	Int.	★	MVS0490X30S050	147.9	5.823	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	5	.197	8
					30	Int.	●	MVS0490X30S060	147.9	5.823	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	6	.236	8
					35	Int.	□	MVS0490X35S050	172.4	6.787	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	5	.197	8
					35	Int.	□	MVS0490X35S060	172.4	6.787	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	6	.236	8
					40	Int.	□	MVS0490X40S050	196.9	7.752	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	5	.197	8
					40	Int.	□	MVS0490X40S060	196.9	7.752	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	6	.236	8
5.000	.1969			M6x1.0	2	Ext.	★	MVE0500X02S050	10.9	.429	24.9	.980	24.9	.980	62.9	2.476	62	2.441	0.9	.035	5	.197	2
					2	Ext.	●	MVE0500X02S060	10.9	.429	24.9	.980	27.9	1.098	62.9	2.476	62	2.441	0.9	.035	6	.236	2
					2	Int.	★	MVS0500X02S050PL	10.8	.425	24.8	.976	24.8	.976	62.8	2.472	62	2.441	0.8	.031	5	.197	4
					2	Int.	●	MVS0500X02S060PL	10.8	.425	24.8	.976	24.8	.976	62.8	2.472	62	2.441	0.8	.031	6	.236	4
					3	Ext.	★	MVE0500X03S050	15.9	.626	32.9	1.295	32.9	1.295	68.9	2.713	68	2.677	0.9	.035	5	.197	2
					3	Ext.	★	MVE0500X03S060	15.9	.626	32.9	1.295	35.9	1.413	68.9	2.713	68	2.677	0.9	.035	6	.236	2
					3	Int.	★	MVS0500X03S050	15.9	.626	28.4	1.118	28.4	1.118	90.9	3.579	90	3.543	0.9	.035	5	.197	6
					3	Int.	●	MVS0500X03S060	15.9	.626	28.4	1.118	31.4	1.236	90.9	3.579	90	3.543	0.9	.035	6	.236	6
					5	Int.	★	MVS0500X05S050	25.9	1.020	44.9	1.768	44.9	1.768	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					5	Int.	●	MVS0500X05S060	25.9	1.020	44.9	1.768	47.9	1.886	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					8	Int.	★	MVS0500X08S050	40.9	1.610	57.9	2.280	57.9	2.280	105.9	4.169	105	4.134	0.9	.035	5	.197	6
					8	Int.	●	MVS0500X08S060	40.9	1.610	57.9	2.280	60.9	2.398	105.9	4.169	105	4.134	0.9	.035	6	.236	6
					10	Int.	★	MVS0500X10S050	50.9	2.004	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	5	.197	8
					10	Int.	●	MVS0500X10S060	50.9	2.004	65.9	2.594	68.9	2.713	118.9	4.681	118	4.646	0.9	.035	6	.236	8
					15	Int.	★	MVS0500X15S050	75.9	2.988	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	5	.197	8
					15	Int.	●	MVS0500X15S060	75.9	2.988	90.9	3.579	93.9	3.697	143.9	5.665	143	5.630	0.9	.035	6	.236	8
					20	Int.	★	MVS0500X20S050	100.9	3.972	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	5	.197	8
					20	Int.	●	MVS0500X20S060	100.9	3.972	115.9	4.563	118.9	4.681	168.9	6.650	168	6.614	0.9	.035	6	.236	8
					25	Int.	★	MVS0500X25S050	125.9	4.957	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	5	.197	8
					25	Int.	●	MVS0500X25S060	125.9	4.957	140.9	5.547	143.9	5.665	193.9	7.634	193	7.598	0.9	.035	6	.236	8
					30	Int.	★	MVS0500X30S050	150.9	5.941	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	5	.197	8
					30	Int.	●	MVS0500X30S060	150.9	5.941	165.9	6.531	168.9	6.650	218.9	8.618	218	8.583	0.9	.035	6	.236	8
					35	Int.	★	MVS0500X35S050	175.9	6.925	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	5	.197	8
					35	Int.	●	MVS0500X35S060	175.9	6.925	190.9	7.516	193.9	7.634	243.9	9.602	243	9.567	0.9	.035	6	.236	8
					40	Int.	★	MVS0500X40S050	200.9	7.909	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	5	.197	8
					40	Int.	●	MVS0500X40S060	200.9	7.909	215.9	8.500	218.9	8.618	268.9	10.587	268	10.551	0.9	.035	6	.236	8
5.100	.2008		7	1/4-20	2	Ext.	●	MVE0510X02S060	11.1	.437	26.9	1.059	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	2
					2	Int.	●	MVS0510X02S060PL	11.0	.433	26.8	1.055	28.8	1.134	66.8	2.630	66	2.598	0.8	.031	6	.236	4
					3	Ext.	★	MVE0510X03S060	16.2	.638	34.9	1.374	36.9	1.453	74.9	2.949	74	2.913	0.9	.035	6	.236	2
					3	Int.	●	MVS0510X03S060	16.2	.638	28.4	1.118	30.9	1.217	82.9	3.264	82	3.228	0.9	.035	6	.236	6
					5	Int.	●	MVS0510X05S060	26.4	1.039	44.9	1.768	48.9	1.925	100.9	3.972	100	3.937	0.9	.035	6	.236	6
					8	Int.	●	MVS0510X08S060	41.7	1.642	61.9	2.437	66.9	2.634	118.9	4.681	118	4.646	0.9	.035	6	.236	6
					10	Int.	●	MVS0510X10S060	51.9	2.043	72.9	2.870	75.9	2.988	127.9	5.035	127	5.000	0.9	.035	6	.236	8
					15	Int.	●	MVS0510X15S060	77.4	3.047	99.9	3.933	102.9	4.051	154.9	6.098	154	6.063	0.9	.035	6	.236	8
					20	Int.	★	MVS0510X20S060	102.9	4.051	127.9	5.035	130.9	5.154	182.9	7.201	182	7.165	0.9	.035	6	.236	8
					25	Int.	★	MVS0510X25S060	128.4	5.055	154.9	6.098	157.9	6.217	209.9	8.264	209	8.228	0.9	.035	6	.236	8
					30	Int.	★	MVS0510X30S060	153.9	6.059	182.9	7.201	185.9	7.319	237.9	9.366	237	9.331	0.9	.035	6	.236	8
					35	Int.	□	MVS0510X35S060	179.4	7.063	209.9	8.264	212.9	8.382	264.9	10.429	264	10.394	0.9	.035	6	.236	8
					40	Int.	□	MVS0510X40S060	204.9	8.067	240.9	9.484	243.9	9.602	295.9	11.650	295	11.614	0.9	.035	6	.236	8
5.160	.2032	13/64			2	Ext.	●	MVE0516X02S060	11.2	.441	26.9	1.059	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	2
					2	Int.	●	MVS0516X02S060PL	11.2	.441	26.8	1.055	28.8	1.134	66.8	2.630	66	2.598	0.8	.031	6	.236	4
					3	Int.	●	MVS0516X03S060	16.4	.646	28.4	1.118	30.9	1.217	82.9	3.264	82	3.228	0.9	.035	6	.236	6
					5	Int.	●	MVS0516X05S060	26.7	1.051	44.9	1.768	48.9	1.925	100.9	3.972	100	3.937	0.9	.035	6	.236	6
					8	Int.	●	MVS0516X08S060	42.2	1.661	61.9	2.437	66.9	2.634	118.9	4.681	118	4.646	0.9	.035	6	.236	6
					10	Int.	●	MVS0516X10S060	52.5	2.067	72.9	2.870	75.9	2.988	127.9	5.035	127	5.000	0.9	.035	6	.236	8
					15	Int.	●	MVS0516X15S060	78.3	3.083	99.9	3.933	102.9	4.051	154.9	6.098	154	6.063	0.9	.035	6	.236	8
					20	Int.	●	MVS0516X20S060	104.1	4.098	127.9	5.035	130.9	5.154	182.9	7.201	182	7.165	0.9	.035	6	.236	8
					25	Int.	●	MVS0516X25S060	129.9	5.114	154.9	6.098	157.9	6.217	209.9	8.264	209	8.228	0.9	.035	6	.236	8
					30	Int.	●	MVS0516X30S060	155.7	6.130	182.9	7.201	185.9	7.319	237.9	9.366	237	9.331	0.9	.035	6	.236	8
					35	Int.	●	MVS0516X35S060	181.5	7.146	209.9	8.264	212.9	8.382	264.9	10.429	264	10.394	0.9	.035	6	.236	8
					40	Int.	●	MVS0516X40S060	207.3	8.161	240.9	9.484	243.9	9.602	295.9	11.650	295	11.614	0.9	.035	6	.236	8
5.200	.2047				2	Ext.	●	MVE0520X02S060	11.3	.445	26.9	1.059	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	2
					2	Int.	●	MVS0520X02S060PL	11.2	.441	26.8	1.055	28.8	1.134	66.8	2.630	66	2.598	0.8	.031	6	.236	4
					3	Ext.	★	MVE0520X03S060	16.5	.650	34.9	1.374	36.9	1.453	74.9	2.949	74	2.913	0.9	.035	6	.236	2
					3	Int.	●	MVS0520X03S060	16.5	.650	28.4	1.118	30.9	1.217	82.9	3.264	82	3.228	0.9	.035	6	.236	6
					5	Int.	●	MVS0520X05S060	26.9	1.059	44.9	1.768	48.9	1.925	100.9	3.972	100	3.937	0.9	.035	6	.236	6
					8	Int.	●	MVS0520X08S060	42.5	1.673	61.9	2.437	66.9	2.634	118.9	4.681	118	4.646	0.9	.035	6	.236	6
					10	Int.	●	MVS0520X10S060	52.9	2.083	72.9	2.870	75.9	2.992	127.9	5.035	127	5.000	0.9	.035	6	.236	8
					15	Int.	●	MVS0520X15S060	78.9	3.106	99.9	3.933	102.9	4.051	154.9	6.098	154	6.063	0.9	.035	6	.236	8
					20	Int.	★	MVS0520X20S060	104.9	4.130	127.9	5.035	130.9	5.157	182.9	7.201	182	7.165	0.9	.035	6	.236	8
					25	Int.	★	MVS0520X25S060	130.9	5.154	154.9	6.098	157.9	6.217	209.9	8.264	209	8.228	0.9	.035	6	.236	8
					30	Int.	★	MVS0520X30S060	156.9	6.177	182.9	7.201	185.9	7.319	237.9	9.366	237	9.331	0.9	.035	6	.236	8
					35	Int.	□	MVS0520X35S060	182.9	7.201	209.9	8.264	212.9	8.386	264.9	10.429	264	10.394	0.9	.035	6	.236	8
					40	Int.	□	MVS0520X40S060	208.9	8.224	240.9	9.484	243.9	9.606	295.9	11.650	295	11.614	0.9	.035	6	.236	8
5.300	.2087		4		2	Ext.	●	MVE0530X02S060	11.6	.457	27.0	1.063	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0530X02S060PL	11.4	.449	26.8	1.055	28.8	1.134	66.8	2.630	66	2.598	0.8	.031	6	.236	4
					3	Ext.	★	MVE0530X03S060	16.9	.665	35.0	1.378	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	6	.236	2
					3	Int.	●	MVS0530X03S060	16.9	.665	28.5	1.122	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0530X05S060	27.5	1.083	45.0	1.772	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0530X08S060	43.4	1.709	62.0	2.441	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	●	MVS0530X10S060	54.0	2.126	73.0	2.874	76.0	2.992	128.0	5.039	127	5.000	1.0	.039	6	.236	8
					15	Int.	●	MVS0530X15S060	80.5	3.169	100.0	3.937	103.0	4.055	155.0	6.102	154	6.063	1.0	.039	6	.236	8
					20	Int.	★	MVS0530X20S060	107.0	4.213	128.0	5.039	131.0	5.157	183.0	7.205	182	7.165	1.0	.039	6	.236	8
					25	Int.	★	MVS0530X25S060	133.5	5.256	155.0	6.102	158.0	6.220	210.0	8.268	209	8.228	1.0	.039	6	.236	8
					30	Int.	★	MVS0530X30S060	160.0	6.299	183.0	7.205	186.0	7.323	238.0	9.370	237	9.331	1.0	.039	6	.236	8
					35	Int.	□	MVS0530X35S060	186.5	7.343	210.0	8.268	213.0	8.386	265.0	10.433	264	10.394	1.0	.039	6	.236	8
					40	Int.	□	MVS0530X40S060	213.0	8.386	241.0	9.488	244.0	9.606	296.0	11.654	295	11.614	1.0	.039	6	.236	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC					L/D	Coolant (Int./Ext.)	Stock	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size			DP1020		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
5.400	.2126		3	1/4-28	2	Ext.	●	MVE0540X02S060	11.8	.465	27.0	1.063	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0540X02S060PL	11.7	.461	26.9	1.059	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0540X03S060	17.2	.677	35.0	1.378	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	6	.236	2
					3	Int.	●	MVS0540X03S060	17.2	.677	28.5	1.122	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0540X05S060	28.0	1.102	45.0	1.772	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0540X08S060	44.2	1.740	62.0	2.441	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	★	MVS0540X10S060	55.0	2.165	73.0	2.874	76.0	2.992	128.0	5.039	127	5.000	1.0	.039	6	.236	8
					15	Int.	●	MVS0540X15S060	82.0	3.228	100.0	3.937	103.0	4.055	155.0	6.102	154	6.063	1.0	.039	6	.236	8
					20	Int.	★	MVS0540X20S060	109.0	4.291	128.0	5.039	131.0	5.157	183.0	7.205	182	7.165	1.0	.039	6	.236	8
					25	Int.	★	MVS0540X25S060	136.0	5.354	155.0	6.102	158.0	6.220	210.0	8.268	209	8.228	1.0	.039	6	.236	8
					30	Int.	★	MVS0540X30S060	163.0	6.417	183.0	7.205	186.0	7.323	238.0	9.370	237	9.331	1.0	.039	6	.236	8
					35	Int.	□	MVS0540X35S060	190.0	7.480	210.0	8.268	213.0	8.386	265.0	10.433	264	10.394	1.0	.039	6	.236	8
					40	Int.	□	MVS0540X40S060	217.0	8.543	241.0	9.488	244.0	9.606	296.0	11.654	295	11.614	1.0	.039	6	.236	8
5.500	.2165				2	Ext.	●	MVE0550X02S060	12.0	.472	27.0	1.063	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0550X02S060PL	11.9	.469	26.9	1.059	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0550X03S060	17.5	.689	35.0	1.378	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	6	.236	2
					3	Int.	●	MVS0550X03S060	17.5	.689	28.5	1.122	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0550X05S060	28.5	1.122	45.0	1.772	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0550X08S060	45.0	1.772	62.0	2.441	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	●	MVS0550X10S060	56.0	2.205	73.0	2.874	76.0	2.992	128.0	5.039	127	5.000	1.0	.039	6	.236	8
					15	Int.	★	MVS0550X15S060	83.5	3.287	100.0	3.937	103.0	4.055	155.0	6.102	154	6.063	1.0	.039	6	.236	8
					20	Int.	●	MVS0550X20S060	111.0	4.370	128.0	5.039	131.0	5.157	183.0	7.205	182	7.165	1.0	.039	6	.236	8
					25	Int.	●	MVS0550X25S060	138.5	5.453	155.0	6.102	158.0	6.220	210.0	8.268	209	8.228	1.0	.039	6	.236	8
					30	Int.	★	MVS0550X30S060	166.0	6.535	183.0	7.205	186.0	7.323	238.0	9.370	237	9.331	1.0	.039	6	.236	8
					35	Int.	●	MVS0550X35S060	193.5	7.618	210.0	8.268	213.0	8.386	265.0	10.433	264	10.394	1.0	.039	6	.236	8
					40	Int.	●	MVS0550X40S060	221.0	8.701	241.0	9.488	244.0	9.606	296.0	11.654	295	11.614	1.0	.039	6	.236	8
5.557	.2188	7/32			2	Ext.	●	MVE0556X02S060	12.1	.476	29.0	1.142	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0556X02S060PL	12.1	.476	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Int.	●	MVS0556X03S060	17.7	.697	31.0	1.220	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0556X05S060	28.8	1.134	49.0	1.929	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0556X08S060	45.5	1.791	67.0	2.638	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	●	MVS0556X10S060	56.6	2.228	79.0	3.110	82.0	3.228	134.0	5.276	133	5.236	1.0	.039	6	.236	8
					15	Int.	●	MVS0556X15S060	84.4	3.323	109.0	4.291	112.0	4.409	164.0	6.457	163	6.417	1.0	.039	6	.236	8
					20	Int.	●	MVS0556X20S060	112.2	4.417	139.0	5.472	142.0	5.591	194.0	7.638	193	7.598	1.0	.039	6	.236	8
					25	Int.	●	MVS0556X25S060	140.0	5.512	169.0	6.654	172.0	6.772	224.0	8.819	223	8.780	1.0	.039	6	.236	8
					30	Int.	●	MVS0556X30S060	167.7	6.602	199.0	7.835	202.0	7.953	254.0	10.000	253	9.961	1.0	.039	6	.236	8
					35	Int.	●	MVS0556X35S060	195.5	7.697	229.0	9.016	232.0	9.134	284.0	11.181	283	11.142	1.0	.039	6	.236	8
					40	Int.	●	MVS0556X40S060	223.3	8.791	261.0	10.276	264.0	10.394	316.0	12.441	315	12.402	1.0	.039	6	.236	8
5.600	.2205		2		2	Ext.	●	MVE0560X02S060	12.2	.480	29.0	1.142	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0560X02S060PL	12.1	.476	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0560X03S060	17.8	.701	37.0	1.457	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	6	.236	2
					3	Int.	●	MVS0560X03S060	17.8	.701	31.0	1.220	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0560X05S060	29.0	1.142	49.0	1.929	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0560X08S060	45.8	1.803	67.0	2.638	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	★	MVS0560X10S060	57.0	2.244	79.0	3.110	82.0	3.228	134.0	5.276	133	5.236	1.0	.039	6	.236	8
					15	Int.	★	MVS0560X15S060	85.0	3.346	109.0	4.291	112.0	4.409	164.0	6.457	163	6.417	1.0	.039	6	.236	8
					20	Int.	★	MVS0560X20S060	113.0	4.449	139.0	5.472	142.0	5.591	194.0	7.638	193	7.598	1.0	.039	6	.236	8
					25	Int.	★	MVS0560X25S060	141.0	5.551	169.0	6.654	172.0	6.772	224.0	8.819	223	8.780	1.0	.039	6	.236	8
					30	Int.	★	MVS0560X30S060	169.0	6.654	199.0	7.835	202.0	7.953	254.0	10.000	253	9.961	1.0	.039	6	.236	8
					35	Int.	□	MVS0560X35S060	197.0	7.756	229.0	9.016	232.0	9.134	284.0	11.181	283	11.142	1.0	.039	6	.236	8
					40	Int.	□	MVS0560X40S060	225.0	8.858	261.0	10.276	264.0	10.394	316.0	12.441	315	12.402	1.0	.039	6	.236	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of ø5.9mm or less will be round shape.

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC					L/D	Coolant (Int./Ext.)	Stock	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size			DP1020		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
5.700	.2244				2	Ext.	●	MVE0570X02S060	12.4	.488	29.0	1.142	29.0	1.142	67.0	2.638	66	2.598	1.0	.039	6	.236	2
					2	Int.	●	MVS0570X02S060PL	12.3	.484	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0570X03S060	18.1	.713	37.0	1.457	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	6	.236	2
					3	Int.	●	MVS0570X03S060	18.1	.713	31.0	1.220	31.0	1.220	83.0	3.268	82	3.228	1.0	.039	6	.236	6
					5	Int.	●	MVS0570X05S060	29.5	1.161	49.0	1.929	49.0	1.929	101.0	3.976	100	3.937	1.0	.039	6	.236	6
					8	Int.	●	MVS0570X08S060	46.6	1.835	67.0	2.638	67.0	2.638	119.0	4.685	118	4.646	1.0	.039	6	.236	6
					10	Int.	●	MVS0570X10S060	58.0	2.283	79.0	3.110	82.0	3.228	134.0	5.276	133	5.236	1.0	.039	6	.236	8
					15	Int.	●	MVS0570X15S060	86.5	3.406	109.0	4.291	112.0	4.409	164.0	6.457	163	6.417	1.0	.039	6	.236	8
					20	Int.	●	MVS0570X20S060	115.0	4.528	139.0	5.472	142.0	5.591	194.0	7.638	193	7.598	1.0	.039	6	.236	8
					25	Int.	★	MVS0570X25S060	143.5	5.650	169.0	6.654	172.0	6.772	224.0	8.819	223	8.780	1.0	.039	6	.236	8
					30	Int.	★	MVS0570X30S060	172.0	6.772	199.0	7.835	202.0	7.953	254.0	10.000	253	9.961	1.0	.039	6	.236	8
					35	Int.	□	MVS0570X35S060	200.5	7.894	229.0	9.016	232.0	9.134	284.0	11.181	283	11.142	1.0	.039	6	.236	8
					40	Int.	□	MVS0570X40S060	229.0	9.016	261.0	10.276	264.0	10.394	316.0	12.441	315	12.402	1.0	.039	6	.236	8
5.800	.2283		1		2	Ext.	●	MVE0580X02S060	12.7	.500	29.1	1.146	29.1	1.146	67.1	2.642	66	2.598	1.1	.043	6	.236	2
					2	Int.	●	MVS0580X02S060PL	12.5	.492	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0580X03S060	18.5	.728	37.1	1.461	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	6	.236	2
					3	Int.	●	MVS0580X03S060	18.5	.728	31.1	1.224	31.1	1.224	83.1	3.272	82	3.228	1.1	.043	6	.236	6
					5	Int.	●	MVS0580X05S060	30.1	1.185	49.1	1.933	49.1	1.933	101.1	3.980	100	3.937	1.1	.043	6	.236	6
					8	Int.	●	MVS0580X08S060	47.5	1.870	67.1	2.642	67.1	2.642	119.1	4.689	118	4.646	1.1	.043	6	.236	6
					10	Int.	●	MVS0580X10S060	59.1	2.327	79.1	3.114	82.1	3.232	134.1	5.280	133	5.236	1.1	.043	6	.236	8
					15	Int.	★	MVS0580X15S060	88.1	3.469	109.1	4.295	112.1	4.413	164.1	6.461	163	6.417	1.1	.043	6	.236	8
					20	Int.	●	MVS0580X20S060	117.1	4.610	139.1	5.476	142.1	5.594	194.1	7.642	193	7.598	1.1	.043	6	.236	8
					25	Int.	★	MVS0580X25S060	146.1	5.752	169.1	6.657	172.1	6.776	224.1	8.823	223	8.780	1.1	.043	6	.236	8
					30	Int.	★	MVS0580X30S060	175.1	6.894	199.1	7.839	202.1	7.957	254.1	10.004	253	9.961	1.1	.043	6	.236	8
					35	Int.	□	MVS0580X35S060	204.1	8.035	229.1	9.020	232.1	9.138	284.1	11.185	283	11.142	1.1	.043	6	.236	8
					40	Int.	□	MVS0580X40S060	233.1	9.177	261.1	10.280	264.1	10.398	316.1	12.445	315	12.402	1.1	.043	6	.236	8
5.900	.2323				2	Ext.	●	MVE0590X02S060	12.9	.508	29.1	1.146	29.1	1.146	67.1	2.642	66	2.598	1.1	.043	6	.236	2
					2	Int.	●	MVS0590X02S060PL	12.7	.500	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0590X03S060	18.8	.740	37.1	1.461	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	6	.236	2
					3	Int.	●	MVS0590X03S060	18.8	.740	31.1	1.224	31.1	1.224	83.1	3.272	82	3.228	1.1	.043	6	.236	6
					5	Int.	●	MVS0590X05S060	30.6	1.205	49.1	1.933	49.1	1.933	101.1	3.980	100	3.937	1.1	.043	6	.236	6
					8	Int.	●	MVS0590X08S060	48.3	1.902	67.1	2.642	67.1	2.642	119.1	4.689	118	4.646	1.1	.043	6	.236	6
					10	Int.	★	MVS0590X10S060	60.1	2.366	79.1	3.114	82.1	3.232	134.1	5.280	133	5.236	1.1	.043	6	.236	8
					15	Int.	★	MVS0590X15S060	89.6	3.528	109.1	4.295	112.1	4.413	164.1	6.461	163	6.417	1.1	.043	6	.236	8
					20	Int.	★	MVS0590X20S060	119.1	4.689	139.1	5.476	142.1	5.594	194.1	7.642	193	7.598	1.1	.043	6	.236	8
					25	Int.	★	MVS0590X25S060	148.6	5.850	169.1	6.657	172.1	6.776	224.1	8.823	223	8.780	1.1	.043	6	.236	8
					30	Int.	★	MVS0590X30S060	178.1	7.012	199.1	7.839	202.1	7.957	254.1	10.004	253	9.961	1.1	.043	6	.236	8
					35	Int.	□	MVS0590X35S060	207.6	8.173	229.1	9.020	232.1	9.138	284.1	11.185	283	11.142	1.1	.043	6	.236	8
					40	Int.	□	MVS0590X40S060	237.1	9.335	261.1	10.280	264.1	10.398	316.1	12.445	315	12.402	1.1	.043	6	.236	8
5.954	.2344	15/64	A		2	Ext.	●	MVE0595X02S060	12.9	.508	29.1	1.146	29.1	1.146	67.1	2.642	66	2.598	1.1	.043	6	.236	2
					2	Int.	●	MVS0595X02S060PL	12.9	.508	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Int.	●	MVS0595X03S060	18.9	.744	31.1	1.224	31.1	1.224	83.1	3.272	82	3.228	1.1	.043	6	.236	6
					5	Int.	●	MVS0595X05S060	30.8	1.213	49.1	1.933	49.1	1.933	101.1	3.980	100	3.937	1.1	.043	6	.236	6
					8	Int.	●	MVS0595X08S060	48.7	1.917	67.1	2.642	67.1	2.642	119.1	4.689	118	4.646	1.1	.043	6	.236	6
					10	Int.	●	MVS0595X10S060	60.6	2.386	79.1	3.114	82.1	3.232	134.1	5.280	133	5.236	1.1	.043	6	.236	8
					15	Int.	●	MVS0595X15S060	90.4	3.559	109.1	4.295	112.1	4.413	164.1	6.461	163	6.417	1.1	.043	6	.236	8
					20	Int.	●	MVS0595X20S060	120.2	4.732	139.1	5.476	142.1	5.594	194.1	7.642	193	7.598	1.1	.043	6	.236	8
					25	Int.	●	MVS0595X25S060	149.9	5.902	169.1	6.657	172.1	6.776	224.1	8.823	223	8.780	1.1	.043	6	.236	8
					30	Int.	●	MVS0595X30S060	179.7	7.075	199.1	7.839	202.1	7.957	254.1	10.004	253	9.961	1.1	.043	6	.236	8
					35	Int.	●	MVS0595X35S060	209.5	8.248	229.1	9.020	232.1	9.138	284.1	11.185	283	11.142	1.1	.043	6	.236	8
					40	Int.	●	MVS0595X40S060	239.2	9.417	261.1	10.280	264.1	10.398	316.1	12.445	315	12.402	1.1	.043	6	.236	8

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.000	.2362			M7x1.0	2	Ext.	●	MVE0600X02S060	13.1	.516	29.1	1.146	29.1	1.146	67.1	2.642	66	2.598	1.1	.043	6	.236	2
					2	Int.	●	MVS0600X02S060PL	12.9	.508	28.9	1.138	28.9	1.138	66.9	2.634	66	2.598	0.9	.035	6	.236	4
					3	Ext.	★	MVE0600X03S060	19.1	.752	37.1	1.461	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	6	.236	2
					3	Int.	●	MVS0600X03S060	19.1	.752	31.1	1.224	31.1	1.224	83.1	3.272	82	3.228	1.1	.043	6	.236	6
					5	Int.	●	MVS0600X05S060	31.1	1.224	49.1	1.933	49.1	1.933	101.1	3.980	100	3.937	1.1	.043	6	.236	6
					8	Int.	●	MVS0600X08S060	49.1	1.933	67.1	2.642	67.1	2.642	119.1	4.689	118	4.646	1.1	.043	6	.236	6
					10	Int.	●	MVS0600X10S060	61.1	2.406	79.1	3.114	82.1	3.232	134.1	5.280	133	5.236	1.1	.043	6	.236	8
					15	Int.	●	MVS0600X15S060	91.1	3.587	109.1	4.295	112.1	4.413	164.1	6.461	163	6.417	1.1	.043	6	.236	8
					20	Int.	●	MVS0600X20S060	121.1	4.768	139.1	5.476	142.1	5.594	194.1	7.642	193	7.598	1.1	.043	6	.236	8
					25	Int.	●	MVS0600X25S060	151.1	5.949	169.1	6.657	172.1	6.776	224.1	8.823	223	8.780	1.1	.043	6	.236	8
					30	Int.	●	MVS0600X30S060	181.1	7.130	199.1	7.839	202.1	7.957	254.1	10.004	253	9.961	1.1	.043	6	.236	8
					35	Int.	●	MVS0600X35S060	211.1	8.311	229.1	9.020	232.1	9.138	284.1	11.185	283	11.142	1.1	.043	6	.236	8
					40	Int.	●	MVS0600X40S060	241.1	9.492	261.1	10.280	264.1	10.398	316.1	12.445	315	12.402	1.1	.043	6	.236	8
6.100	.2402				2	Ext.	★	MVE0610X02S070	13.3	.524	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	2
					2	Ext.	●	MVE0610X02S080	13.3	.524	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	8	.315	2
					2	Int.	★	MVS0610X02S070PL	13.2	.520	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0610X02S080PL	13.2	.520	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0610X03S070	19.4	.764	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	7	.276	2
					3	Ext.	★	MVE0610X03S080	19.4	.764	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	8	.315	2
					3	Int.	★	MVS0610X03S070	19.4	.764	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	7	.276	6
					3	Int.	●	MVS0610X03S080	19.4	.764	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	8	.315	6
					5	Int.	★	MVS0610X05S070	31.6	1.244	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	7	.276	6
					5	Int.	●	MVS0610X05S080	31.6	1.244	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	8	.315	6
					8	Int.	★	MVS0610X08S070	49.9	1.965	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	7	.276	6
					8	Int.	●	MVS0610X08S080	49.9	1.965	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	8	.315	6
					10	Int.	★	MVS0610X10S070	62.1	2.445	86.1	3.390	89.1	3.508	142.1	5.594	141	5.551	1.1	.043	7	.276	8
					10	Int.	●	MVS0610X10S080	62.1	2.445	86.1	3.390	89.1	3.508	142.1	5.594	141	5.551	1.1	.043	8	.315	8
					15	Int.	★	MVS0610X15S070	92.6	3.646	118.1	4.650	121.1	4.768	174.1	6.854	173	6.811	1.1	.043	7	.276	8
					15	Int.	●	MVS0610X15S080	92.6	3.646	118.1	4.650	121.1	4.768	174.1	6.854	173	6.811	1.1	.043	8	.315	8
					20	Int.	★	MVS0610X20S070	123.1	4.846	151.1	5.949	154.1	6.067	207.1	8.154	206	8.110	1.1	.043	7	.276	8
					20	Int.	●	MVS0610X20S080	123.1	4.846	151.1	5.949	154.1	6.067	207.1	8.154	206	8.110	1.1	.043	8	.315	8
					25	Int.	★	MVS0610X25S070	153.6	6.047	183.1	7.209	186.1	7.327	239.1	9.413	238	9.370	1.1	.043	7	.276	8
					25	Int.	●	MVS0610X25S080	153.6	6.047	183.1	7.209	186.1	7.327	239.1	9.413	238	9.370	1.1	.043	8	.315	8
					30	Int.	★	MVS0610X30S070	184.1	7.248	216.1	8.508	219.1	8.626	272.1	10.713	271	10.669	1.1	.043	7	.276	8
					30	Int.	●	MVS0610X30S080	184.1	7.248	216.1	8.508	219.1	8.626	272.1	10.713	271	10.669	1.1	.043	8	.315	8
					35	Int.	□	MVS0610X35S070	214.6	8.449	248.1	9.768	253.1	9.965	306.1	12.051	305	12.008	1.1	.043	7	.276	8
					35	Int.	□	MVS0610X35S080	214.6	8.449	248.1	9.768	253.1	9.965	306.1	12.051	305	12.008	1.1	.043	8	.315	8
					40	Int.	□	MVS0610X40S070	245.1	9.650	281.1	11.067	284.1	11.185	337.1	13.272	336	13.228	1.1	.043	7	.276	8
					40	Int.	□	MVS0610X40S080	245.1	9.650	281.1	11.067	284.1	11.185	337.1	13.272	336	13.228	1.1	.043	8	.315	8
6.200	.2441				2	Ext.	★	MVE0620X02S070	13.5	.531	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	2
					2	Ext.	●	MVE0620X02S080	13.5	.531	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	8	.315	2
					2	Int.	★	MVS0620X02S070PL	13.4	.528	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0620X02S080PL	13.4	.528	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0620X03S070	19.7	.776	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	7	.276	2
					3	Ext.	★	MVE0620X03S080	19.7	.776	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	8	.315	2
					3	Int.	★	MVS0620X03S070	19.7	.776	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	7	.276	6
					3	Int.	●	MVS0620X03S080	19.7	.776	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	8	.315	6
					5	Int.	★	MVS0620X05S070	32.1	1.264	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	7	.276	6
					5	Int.	●	MVS0620X05S080	32.1	1.264	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	8	.315	6
					8	Int.	★	MVS0620X08S070	50.7	1.996	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	7	.276	6
					8	Int.	●	MVS0620X08S080	50.7	1.996	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	8	.315	6
					10	Int.	★	MVS0620X10S070	63.1	2.484	86.1	3.390	89.1	3.508	142.1	5.594	141	5.551	1.1	.043	7	.276	8
					10	Int.	●	MVS0620X10S080	63.1	2.484	86.1	3.390	89.1	3.508	142.1	5.594	141	5.551	1.1	.043	8	.315	8
					15	Int.	★	MVS0620X15S070	94.1	3.705	118.1	4.650	121.1	4.768	174.1	6.854	173	6.811	1.1	.043	7	.276	8
					15	Int.	●	MVS0620X15S080	94.1	3.705	118.1	4.650	121.1	4.768	174.1	6.854	173	6.811	1.1	.043	8	.315	8
					20	Int.	★	MVS0620X20S070	125.1	4.925	151.1	5.949	154.1	6.067	207.1	8.154	206	8.110	1.1	.043	7	.276	8
					20	Int.	●	MVS0620X20S080	125.1	4.925	151.1	5.949	154.1	6.067	207.1	8.154	206	8.110	1.1	.043	8	.315	8
					25	Int.	★	MVS0620X25S070	156.1	6.146	183.1	7.209	186.1	7.327	239.1	9.413	238	9.370	1.1	.043	7	.276	8
					25	Int.	●	MVS0620X25S080	156.1	6.146	183.1	7.209	186.1	7.327	239.1	9.413	238	9.370	1.1	.043	8	.315	8
					30	Int.	★	MVS0620X30S070	187.1	7.366	216.1	8.508	219.1	8.626	272.1	10.713	271	10.669	1.1	.043	7	.276	8
					30	Int.	●	MVS0620X30S080	187.1	7.366	216.1	8.508	219.1	8.626	272.1	10.713	271	10.669	1.1	.043	8	.315	8
					35	Int.	□	MVS0620X35S070	218.1	8.587	248.1	9.768	253.1	9.965	306.1	12.051	305	12.008	1.1	.043	7	.276	8
					35	Int.	□	MVS0620X35S080	218.1	8.587	248.1	9.768	253.1	9.965	306.1	12.051	305	12.008	1.1	.043	8	.315	8
					40	Int.	□	MVS0620X40S070	249.1	9.807	281.1	11.067	284.1	11.185	337.1	13.272	336	13.228	1.1	.043	7	.276	8
					40	Int.	□	MVS0620X40S080	249.1	9.807	281.1	11.067	284.1	11.185	337.1	13.272	336	13.228	1.1	.043	8	.315	8
6.300	.2480				2	Ext.	★	MVE0630X02S070	13.7	.539	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	2
					2	Ext.	●	MVE0630X02S080	13.7	.539	32.1	1.264	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	8	.315	2
					2	Int.	★	MVS0630X02S070PL	13.6	.535	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0630X02S080PL	13.6	.535	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0630X03S070	20.0	.787	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	7	.276	2
					3	Ext.	★	MVE0630X03S080	20.0	.787	42.1	1.657	45.1	1.776	84.1	3.311	83	3.268	1.1	.043	8	.315	2
					3	Int.	★	MVS0630X03S070	20.0	.787	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	7	.276	6
					3	Int.	●	MVS0630X03S080	20.0	.787	33.6	1.323	36.1	1.421	89.1	3.508	88	3.465	1.1	.043	8	.315	6
					5	Int.	★	MVS0630X05S070	32.6	1.283	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	7	.276	6
					5	Int.	●	MVS0630X05S080	32.6	1.283	53.1	2.091	57.1	2.248	110.1	4.335	109	4.291	1.1	.043	8	.315	6
					8	Int.	★	MVS0630X08S070	51.5	2.028	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	7	.276	6
					8	Int.	●	MVS0630X08S080	51.5	2.028	73.1	2.878	78.1	3.075	131.1	5.161	130	5.118	1.1	.043	8	.315	6
					10	Int.	★	MVS0630X10S070	64.1	2.524	86.1	3.390	89.1	3.512	142.1	5.594	141	5.551	1.1	.043	7	.276	8
					10	Int.	●	MVS0630X10S080	64.1	2.524	86.1	3.390	89.1	3.508	142.1	5.594	141	5.551	1.1	.043	8	.315	8
					15	Int.	★	MVS0630X15S070	95.6	3.764	118.1	4.650	121.1	4.772	174.1	6.854	173	6.811	1.1	.043	7	.276	8
					15	Int.	●	MVS0630X15S080	95.6	3.764	118.1	4.650	121.1	4.768	174.1	6.854	173	6.811	1.1	.043	8	.315	8
					20	Int.	★	MVS0630X20S070	127.1	5.004	151.1	5.949	154.1	6.071	207.1	8.154	206	8.110	1.1	.043	7	.276	8
					20	Int.	●	MVS0630X20S080	127.1	5.004	151.1	5.949	154.1	6.067	207.1	8.154	206	8.110	1.1	.043	8	.315	8
					25	Int.	★	MVS0630X25S070	158.6	6.244	183.1	7.209	186.1	7.331	239.1	9.413	238	9.370	1.1	.043	7	.276	8
					25	Int.	●	MVS0630X25S080	158.6	6.244	183.1	7.209	186.1	7.327	239.1	9.413	238	9.370	1.1	.043	8	.315	8
					30	Int.	★	MVS0630X30S070	190.1	7.484	216.1	8.508	219.1	8.630	272.1	10.713	271	10.669	1.1	.043	7	.276	8
					30	Int.	●	MVS0630X30S080	190.1	7.484	216.1	8.508	219.1	8.626	272.1	10.713	271	10.669	1.1	.043	8	.315	8
					35	Int.	□	MVS0630X35S070	221.6	8.724	248.1	9.768	253.1	9.969	306.1	12.051	305	12.008	1.1	.043	7	.276	8
					35	Int.	□	MVS0630X35S080	221.6	8.724	248.1	9.768	253.1	9.969	306.1	12.051	305	12.008	1.1	.043	8	.315	8
					40	Int.	□	MVS0630X40S070	253.1	9.965	281.1	11.067	284.1	11.189	337.1	13.272	336	13.228	1.1	.043	7	.276	8
					40	Int.	□	MVS0630X40S080	253.1	9.965	281.1	11.067	284.1	11.189	337.1	13.272	336	13.228	1.1	.043	8	.315	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.350	.2500	1/4	E		2	Ext.	●	MVE0635X02S080	13.8	.543	32.2	1.268	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	●	MVS0635X02S080PL	13.8	.543	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Int.	●	MVS0635X03S080	20.2	.795	33.7	1.327	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	●	MVS0635X05S080	32.9	1.295	53.2	2.094	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	●	MVS0635X08S080	51.9	2.043	73.2	2.882	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	●	MVS0635X10S080	64.6	2.543	86.2	3.394	89.2	3.512	142.2	5.598	141	5.551	1.2	.047	8	.315	8
					15	Int.	●	MVS0635X15S080	96.4	3.795	118.2	4.654	121.2	4.772	174.2	6.858	173	6.811	1.2	.047	8	.315	8
					20	Int.	●	MVS0635X20S080	128.1	5.043	151.2	5.953	154.2	6.071	207.2	8.157	206	8.110	1.2	.047	8	.315	8
					25	Int.	●	MVS0635X25S080	159.9	6.295	183.2	7.213	186.2	7.331	239.2	9.417	238	9.370	1.2	.047	8	.315	8
					30	Int.	●	MVS0635X30S080	191.6	7.543	216.2	8.512	219.2	8.630	272.2	10.717	271	10.669	1.2	.047	8	.315	8
					35	Int.	●	MVS0635X35S080	223.4	8.795	248.2	9.772	253.2	9.969	306.2	12.055	305	12.008	1.2	.047	8	.315	8
					40	Int.	●	MVS0635X40S080	255.1	10.043	281.2	11.071	284.2	11.189	337.2	13.276	336	13.228	1.2	.047	8	.315	8
6.400	.2520				2	Ext.	★	MVE0640X02S070	14.0	.551	32.2	1.268	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	7	.276	2
					2	Ext.	●	MVE0640X02S080	14.0	.551	32.2	1.268	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	★	MVS0640X02S070PL	13.8	.543	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0640X02S080PL	13.8	.543	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0640X03S070	20.4	.803	42.2	1.661	45.2	1.780	84.2	3.315	83	3.268	1.2	.047	7	.276	2
					3	Ext.	★	MVE0640X03S080	20.4	.803	42.2	1.661	45.2	1.780	84.2	3.315	83	3.268	1.2	.047	8	.315	2
					3	Int.	★	MVS0640X03S070	20.4	.803	33.7	1.327	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	7	.276	6
					3	Int.	●	MVS0640X03S080	20.4	.803	33.7	1.327	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	★	MVS0640X05S070	33.2	1.307	53.2	2.094	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	7	.276	6
					5	Int.	●	MVS0640X05S080	33.2	1.307	53.2	2.094	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	★	MVS0640X08S070	52.4	2.063	73.2	2.882	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	7	.276	6
					8	Int.	●	MVS0640X08S080	52.4	2.063	73.2	2.882	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	★	MVS0640X10S070	65.2	2.567	86.2	3.394	89.2	3.512	142.2	5.598	141	5.551	1.2	.047	7	.276	8
					10	Int.	●	MVS0640X10S080	65.2	2.567	86.2	3.394	89.2	3.512	142.2	5.598	141	5.551	1.2	.047	8	.315	8
					15	Int.	★	MVS0640X15S070	97.2	3.827	118.2	4.654	121.2	4.772	174.2	6.858	173	6.811	1.2	.047	7	.276	8
					15	Int.	●	MVS0640X15S080	97.2	3.827	118.2	4.654	121.2	4.772	174.2	6.858	173	6.811	1.2	.047	8	.315	8
					20	Int.	★	MVS0640X20S070	129.2	5.087	151.2	5.953	154.2	6.071	207.2	8.157	206	8.110	1.2	.047	7	.276	8
					20	Int.	●	MVS0640X20S080	129.2	5.087	151.2	5.953	154.2	6.071	207.2	8.157	206	8.110	1.2	.047	8	.315	8
					25	Int.	★	MVS0640X25S070	161.2	6.346	183.2	7.213	186.2	7.331	239.2	9.417	238	9.370	1.2	.047	7	.276	8
					25	Int.	●	MVS0640X25S080	161.2	6.346	183.2	7.213	186.2	7.331	239.2	9.417	238	9.370	1.2	.047	8	.315	8
					30	Int.	★	MVS0640X30S070	193.2	7.606	216.2	8.512	219.2	8.630	272.2	10.717	271	10.669	1.2	.047	7	.276	8
					30	Int.	●	MVS0640X30S080	193.2	7.606	216.2	8.512	219.2	8.630	272.2	10.717	271	10.669	1.2	.047	8	.315	8
					35	Int.	□	MVS0640X35S070	225.2	8.866	248.2	9.772	253.2	9.969	306.2	12.055	305	12.008	1.2	.047	7	.276	8
					35	Int.	□	MVS0640X35S080	225.2	8.866	248.2	9.772	253.2	9.969	306.2	12.055	305	12.008	1.2	.047	8	.315	8
					40	Int.	□	MVS0640X40S070	257.2	10.126	281.2	11.071	284.2	11.189	337.2	13.276	336	13.228	1.2	.047	7	.276	8
					40	Int.	□	MVS0640X40S080	257.2	10.126	281.2	11.071	284.2	11.189	337.2	13.276	336	13.228	1.2	.047	8	.315	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.500	.2559				2	Ext.	★	MVE0650X02S070	14.2	.559	32.2	1.268	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	7	.276	2
					2	Ext.	●	MVE0650X02S080	14.2	.559	32.2	1.268	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	★	MVS0650X02S070PL	14.0	.551	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0650X02S080PL	14.0	.551	32.0	1.260	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0650X03S070	20.7	.815	42.2	1.661	45.2	1.780	84.2	3.315	83	3.268	1.2	.047	7	.276	2
					3	Ext.	★	MVE0650X03S080	20.7	.815	42.2	1.661	45.2	1.780	84.2	3.315	83	3.268	1.2	.047	8	.315	2
					3	Int.	★	MVS0650X03S070	20.7	.815	33.7	1.327	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	7	.276	6
					3	Int.	●	MVS0650X03S080	20.7	.815	33.7	1.327	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	★	MVS0650X05S070	33.7	1.327	53.2	2.094	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	7	.276	6
					5	Int.	●	MVS0650X05S080	33.7	1.327	53.2	2.094	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	★	MVS0650X08S070	53.2	2.094	73.2	2.882	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	7	.276	6
					8	Int.	●	MVS0650X08S080	53.2	2.094	73.2	2.882	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	★	MVS0650X10S070	66.2	2.606	86.2	3.394	89.2	3.512	142.2	5.598	141	5.551	1.2	.047	7	.276	8
					10	Int.	●	MVS0650X10S080	66.2	2.606	86.2	3.394	89.2	3.512	142.2	5.598	141	5.551	1.2	.047	8	.315	8
					15	Int.	★	MVS0650X15S070	98.7	3.886	118.2	4.654	121.2	4.772	174.2	6.858	173	6.811	1.2	.047	7	.276	8
					15	Int.	●	MVS0650X15S080	98.7	3.886	118.2	4.654	121.2	4.772	174.2	6.858	173	6.811	1.2	.047	8	.315	8
					20	Int.	★	MVS0650X20S070	131.2	5.165	151.2	5.953	154.2	6.071	207.2	8.157	206	8.110	1.2	.047	7	.276	8
					20	Int.	●	MVS0650X20S080	131.2	5.165	151.2	5.953	154.2	6.071	207.2	8.157	206	8.110	1.2	.047	8	.315	8
					25	Int.	★	MVS0650X25S070	163.7	6.445	183.2	7.213	186.2	7.331	239.2	9.417	238	9.370	1.2	.047	7	.276	8
					25	Int.	●	MVS0650X25S080	163.7	6.445	183.2	7.213	186.2	7.331	239.2	9.417	238	9.370	1.2	.047	8	.315	8
					30	Int.	★	MVS0650X30S070	196.2	7.724	216.2	8.512	219.2	8.630	272.2	10.717	271	10.669	1.2	.047	7	.276	8
					30	Int.	●	MVS0650X30S080	196.2	7.724	216.2	8.512	219.2	8.630	272.2	10.717	271	10.669	1.2	.047	8	.315	8
					35	Int.	★	MVS0650X35S070	228.7	9.004	248.2	9.772	253.2	9.969	306.2	12.055	305	12.008	1.2	.047	7	.276	8
					35	Int.	●	MVS0650X35S080	228.7	9.004	248.2	9.772	253.2	9.969	306.2	12.055	305	12.008	1.2	.047	8	.315	8
					40	Int.	★	MVS0650X40S070	261.2	10.283	281.2	11.071	284.2	11.189	337.2	13.276	336	13.228	1.2	.047	7	.276	8
					40	Int.	●	MVS0650X40S080	261.2	10.283	281.2	11.071	284.2	11.189	337.2	13.276	336	13.228	1.2	.047	8	.315	8
6.528	.2570		F	5/16-18	2	Ext.	●	MVE0653X02S080	14.2	.559	35.2	1.386	37.2	1.465	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	●	MVS0653X02S080PL	14.2	.559	35.0	1.378	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Int.	●	MVS0653X03S080	20.8	.819	36.2	1.425	38.2	1.504	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	●	MVS0653X05S080	33.8	1.331	57.2	2.252	59.2	2.331	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	●	MVS0653X08S080	53.4	2.102	78.2	3.079	80.2	3.157	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	●	MVS0653X10S080	66.5	2.618	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	8	.315	8
					15	Int.	●	MVS0653X15S080	99.1	3.902	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	8	.315	8
					20	Int.	●	MVS0653X20S080	131.7	5.185	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	8	.315	8
					25	Int.	●	MVS0653X25S080	164.4	6.472	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	8	.315	8
					30	Int.	●	MVS0653X30S080	197.0	7.756	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	8	.315	8
					35	Int.	●	MVS0653X35S080	229.7	9.043	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	8	.315	8
					40	Int.	●	MVS0653X40S080	262.3	10.327	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	8	.315	8

● : USA Stock ★ : Stocked in Japan □ : Made to Order

M
DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.600	.2598				2	Ext.	★	MVE0660X02S070	14.4	.567	35.2	1.386	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	7	.276	2
					2	Ext.	●	MVE0660X02S080	14.4	.567	35.2	1.386	37.2	1.465	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	★	MVS0660X02S070PL	14.2	.559	35.0	1.378	35.0	1.378	75.0	2.953	74	2.913	1.0	.039	7	.276	4
					2	Int.	●	MVS0660X02S080PL	14.2	.559	35.0	1.378	37.0	1.457	75.0	2.953	74	2.913	1.0	.039	8	.315	4
					3	Ext.	★	MVE0660X03S070	21.0	.827	44.2	1.740	44.2	1.740	84.2	3.315	83	3.268	1.2	.047	7	.276	2
					3	Ext.	★	MVE0660X03S080	21.0	.827	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	8	.315	2
					3	Int.	★	MVS0660X03S070	21.0	.827	36.2	1.425	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	7	.276	6
					3	Int.	●	MVS0660X03S080	21.0	.827	36.2	1.425	38.2	1.504	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	★	MVS0660X05S070	34.2	1.346	57.2	2.252	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	7	.276	6
					5	Int.	●	MVS0660X05S080	34.2	1.346	57.2	2.252	59.2	2.331	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	★	MVS0660X08S070	54.0	2.126	78.2	3.079	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	7	.276	6
					8	Int.	●	MVS0660X08S080	54.0	2.126	78.2	3.079	80.2	3.157	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	★	MVS0660X10S070	67.2	2.646	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	7	.276	8
					10	Int.	●	MVS0660X10S080	67.2	2.646	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	8	.315	8
					15	Int.	★	MVS0660X15S070	100.2	3.945	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	7	.276	8
					15	Int.	●	MVS0660X15S080	100.2	3.945	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	8	.315	8
					20	Int.	★	MVS0660X20S070	133.2	5.244	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	7	.276	8
					20	Int.	●	MVS0660X20S080	133.2	5.244	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	8	.315	8
					25	Int.	★	MVS0660X25S070	166.2	6.543	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	7	.276	8
					25	Int.	●	MVS0660X25S080	166.2	6.543	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	8	.315	8
					30	Int.	★	MVS0660X30S070	199.2	7.843	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	7	.276	8
					30	Int.	●	MVS0660X30S080	199.2	7.843	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	8	.315	8
					35	Int.	□	MVS0660X35S070	232.2	9.142	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	7	.276	8
					35	Int.	□	MVS0660X35S080	232.2	9.142	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	8	.315	8
					40	Int.	□	MVS0660X40S070	265.2	10.441	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	7	.276	8
					40	Int.	□	MVS0660X40S080	265.2	10.441	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	8	.315	8
6.700	.2638			M8x1.25	2	Ext.	★	MVE0670X02S070	14.6	.575	35.2	1.386	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	7	.276	2
					2	Ext.	●	MVE0670X02S080	14.6	.575	35.2	1.386	37.2	1.465	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	★	MVS0670X02S070PL	14.5	.571	35.1	1.382	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	4
					2	Int.	●	MVS0670X02S080PL	14.5	.571	35.1	1.382	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	8	.315	4
					3	Ext.	★	MVE0670X03S070	21.3	.839	44.2	1.740	44.2	1.740	84.2	3.315	83	3.268	1.2	.047	7	.276	2
					3	Ext.	★	MVE0670X03S080	21.3	.839	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	8	.315	2
					3	Int.	★	MVS0670X03S070	21.3	.839	36.2	1.425	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	7	.276	6
					3	Int.	●	MVS0670X03S080	21.3	.839	36.2	1.425	38.2	1.504	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	★	MVS0670X05S070	34.7	1.366	57.2	2.252	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	7	.276	6
					5	Int.	●	MVS0670X05S080	34.7	1.366	57.2	2.252	59.2	2.331	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	★	MVS0670X08S070	54.8	2.157	78.2	3.079	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	7	.276	6
					8	Int.	●	MVS0670X08S080	54.8	2.157	78.2	3.079	80.2	3.157	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	★	MVS0670X10S070	68.2	2.685	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	7	.276	8
					10	Int.	●	MVS0670X10S080	68.2	2.685	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	8	.315	8
					15	Int.	★	MVS0670X15S070	101.7	4.004	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	7	.276	8
					15	Int.	●	MVS0670X15S080	101.7	4.004	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	8	.315	8
					20	Int.	★	MVS0670X20S070	135.2	5.323	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	7	.276	8
					20	Int.	●	MVS0670X20S080	135.2	5.323	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	8	.315	8
					25	Int.	★	MVS0670X25S070	168.7	6.642	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	7	.276	8
					25	Int.	●	MVS0670X25S080	168.7	6.642	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	8	.315	8
					30	Int.	★	MVS0670X30S070	202.2	7.961	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	7	.276	8
					30	Int.	●	MVS0670X30S080	202.2	7.961	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	8	.315	8
					35	Int.	□	MVS0670X35S070	235.7	9.280	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	7	.276	8
					35	Int.	□	MVS0670X35S080	235.7	9.280	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	8	.315	8
					40	Int.	□	MVS0670X40S070	269.2	10.598	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	7	.276	8
					40	Int.	□	MVS0670X40S080	269.2	10.598	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	8	.315	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan □ : Made to Order

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.747	.2657	17/64			2	Ext.	●	MVE0675X02S080	14.6	.575	35.2	1.386	37.2	1.465	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	●	MVS0675X02S080PL	14.6	.575	35.1	1.382	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	8	.315	4
					3	Int.	●	MVS0675X03S080	21.5	.846	36.2	1.425	38.2	1.504	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	●	MVS0675X05S080	34.9	1.374	57.2	2.252	59.2	2.331	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	●	MVS0675X08S080	55.2	2.173	78.2	3.079	80.2	3.157	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	●	MVS0675X10S080	68.7	2.705	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	8	.315	8
					15	Int.	●	MVS0675X15S080	102.4	4.031	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	8	.315	8
					20	Int.	●	MVS0675X20S080	136.1	5.358	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	8	.315	8
					25	Int.	●	MVS0675X25S080	169.9	6.689	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	8	.315	8
					30	Int.	●	MVS0675X30S080	203.6	8.016	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	8	.315	8
					35	Int.	●	MVS0675X35S080	237.3	9.343	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	8	.315	8
					40	Int.	●	MVS0675X40S080	271.1	10.673	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	8	.315	8
6.800	.2677				2	Ext.	★	MVE0680X02S070	14.8	.583	35.2	1.386	35.2	1.386	75.2	2.961	74	2.913	1.2	.047	7	.276	2
					2	Ext.	●	MVE0680X02S080	14.8	.583	35.2	1.386	37.2	1.465	75.2	2.961	74	2.913	1.2	.047	8	.315	2
					2	Int.	★	MVS0680X02S070PL	14.7	.579	35.1	1.382	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	4
					2	Int.	●	MVS0680X02S080PL	14.7	.579	35.1	1.382	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	8	.315	4
					3	Ext.	★	MVE0680X03S070	21.6	.850	44.2	1.740	44.2	1.740	84.2	3.315	83	3.268	1.2	.047	7	.276	2
					3	Ext.	★	MVE0680X03S080	21.6	.850	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	8	.315	2
					3	Int.	★	MVS0680X03S070	21.6	.850	36.2	1.425	36.2	1.425	89.2	3.512	88	3.465	1.2	.047	7	.276	6
					3	Int.	●	MVS0680X03S080	21.6	.850	36.2	1.425	38.2	1.504	89.2	3.512	88	3.465	1.2	.047	8	.315	6
					5	Int.	★	MVS0680X05S070	35.2	1.386	57.2	2.252	57.2	2.252	110.2	4.339	109	4.291	1.2	.047	7	.276	6
					5	Int.	●	MVS0680X05S080	35.2	1.386	57.2	2.252	59.2	2.331	110.2	4.339	109	4.291	1.2	.047	8	.315	6
					8	Int.	★	MVS0680X08S070	55.6	2.189	78.2	3.079	78.2	3.079	131.2	5.165	130	5.118	1.2	.047	7	.276	6
					8	Int.	●	MVS0680X08S080	55.6	2.189	78.2	3.079	80.2	3.157	131.2	5.165	130	5.118	1.2	.047	8	.315	6
					10	Int.	★	MVS0680X10S070	69.2	2.724	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	7	.276	8
					10	Int.	●	MVS0680X10S080	69.2	2.724	92.2	3.630	95.2	3.748	148.2	5.835	147	5.787	1.2	.047	8	.315	8
					15	Int.	★	MVS0680X15S070	103.2	4.063	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	7	.276	8
					15	Int.	●	MVS0680X15S080	103.2	4.063	127.2	5.008	130.2	5.126	183.2	7.213	182	7.165	1.2	.047	8	.315	8
					20	Int.	★	MVS0680X20S070	137.2	5.402	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	7	.276	8
					20	Int.	●	MVS0680X20S080	137.2	5.402	162.2	6.386	165.2	6.504	218.2	8.591	217	8.543	1.2	.047	8	.315	8
					25	Int.	★	MVS0680X25S070	171.2	6.740	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	7	.276	8
					25	Int.	●	MVS0680X25S080	171.2	6.740	197.2	7.764	200.2	7.882	253.2	9.969	252	9.921	1.2	.047	8	.315	8
					30	Int.	★	MVS0680X30S070	205.2	8.079	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	7	.276	8
					30	Int.	●	MVS0680X30S080	205.2	8.079	232.2	9.142	235.2	9.260	288.2	11.346	287	11.299	1.2	.047	8	.315	8
					35	Int.	□	MVS0680X35S070	239.2	9.417	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	7	.276	8
					35	Int.	□	MVS0680X35S080	239.2	9.417	267.2	10.520	270.2	10.638	323.2	12.724	322	12.677	1.2	.047	8	.315	8
					40	Int.	□	MVS0680X40S070	273.2	10.756	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	7	.276	8
					40	Int.	□	MVS0680X40S080	273.2	10.756	301.2	11.858	304.2	11.976	357.2	14.063	356	14.016	1.2	.047	8	.315	8

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
6.900	.2717		I	5/16-24	2	Ext.	★	MVE0690X02S070	15.1	.594	35.3	1.390	35.3	1.390	75.3	2.965	74	2.913	1.3	.051	7	.276	2
					2	Ext.	●	MVE0690X02S080	15.1	.594	35.3	1.390	37.3	1.469	75.3	2.965	74	2.913	1.3	.051	8	.315	2
					2	Int.	★	MVS0690X02S070PL	14.9	.587	35.1	1.382	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	4
					2	Int.	●	MVS0690X02S080PL	14.9	.587	35.1	1.382	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	8	.315	4
					3	Ext.	★	MVE0690X03S070	22.0	.866	44.3	1.744	44.3	1.744	84.3	3.319	83	3.268	1.3	.051	7	.276	2
					3	Ext.	★	MVE0690X03S080	22.0	.866	44.3	1.744	46.3	1.823	84.3	3.319	83	3.268	1.3	.051	8	.315	2
					3	Int.	★	MVS0690X03S070	22.0	.866	36.3	1.429	36.3	1.429	89.3	3.516	88	3.465	1.3	.051	7	.276	6
					3	Int.	●	MVS0690X03S080	22.0	.866	36.3	1.429	38.3	1.508	89.3	3.516	88	3.465	1.3	.051	8	.315	6
					5	Int.	★	MVS0690X05S070	35.8	1.409	57.3	2.256	57.3	2.256	110.3	4.343	109	4.291	1.3	.051	7	.276	6
					5	Int.	●	MVS0690X05S080	35.8	1.409	57.3	2.256	59.3	2.335	110.3	4.343	109	4.291	1.3	.051	8	.315	6
					8	Int.	★	MVS0690X08S070	56.5	2.224	78.3	3.083	78.3	3.083	131.3	5.169	130	5.118	1.3	.051	7	.276	6
					8	Int.	●	MVS0690X08S080	56.5	2.226	78.3	3.083	80.3	3.161	131.3	5.169	130	5.118	1.3	.051	8	.315	6
					10	Int.	★	MVS0690X10S070	70.3	2.768	92.3	3.634	95.3	3.752	148.3	5.839	147	5.787	1.3	.051	7	.276	8
					10	Int.	●	MVS0690X10S080	70.3	2.768	92.3	3.634	95.3	3.752	148.3	5.839	147	5.787	1.3	.051	8	.315	8
					15	Int.	★	MVS0690X15S070	104.8	4.126	127.3	5.012	130.3	5.130	183.3	7.217	182	7.165	1.3	.051	7	.276	8
					15	Int.	●	MVS0690X15S080	104.8	4.126	127.3	5.012	130.3	5.130	183.3	7.217	182	7.165	1.3	.051	8	.315	8
					20	Int.	★	MVS0690X20S070	139.3	5.484	162.3	6.390	165.3	6.508	218.3	8.594	217	8.543	1.3	.051	7	.276	8
					20	Int.	●	MVS0690X20S080	139.3	5.484	162.3	6.390	165.3	6.508	218.3	8.594	217	8.543	1.3	.051	8	.315	8
					25	Int.	★	MVS0690X25S070	173.8	6.843	197.3	7.768	200.3	7.886	253.3	9.972	252	9.921	1.3	.051	7	.276	8
					25	Int.	●	MVS0690X25S080	173.8	6.843	197.3	7.768	200.3	7.886	253.3	9.972	252	9.921	1.3	.051	8	.315	8
					30	Int.	★	MVS0690X30S070	208.3	8.201	232.3	9.146	235.3	9.264	288.3	11.350	287	11.299	1.3	.051	7	.276	8
					30	Int.	●	MVS0690X30S080	208.3	8.201	232.3	9.146	235.3	9.264	288.3	11.350	287	11.299	1.3	.051	8	.315	8
					35	Int.	□	MVS0690X35S070	242.8	9.559	267.3	10.524	270.3	10.642	323.3	12.728	322	12.677	1.3	.051	7	.276	8
					35	Int.	□	MVS0690X35S080	242.8	9.559	267.3	10.524	270.3	10.642	323.3	12.728	322	12.677	1.3	.051	8	.315	8
					40	Int.	□	MVS0690X40S070	277.3	10.917	301.3	11.862	304.3	11.980	357.3	14.067	356	14.016	1.3	.051	7	.276	8
					40	Int.	□	MVS0690X40S080	277.3	10.917	301.3	11.862	304.3	11.980	357.3	14.067	356	14.016	1.3	.051	8	.315	8
7.000	.2756			M8x1.0	2	Ext.	★	MVE0700X02S070	15.3	.602	35.3	1.390	35.3	1.390	75.3	2.965	74	2.913	1.3	.051	7	.276	2
					2	Ext.	●	MVE0700X02S080	15.3	.602	35.3	1.390	37.3	1.469	75.3	2.965	74	2.913	1.3	.051	8	.315	2
					2	Int.	★	MVS0700X02S070PL	15.1	.594	35.1	1.382	35.1	1.382	75.1	2.957	74	2.913	1.1	.043	7	.276	4
					2	Int.	●	MVS0700X02S080PL	15.1	.594	35.1	1.382	37.1	1.461	75.1	2.957	74	2.913	1.1	.043	8	.315	4
					3	Ext.	★	MVE0700X03S070	22.3	.878	44.3	1.744	44.3	1.744	84.3	3.319	83	3.268	1.3	.051	7	.276	2
					3	Ext.	★	MVE0700X03S080	22.3	.878	44.3	1.744	46.3	1.823	84.3	3.319	83	3.268	1.3	.051	8	.315	2
					3	Int.	★	MVS0700X03S070	22.3	.878	36.3	1.429	36.3	1.429	89.3	3.516	88	3.465	1.3	.051	7	.276	6
					3	Int.	●	MVS0700X03S080	22.3	.878	36.3	1.429	38.3	1.508	89.3	3.516	88	3.465	1.3	.051	8	.315	6
					5	Int.	★	MVS0700X05S070	36.3	1.429	57.3	2.256	57.3	2.256	110.3	4.343	109	4.291	1.3	.051	7	.276	6
					5	Int.	●	MVS0700X05S080	36.3	1.429	57.3	2.256	59.3	2.335	110.3	4.343	109	4.291	1.3	.051	8	.315	6
					8	Int.	★	MVS0700X08S070	57.3	2.256	78.3	3.083	78.3	3.083	131.3	5.169	130	5.118	1.3	.051	7	.276	6
					8	Int.	●	MVS0700X08S080	57.3	2.256	78.3	3.083	80.3	3.161	131.3	5.169	130	5.118	1.3	.051	8	.315	6
					10	Int.	★	MVS0700X10S070	71.3	2.807	92.3	3.634	95.3	3.752	148.3	5.839	147	5.787	1.3	.051	7	.276	8
					10	Int.	●	MVS0700X10S080	71.3	2.807	92.3	3.634	95.3	3.752	148.3	5.839	147	5.787	1.3	.051	8	.315	8
					15	Int.	★	MVS0700X15S070	106.3	4.185	127.3	5.012	130.3	5.130	183.3	7.217	182	7.165	1.3	.051	7	.276	8
					15	Int.	●	MVS0700X15S080	106.3	4.185	127.3	5.012	130.3	5.130	183.3	7.217	182	7.165	1.3	.051	8	.315	8
					20	Int.	★	MVS0700X20S070	141.3	5.563	162.3	6.390	165.3	6.508	218.3	8.594	217	8.543	1.3	.051	7	.276	8
					20	Int.	●	MVS0700X20S080	141.3	5.563	162.3	6.390	165.3	6.508	218.3	8.594	217	8.543	1.3	.051	8	.315	8
					25	Int.	★	MVS0700X25S070	176.3	6.941	197.3	7.768	200.3	7.886	253.3	9.972	252	9.921	1.3	.051	7	.276	8
					25	Int.	●	MVS0700X25S080	176.3	6.941	197.3	7.768	200.3	7.886	253.3	9.972	252	9.921	1.3	.051	8	.315	8
					30	Int.	★	MVS0700X30S070	211.3	8.319	232.3	9.146	235.3	9.264	288.3	11.350	287	11.299	1.3	.051	7	.276	8
					30	Int.	●	MVS0700X30S080	211.3	8.319	232.3	9.146	235.3	9.264	288.3	11.350	287	11.299	1.3	.051	8	.315	8
					35	Int.	★	MVS0700X35S070	246.3	9.697	267.3	10.524	270.3	10.642	323.3	12.728	322	12.677	1.3	.051	7	.276	8
					35	Int.	●	MVS0700X35S080	246.3	9.697	267.3	10.524	270.3	10.642	323.3	12.728	322	12.677	1.3	.051	8	.315	8
					40	Int.	★	MVS0700X40S070	281.3	11.075	301.3	11.862	304.3	11.980	357.3	14.067	356	14.016	1.3	.051	7	.276	8
					40	Int.	●	MVS0700X40S080	281.3	11.075	301.3	11.862	304.3	11.980	357.3	14.067	356	14.016	1.3	.051	8	.315	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan □ : Made to Order

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
7.100	.2795				2	Ext.	●	MVE0710X02S080	15.5	.610	35.3	1.390	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	2
					2	Int.	●	MVS0710X02S080PL	15.3	.602	35.1	1.382	38.1	1.500	80.1	3.154	79	3.110	1.1	.043	8	.315	4
					3	Ext.	★	MVE0710X03S080	22.6	.890	46.3	1.823	49.3	1.941	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					3	Int.	●	MVS0710X03S080	22.6	.890	38.8	1.528	41.3	1.626	95.3	3.752	94	3.701	1.3	.051	8	.315	6
					5	Int.	●	MVS0710X05S080	36.8	1.449	61.3	2.413	65.3	2.571	119.3	4.697	118	4.646	1.3	.051	8	.315	6
					8	Int.	●	MVS0710X08S080	58.1	2.287	84.3	3.319	89.3	3.516	143.3	5.642	142	5.591	1.3	.051	8	.315	6
					10	Int.	★	MVS0710X10S080	72.3	2.846	99.3	3.909	102.3	4.028	156.3	6.154	155	6.102	1.3	.051	8	.315	8
					15	Int.	★	MVS0710X15S080	107.8	4.244	136.3	5.366	139.3	5.484	193.3	7.610	192	7.559	1.3	.051	8	.315	8
					20	Int.	★	MVS0710X20S080	143.3	5.642	174.3	6.862	177.3	6.980	231.3	9.106	230	9.055	1.3	.051	8	.315	8
					25	Int.	★	MVS0710X25S080	178.8	7.039	211.3	8.319	214.3	8.437	268.3	10.563	267	10.512	1.3	.051	8	.315	8
					30	Int.	★	MVS0710X30S080	214.3	8.437	249.3	9.815	252.3	9.933	306.3	12.059	305	12.008	1.3	.051	8	.315	8
					35	Int.	□	MVS0710X35S080	249.8	9.835	286.3	11.272	289.3	11.390	343.3	13.516	342	13.465	1.3	.051	8	.315	8
					40	Int.	□	MVS0710X40S080	285.3	11.232	321.3	12.650	324.3	12.768	378.3	14.894	377	14.843	1.3	.051	8	.315	8
7.144	.2813	9/32	K		2	Ext.	●	MVE0714X02S080	15.5	.610	35.3	1.390	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	2
					2	Int.	●	MVS0714X02S080PL	15.5	.610	35.1	1.382	38.1	1.500	80.1	3.154	79	3.110	1.1	.043	8	.315	4
					3	Int.	●	MVS0714X03S080	22.7	.894	38.8	1.528	41.3	1.626	95.3	3.752	94	3.701	1.3	.051	8	.315	6
					5	Int.	●	MVS0714X05S080	37.0	1.457	61.3	2.413	65.3	2.571	119.3	4.697	118	4.646	1.3	.051	8	.315	6
					8	Int.	●	MVS0714X08S080	58.4	2.299	84.3	3.319	89.3	3.516	143.3	5.642	142	5.591	1.3	.051	8	.315	6
					10	Int.	●	MVS0714X10S080	72.7	2.862	99.3	3.909	102.3	4.028	156.3	6.154	155	6.102	1.3	.051	8	.315	8
					15	Int.	●	MVS0714X15S080	108.4	4.268	136.3	5.366	139.3	5.484	193.3	7.610	192	7.559	1.3	.051	8	.315	8
					20	Int.	●	MVS0714X20S080	144.1	5.673	174.3	6.862	177.3	6.980	231.3	9.106	230	9.055	1.3	.051	8	.315	8
					25	Int.	●	MVS0714X25S080	179.8	7.079	211.3	8.319	214.3	8.437	268.3	10.563	267	10.512	1.3	.051	8	.315	8
					30	Int.	●	MVS0714X30S080	215.5	8.484	249.3	9.815	252.3	9.933	306.3	12.059	305	12.008	1.3	.051	8	.315	8
					35	Int.	●	MVS0714X35S080	251.3	9.894	286.3	11.272	289.3	11.390	343.3	13.516	342	13.465	1.3	.051	8	.315	8
					40	Int.	●	MVS0714X40S080	287.0	11.299	321.3	12.650	324.3	12.768	378.3	14.894	377	14.843	1.3	.051	8	.315	8
7.200	.2835				2	Ext.	●	MVE0720X02S080	15.7	.618	35.3	1.390	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	2
					2	Int.	●	MVS0720X02S080PL	15.5	.610	35.1	1.382	38.1	1.500	80.1	3.154	79	3.110	1.1	.043	8	.315	4
					3	Ext.	★	MVE0720X03S080	22.9	.902	46.3	1.823	49.3	1.941	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					3	Int.	●	MVS0720X03S080	22.9	.902	38.8	1.528	41.3	1.626	95.3	3.752	94	3.701	1.3	.051	8	.315	6
					5	Int.	●	MVS0720X05S080	37.3	1.469	61.3	2.413	65.3	2.571	119.3	4.697	118	4.646	1.3	.051	8	.315	6
					8	Int.	●	MVS0720X08S080	58.9	2.319	84.3	3.319	89.3	3.516	143.3	5.642	142	5.591	1.3	.051	8	.315	6
					10	Int.	★	MVS0720X10S080	73.3	2.886	99.3	3.909	102.3	4.028	156.3	6.154	155	6.102	1.3	.051	8	.315	8
					15	Int.	★	MVS0720X15S080	109.3	4.303	136.3	5.366	139.3	5.484	193.3	7.610	192	7.559	1.3	.051	8	.315	8
					20	Int.	★	MVS0720X20S080	145.3	5.720	174.3	6.862	177.3	6.980	231.3	9.106	230	9.055	1.3	.051	8	.315	8
					25	Int.	★	MVS0720X25S080	181.3	7.138	211.3	8.319	214.3	8.437	268.3	10.563	267	10.512	1.3	.051	8	.315	8
					30	Int.	★	MVS0720X30S080	217.3	8.555	249.3	9.815	252.3	9.933	306.3	12.059	305	12.008	1.3	.051	8	.315	8
					35	Int.	□	MVS0720X35S080	253.3	9.972	286.3	11.272	289.3	11.390	343.3	13.516	342	13.465	1.3	.051	8	.315	8
					40	Int.	□	MVS0720X40S080	289.3	11.390	321.3	12.650	324.3	12.768	378.3	14.894	377	14.843	1.3	.051	8	.315	8
7.300	.2874				2	Ext.	●	MVE0730X02S080	15.9	.626	35.3	1.390	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	2
					2	Int.	●	MVS0730X02S080PL	15.8	.622	35.2	1.386	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0730X03S080	23.2	.913	46.3	1.823	49.3	1.941	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					3	Int.	●	MVS0730X03S080	23.2	.913	38.8	1.528	41.3	1.626	95.3	3.752	94	3.701	1.3	.051	8	.315	6
					5	Int.	●	MVS0730X05S080	37.8	1.488	61.3	2.413	65.3	2.571	119.3	4.697	118	4.646	1.3	.051	8	.315	6
					8	Int.	●	MVS0730X08S080	59.7	2.350	84.3	3.319	89.3	3.516	143.3	5.642	142	5.591	1.3	.051	8	.315	6
					10	Int.	★	MVS0730X10S080	74.3	2.925	99.3	3.909	102.3	4.028	156.3	6.154	155	6.102	1.3	.051	8	.315	8
					15	Int.	★	MVS0730X15S080	110.8	4.362	136.3	5.366	139.3	5.484	193.3	7.610	192	7.559	1.3	.051	8	.315	8
					20	Int.	★	MVS0730X20S080	147.3	5.799	174.3	6.862	177.3	6.980	231.3	9.106	230	9.055	1.3	.051	8	.315	8
					25	Int.	★	MVS0730X25S080	183.8	7.236	211.3	8.319	214.3	8.437	268.3	10.563	267	10.512	1.3	.051	8	.315	8
					30	Int.	★	MVS0730X30S080	220.3	8.673	249.3	9.815	252.3	9.933	306.3	12.059	305	12.008	1.3	.051	8	.315	8
					35	Int.	□	MVS0730X35S080	256.8	10.110	286.3	11.272	289.3	11.390	343.3	13.516	342	13.465	1.3	.051	8	.315	8
					40	Int.	□	MVS0730X40S080	293.3	11.547	321.3	12.650	324.3	12.768	378.3	14.894	377	14.843	1.3	.051	8	.315	8

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
7.400	.2913				2	Ext.	●	MVE0740X02S080	16.1	.634	35.3	1.390	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	2
					2	Int.	●	MVS0740X02S080PL	16.0	.630	35.2	1.386	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0740X03S080	23.5	.925	46.3	1.823	49.3	1.941	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					3	Int.	●	MVS0740X03S080	23.5	.925	38.8	1.528	41.3	1.626	95.3	3.752	94	3.701	1.3	.051	8	.315	6
					5	Int.	●	MVS0740X05S080	38.3	1.508	61.3	2.413	65.3	2.571	119.3	4.697	118	4.646	1.3	.051	8	.315	6
					8	Int.	●	MVS0740X08S080	60.5	2.382	84.3	3.319	89.3	3.516	143.3	5.642	142	5.591	1.3	.051	8	.315	6
					10	Int.	★	MVS0740X10S080	75.3	2.965	99.3	3.909	102.3	4.031	156.3	6.154	155	6.102	1.3	.051	8	.315	8
					15	Int.	★	MVS0740X15S080	112.3	4.421	136.3	5.366	139.3	5.488	193.3	7.610	192	7.559	1.3	.051	8	.315	8
					20	Int.	★	MVS0740X20S080	149.3	5.878	174.3	6.862	177.3	6.984	231.3	9.106	230	9.055	1.3	.051	8	.315	8
					25	Int.	★	MVS0740X25S080	186.3	7.335	211.3	8.319	214.3	8.441	268.3	10.563	267	10.512	1.3	.051	8	.315	8
					30	Int.	★	MVS0740X30S080	223.3	8.791	249.3	9.815	252.3	9.937	306.3	12.059	305	12.008	1.3	.051	8	.315	8
					35	Int.	□	MVS0740X35S080	260.3	10.248	286.3	11.272	289.3	11.394	343.3	13.516	342	13.465	1.3	.051	8	.315	8
					40	Int.	□	MVS0740X40S080	297.3	11.705	321.3	12.650	324.3	12.772	378.3	14.894	377	14.843	1.3	.051	8	.315	8
7.500	.2953		M		2	Ext.	●	MVE0750X02S080	16.4	.646	35.4	1.394	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0750X02S080PL	16.2	.638	35.2	1.386	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0750X03S080	23.9	.941	46.4	1.827	49.4	1.945	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					3	Int.	●	MVS0750X03S080	23.9	.941	38.9	1.531	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0750X05S080	38.9	1.531	61.4	2.417	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0750X08S080	61.4	2.417	84.4	3.323	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	●	MVS0750X10S080	76.4	3.008	99.4	3.913	102.4	4.031	156.4	6.157	155	6.102	1.4	.055	8	.315	8
					15	Int.	★	MVS0750X15S080	113.9	4.484	136.4	5.370	139.4	5.488	193.4	7.614	192	7.559	1.4	.055	8	.315	8
					20	Int.	★	MVS0750X20S080	151.4	5.961	174.4	6.866	177.4	6.984	231.4	9.110	230	9.055	1.4	.055	8	.315	8
					25	Int.	★	MVS0750X25S080	188.9	7.437	211.4	8.323	214.4	8.441	268.4	10.567	267	10.512	1.4	.055	8	.315	8
					30	Int.	★	MVS0750X30S080	226.4	8.913	249.4	9.819	252.4	9.937	306.4	12.063	305	12.008	1.4	.055	8	.315	8
					35	Int.	●	MVS0750X35S080	263.9	10.390	286.4	11.276	289.4	11.394	343.4	13.520	342	13.465	1.4	.055	8	.315	8
					40	Int.	●	MVS0750X40S080	301.4	11.866	321.4	12.654	324.4	12.772	378.4	14.898	377	14.843	1.4	.055	8	.315	8
7.541	.2969	19/64			2	Ext.	●	MVE0754X02S080	16.4	.646	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0754X02S080PL	16.4	.646	38.2	1.504	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Int.	●	MVS0754X03S080	24.0	.945	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0754X05S080	39.1	1.539	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0754X08S080	61.7	2.429	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	●	MVS0754X10S080	76.8	3.024	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	●	MVS0754X15S080	114.5	4.508	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	●	MVS0754X20S080	152.2	5.992	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	●	MVS0754X25S080	189.9	7.478	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	●	MVS0754X30S080	227.6	8.961	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	●	MVS0754X35S080	265.3	10.445	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	●	MVS0754X40S080	303.0	11.929	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8
7.600	.2992				2	Ext.	●	MVE0760X02S080	16.6	.654	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0760X02S080PL	16.4	.646	38.2	1.504	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0760X03S080	24.2	.953	49.4	1.945	49.4	1.945	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					3	Int.	●	MVS0760X03S080	24.2	.953	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0760X05S080	39.4	1.551	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0760X08S080	62.2	2.449	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	★	MVS0760X10S080	77.4	3.047	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	★	MVS0760X15S080	115.1	4.531	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	★	MVS0760X20S080	153.4	6.039	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	★	MVS0760X25S080	191.4	7.535	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	★	MVS0760X30S080	229.4	9.031	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	□	MVS0760X35S080	267.4	10.528	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	□	MVS0760X40S080	305.4	12.024	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan □ : Made to Order

M

DRILLING

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
7.700	.3031				2	Ext.	●	MVE0770X02S080	16.8	.661	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0770X02S080PL	16.6	.654	38.2	1.504	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0770X03S080	24.5	.965	49.4	1.945	49.4	1.945	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					3	Int.	●	MVS0770X03S080	24.5	.965	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0770X05S080	39.9	1.571	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0770X08S080	63.0	2.480	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	★	MVS0770X10S080	78.4	3.087	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	★	MVS0770X15S080	116.9	4.602	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	★	MVS0770X20S080	155.4	6.118	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	★	MVS0770X25S080	193.9	7.634	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	★	MVS0770X30S080	232.4	9.150	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	□	MVS0770X35S080	270.9	10.665	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	□	MVS0770X40S080	309.4	12.181	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8
7.800	.3071				2	Ext.	●	MVE0780X02S080	17.0	.669	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0780X02S080PL	16.8	.661	38.2	1.504	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0780X03S080	24.8	.976	49.4	1.945	49.4	1.945	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					3	Int.	●	MVS0780X03S080	24.8	.976	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0780X05S080	40.4	1.591	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0780X08S080	63.8	2.512	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	★	MVS0780X10S080	79.4	3.126	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	●	MVS0780X15S080	118.4	4.661	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	★	MVS0780X20S080	157.4	6.197	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	★	MVS0780X25S080	196.4	7.732	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	★	MVS0780X30S080	235.4	9.268	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	□	MVS0780X35S080	274.4	10.803	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	□	MVS0780X40S080	313.4	12.339	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8
7.900	.3110				2	Ext.	●	MVE0790X02S080	17.2	.677	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0790X02S080PL	17.0	.669	38.2	1.504	38.2	1.504	80.2	3.157	79	3.110	1.2	.047	8	.315	4
					3	Ext.	★	MVE0790X03S080	25.1	.988	49.4	1.945	49.4	1.945	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					3	Int.	●	MVS0790X03S080	25.1	.988	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0790X05S080	40.9	1.610	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0790X08S080	64.6	2.543	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	★	MVS0790X10S080	80.4	3.165	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	★	MVS0790X15S080	119.9	4.720	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	★	MVS0790X20S080	159.4	6.276	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	★	MVS0790X25S080	198.9	7.831	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	★	MVS0790X30S080	238.4	9.386	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	□	MVS0790X35S080	277.9	10.941	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	□	MVS0790X40S080	317.4	12.496	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8
7.938	.3125	5/16		3/8-16	2	Ext.	●	MVE0794X02S080	17.2	.677	38.4	1.512	38.4	1.512	80.4	3.165	79	3.110	1.4	.055	8	.315	2
					2	Int.	●	MVS0794X02S080PL	17.2	.677	38.3	1.508	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	4
					3	Int.	●	MVS0794X03S080	25.2	.992	41.4	1.630	41.4	1.630	95.4	3.756	94	3.701	1.4	.055	8	.315	6
					5	Int.	●	MVS0794X05S080	41.1	1.618	65.4	2.575	65.4	2.575	119.4	4.701	118	4.646	1.4	.055	8	.315	6
					8	Int.	●	MVS0794X08S080	64.9	2.555	89.4	3.520	89.4	3.520	143.4	5.646	142	5.591	1.4	.055	8	.315	6
					10	Int.	●	MVS0794X10S080	80.8	3.181	105.4	4.150	108.4	4.268	162.4	6.394	161	6.339	1.4	.055	8	.315	8
					15	Int.	●	MVS0794X15S080	120.5	4.744	145.4	5.724	148.4	5.843	202.4	7.969	201	7.913	1.4	.055	8	.315	8
					20	Int.	●	MVS0794X20S080	160.2	6.307	185.4	7.299	188.4	7.417	242.4	9.543	241	9.488	1.4	.055	8	.315	8
					25	Int.	●	MVS0794X25S080	199.9	7.870	225.4	8.874	228.4	8.992	282.4	11.118	281	11.063	1.4	.055	8	.315	8
					30	Int.	●	MVS0794X30S080	239.6	9.433	265.4	10.449	268.4	10.567	322.4	12.693	321	12.638	1.4	.055	8	.315	8
					35	Int.	●	MVS0794X35S080	279.3	10.996	305.4	12.024	308.4	12.142	362.4	14.268	361	14.213	1.4	.055	8	.315	8
					40	Int.	●	MVS0794X40S080	318.9	12.555	341.4	13.441	344.4	13.559	398.4	15.685	397	15.630	1.4	.055	8	.315	8

M

DRILLING

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
8.000	.3150				2	Ext.	●	MVE0800X02S080	17.5	.689	38.5	1.516	38.5	1.516	80.5	3.169	79	3.110	1.5	.059	8	.315	2
					2	Int.	●	MVS0800X02S080PL	17.3	.681	38.3	1.508	38.3	1.508	80.3	3.161	79	3.110	1.3	.051	8	.315	4
					3	Ext.	★	MVE0800X03S080	25.5	1.004	49.5	1.949	49.5	1.949	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					3	Int.	●	MVS0800X03S080	25.5	1.004	41.5	1.634	41.5	1.634	95.5	3.760	94	3.701	1.5	.059	8	.315	6
					5	Int.	●	MVS0800X05S080	41.5	1.634	65.5	2.579	65.5	2.579	119.5	4.705	118	4.646	1.5	.059	8	.315	6
					8	Int.	●	MVS0800X08S080	65.5	2.579	89.5	3.524	89.5	3.524	143.5	5.650	142	5.591	1.5	.059	8	.315	6
					10	Int.	●	MVS0800X10S080	81.5	3.209	105.5	4.154	108.5	4.272	162.5	6.398	161	6.339	1.5	.059	8	.315	8
					15	Int.	●	MVS0800X15S080	121.5	4.783	145.5	5.728	148.5	5.846	202.5	7.972	201	7.913	1.5	.059	8	.315	8
					20	Int.	●	MVS0800X20S080	161.5	6.358	185.5	7.303	188.5	7.421	242.5	9.547	241	9.488	1.5	.059	8	.315	8
					25	Int.	★	MVS0800X25S080	201.5	7.933	225.5	8.878	228.5	8.996	282.5	11.122	281	11.063	1.5	.059	8	.315	8
					30	Int.	●	MVS0800X30S080	241.5	9.508	265.5	10.453	268.5	10.571	322.5	12.697	321	12.638	1.5	.059	8	.315	8
					35	Int.	●	MVS0800X35S080	281.5	11.083	305.5	12.028	308.5	12.146	362.5	14.272	361	14.213	1.5	.059	8	.315	8
					40	Int.	●	MVS0800X40S080	321.5	12.657	341.5	13.445	344.5	13.563	398.5	15.689	397	15.630	1.5	.059	8	.315	8
8.100	.3189				2	Ext.	★	MVE0810X02S090	17.7	.697	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	9	.354	2
					2	Ext.	●	MVE0810X02S100	17.7	.697	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	★	MVS0810X02S090PL	17.5	.689	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	9	.354	4
					2	Int.	●	MVS0810X02S100PL	17.5	.689	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Ext.	★	MVE0810X03S090	25.8	1.016	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	9	.354	2
					3	Ext.	★	MVE0810X03S100	25.8	1.016	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	10	.394	2
					3	Int.	★	MVS0810X03S090	25.8	1.016	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	9	.354	6
					3	Int.	●	MVS0810X03S100	25.8	1.016	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	★	MVS0810X05S090	42.0	1.654	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	9	.354	6
					5	Int.	●	MVS0810X05S100	42.0	1.654	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	★	MVS0810X08S090	66.3	2.610	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	9	.354	6
					8	Int.	●	MVS0810X08S100	66.3	2.610	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	★	MVS0810X10S090	82.5	3.248	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	9	.354	8
					10	Int.	●	MVS0810X10S100	82.5	3.248	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	★	MVS0810X15S090	123.0	4.843	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	9	.354	8
					15	Int.	●	MVS0810X15S100	123.0	4.843	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	★	MVS0810X20S090	163.5	6.437	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	9	.354	8
					20	Int.	●	MVS0810X20S100	163.5	6.437	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	★	MVS0810X25S090	204.0	8.031	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	9	.354	8
					25	Int.	●	MVS0810X25S100	204.0	8.031	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	★	MVS0810X30S090	244.5	9.626	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	9	.354	8
					30	Int.	●	MVS0810X30S100	244.5	9.626	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	□	MVS0810X35S090	285.0	11.220	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	9	.354	8
					35	Int.	□	MVS0810X35S100	285.0	11.220	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	□	MVS0810X40S090	325.5	12.815	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	9	.354	8
					40	Int.	□	MVS0810X40S100	325.5	12.815	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
8.200	.3228		P		2	Ext.	★	MVE0820X02S090	17.9	.705	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	9	.354	2
					2	Ext.	●	MVE0820X02S100	17.9	.705	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	★	MVS0820X02S090PL	17.7	.697	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	9	.354	4
					2	Int.	●	MVS0820X02S100PL	17.7	.697	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Ext.	★	MVE0820X03S090	26.1	1.028	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	9	.354	2
					3	Ext.	★	MVE0820X03S100	26.1	1.028	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	10	.394	2
					3	Int.	★	MVS0820X03S090	26.1	1.028	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	9	.354	6
					3	Int.	●	MVS0820X03S100	26.1	1.028	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	★	MVS0820X05S090	42.5	1.673	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	9	.354	6
					5	Int.	●	MVS0820X05S100	42.5	1.673	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	★	MVS0820X08S090	67.1	2.642	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	9	.354	6
					8	Int.	●	MVS0820X08S100	67.1	2.642	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	★	MVS0820X10S090	83.5	3.287	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	9	.354	8
					10	Int.	●	MVS0820X10S100	83.5	3.287	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	★	MVS0820X15S090	124.5	4.902	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	9	.354	8
					15	Int.	●	MVS0820X15S100	124.5	4.902	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	★	MVS0820X20S090	165.5	6.516	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	9	.354	8
					20	Int.	●	MVS0820X20S100	165.5	6.516	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	★	MVS0820X25S090	206.5	8.130	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	9	.354	8
					25	Int.	●	MVS0820X25S100	206.5	8.130	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	★	MVS0820X30S090	247.5	9.744	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	9	.354	8
					30	Int.	●	MVS0820X30S100	247.5	9.744	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	□	MVS0820X35S090	288.5	11.358	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	9	.354	8
					35	Int.	□	MVS0820X35S100	288.5	11.358	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	□	MVS0820X40S090	329.5	12.972	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	9	.354	8
					40	Int.	□	MVS0820X40S100	329.5	12.972	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8
8.300	.3268				2	Ext.	★	MVE0830X02S090	18.1	.713	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	9	.354	2
					2	Ext.	●	MVE0830X02S100	18.1	.713	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	★	MVS0830X02S090PL	17.9	.705	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	9	.354	4
					2	Int.	●	MVS0830X02S100PL	17.9	.705	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Ext.	★	MVE0830X03S090	26.4	1.039	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	9	.354	2
					3	Ext.	★	MVE0830X03S100	26.4	1.039	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	10	.394	2
					3	Int.	★	MVS0830X03S090	26.4	1.039	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	9	.354	6
					3	Int.	●	MVS0830X03S100	26.4	1.039	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	★	MVS0830X05S090	43.0	1.693	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	9	.354	6
					5	Int.	●	MVS0830X05S100	43.0	1.693	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	★	MVS0830X08S090	67.9	2.673	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	9	.354	6
					8	Int.	●	MVS0830X08S100	67.9	2.673	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	★	MVS0830X10S090	84.5	3.327	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	9	.354	8
					10	Int.	●	MVS0830X10S100	84.5	3.327	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	★	MVS0830X15S090	126.0	4.961	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	9	.354	8
					15	Int.	●	MVS0830X15S100	126.0	4.961	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	★	MVS0830X20S090	167.5	6.594	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	9	.354	8
					20	Int.	●	MVS0830X20S100	167.5	6.594	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	★	MVS0830X25S090	209.0	8.228	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	9	.354	8
					25	Int.	●	MVS0830X25S100	209.0	8.228	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	★	MVS0830X30S090	250.5	9.862	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	9	.354	8
					30	Int.	●	MVS0830X30S100	250.5	9.862	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	□	MVS0830X35S090	292.0	11.496	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	9	.354	8
					35	Int.	□	MVS0830X35S100	292.0	11.496	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	□	MVS0830X40S090	333.5	13.130	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	9	.354	8
					40	Int.	□	MVS0830X40S100	333.5	13.130	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
									mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
8.335	.3282	21/64			2	Ext.	●	MVE0833X02S100	18.1	.713	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	●	MVS0833X02S100PL	18.1	.713	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Int.	●	MVS0833X03S100	26.5	1.043	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	●	MVS0833X05S100	43.2	1.701	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	●	MVS0833X08S100	68.2	2.685	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	●	MVS0833X10S100	84.8	3.339	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	●	MVS0833X15S100	126.5	4.980	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	●	MVS0833X20S100	168.2	6.622	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	●	MVS0833X25S100	209.9	8.264	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	●	MVS0833X30S100	251.5	9.902	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	●	MVS0833X35S100	293.2	11.543	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	●	MVS0833X40S100	334.9	13.185	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8
8.400	.3307				2	Ext.	★	MVE0840X02S090	18.3	.720	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	9	.354	2
					2	Ext.	●	MVE0840X02S100	18.3	.720	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	★	MVS0840X02S090PL	18.1	.713	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	9	.354	4
					2	Int.	●	MVS0840X02S100PL	18.1	.713	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Ext.	★	MVE0840X03S090	26.7	1.051	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	9	.354	2
					3	Ext.	★	MVE0840X03S100	26.7	1.051	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	10	.394	2
					3	Int.	★	MVS0840X03S090	26.7	1.051	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	9	.354	6
					3	Int.	●	MVS0840X03S100	26.7	1.051	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	★	MVS0840X05S090	43.5	1.713	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	9	.354	6
					5	Int.	●	MVS0840X05S100	43.5	1.713	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	★	MVS0840X08S090	68.7	2.705	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	9	.354	6
					8	Int.	●	MVS0840X08S100	68.7	2.705	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	★	MVS0840X10S090	85.5	3.366	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	9	.354	8
					10	Int.	●	MVS0840X10S100	85.5	3.366	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	★	MVS0840X15S090	127.5	5.020	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	9	.354	8
					15	Int.	●	MVS0840X15S100	127.5	5.020	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	★	MVS0840X20S090	169.5	6.673	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	9	.354	8
					20	Int.	●	MVS0840X20S100	169.5	6.673	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	★	MVS0840X25S090	211.5	8.327	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	9	.354	8
					25	Int.	●	MVS0840X25S100	211.5	8.327	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	★	MVS0840X30S090	253.5	9.980	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	9	.354	8
					30	Int.	●	MVS0840X30S100	253.5	9.980	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	□	MVS0840X35S090	295.5	11.634	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	9	.354	8
					35	Int.	□	MVS0840X35S100	295.5	11.634	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	□	MVS0840X40S090	337.5	13.287	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	9	.354	8
					40	Int.	□	MVS0840X40S100	337.5	13.287	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8
8.433	.3320		Q	3/8-24	2	Ext.	●	MVE0843X02S100	18.3	.720	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	●	MVS0843X02S100PL	18.3	.720	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Int.	●	MVS0843X03S100	26.8	1.055	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	●	MVS0843X05S100	43.7	1.720	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	●	MVS0843X08S100	69.0	2.717	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	●	MVS0843X10S100	85.8	3.378	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	●	MVS0843X15S100	128.0	5.039	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	●	MVS0843X20S100	170.2	6.701	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	●	MVS0843X25S100	212.3	8.358	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	●	MVS0843X30S100	254.5	10.020	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	●	MVS0843X35S100	296.7	11.681	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	●	MVS0843X40S100	338.8	13.339	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

M

DRILLING

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
									mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
8.500	.3346			M10x1.5	2	Ext.	★	MVE0850X02S090	18.5	.728	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	9	.354	2
					2	Ext.	●	MVE0850X02S100	18.5	.728	38.5	1.516	41.5	1.634	85.5	3.366	84	3.307	1.5	.059	10	.394	2
					2	Int.	★	MVS0850X02S090PL	18.3	.720	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	9	.354	4
					2	Int.	●	MVS0850X02S100PL	18.3	.720	38.3	1.508	41.3	1.626	85.3	3.358	84	3.307	1.3	.051	10	.394	4
					3	Ext.	★	MVE0850X03S090	27.0	1.063	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	9	.354	2
					3	Ext.	★	MVE0850X03S100	27.0	1.063	54.5	2.146	57.5	2.264	99.5	3.917	98	3.858	1.5	.059	10	.394	2
					3	Int.	★	MVS0850X03S090	27.0	1.063	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	9	.354	6
					3	Int.	●	MVS0850X03S100	27.0	1.063	44.0	1.732	46.5	1.831	101.5	3.996	100	3.937	1.5	.059	10	.394	6
					5	Int.	★	MVS0850X05S090	44.0	1.732	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	9	.354	6
					5	Int.	●	MVS0850X05S100	44.0	1.732	69.5	2.736	73.5	2.894	128.5	5.059	127	5.000	1.5	.059	10	.394	6
					8	Int.	★	MVS0850X08S090	69.5	2.736	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	9	.354	6
					8	Int.	●	MVS0850X08S100	69.5	2.736	95.5	3.760	100.5	3.957	155.5	6.122	154	6.063	1.5	.059	10	.394	6
					10	Int.	★	MVS0850X10S090	86.5	3.406	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	9	.354	8
					10	Int.	●	MVS0850X10S100	86.5	3.406	112.5	4.429	115.5	4.547	170.5	6.713	169	6.654	1.5	.059	10	.394	8
					15	Int.	★	MVS0850X15S090	129.0	5.079	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	9	.354	8
					15	Int.	●	MVS0850X15S100	129.0	5.079	154.5	6.083	157.5	6.201	212.5	8.366	211	8.307	1.5	.059	10	.394	8
					20	Int.	★	MVS0850X20S090	171.5	6.752	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	9	.354	8
					20	Int.	●	MVS0850X20S100	171.5	6.752	197.5	7.776	200.5	7.894	255.5	10.059	254	10.000	1.5	.059	10	.394	8
					25	Int.	★	MVS0850X25S090	214.0	8.425	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	9	.354	8
					25	Int.	●	MVS0850X25S100	214.0	8.425	239.5	9.429	242.5	9.547	297.5	11.713	296	11.654	1.5	.059	10	.394	8
					30	Int.	★	MVS0850X30S090	256.5	10.098	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	9	.354	8
					30	Int.	●	MVS0850X30S100	256.5	10.098	282.5	11.122	285.5	11.240	340.5	13.406	339	13.346	1.5	.059	10	.394	8
					35	Int.	★	MVS0850X35S090	299.0	11.772	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	9	.354	8
					35	Int.	●	MVS0850X35S100	299.0	11.772	324.5	12.776	327.5	12.894	382.5	15.059	381	15.000	1.5	.059	10	.394	8
					40	Int.	★	MVS0850X40S090	341.5	13.445	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	9	.354	8
					40	Int.	●	MVS0850X40S100	341.5	13.445	366.5	14.429	369.5	14.547	424.5	16.713	423	16.654	1.5	.059	10	.394	8
8.600	.3386		R		2	Ext.	★	MVE0860X02S090	18.8	.740	41.6	1.638	41.6	1.638	85.6	3.370	84	3.307	1.6	.063	9	.354	2
					2	Ext.	●	MVE0860X02S100	18.8	.740	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	★	MVS0860X02S090PL	18.6	.732	41.4	1.630	41.4	1.630	85.4	3.362	84	3.307	1.4	.055	9	.354	4
					2	Int.	●	MVS0860X02S100PL	18.6	.732	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Ext.	★	MVE0860X03S090	27.4	1.079	56.6	2.228	56.6	2.228	99.6	3.921	98	3.858	1.6	.063	9	.354	2
					3	Ext.	★	MVE0860X03S100	27.4	1.079	56.6	2.228	58.6	2.307	99.6	3.921	98	3.858	1.6	.063	10	.394	2
					3	Int.	★	MVS0860X03S090	27.4	1.079	46.6	1.835	46.6	1.835	101.6	4.000	100	3.937	1.6	.063	9	.354	6
					3	Int.	●	MVS0860X03S100	27.4	1.079	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	★	MVS0860X05S090	44.6	1.756	73.6	2.898	73.6	2.898	128.6	5.063	127	5.000	1.6	.063	9	.354	6
					5	Int.	●	MVS0860X05S100	44.6	1.756	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	★	MVS0860X08S090	70.4	2.772	100.6	3.961	100.6	3.961	155.6	6.126	154	6.063	1.6	.063	9	.354	6
					8	Int.	●	MVS0860X08S100	70.4	2.772	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	★	MVS0860X10S090	87.6	3.449	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	9	.354	8
					10	Int.	●	MVS0860X10S100	87.6	3.449	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	★	MVS0860X15S090	130.6	5.142	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	9	.354	8
					15	Int.	●	MVS0860X15S100	130.6	5.142	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	★	MVS0860X20S090	173.6	6.835	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	9	.354	8
					20	Int.	●	MVS0860X20S100	173.6	6.835	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	★	MVS0860X25S090	216.6	8.528	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	9	.354	8
					25	Int.	●	MVS0860X25S100	216.6	8.528	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	★	MVS0860X30S090	259.6	10.220	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	9	.354	8
					30	Int.	●	MVS0860X30S100	259.6	10.220	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	□	MVS0860X35S090	302.6	11.913	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	9	.354	8
					35	Int.	□	MVS0860X35S100	302.6	11.913	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	□	MVS0860X40S090	345.6	13.606	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	9	.354	8
					40	Int.	□	MVS0860X40S100	345.6	13.606	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8

M

DRILLING

MVE/MVS

DC					L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size					mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
8.700	.3425			M10x1.25	2	Ext.	★	MVE0870X02S090	19.0	.748	41.6	1.638	41.6	1.638	85.6	3.370	84	3.307	1.6	.063	9	.354	2
					2	Ext.	●	MVE0870X02S100	19.0	.748	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	★	MVS0870X02S090PL	18.8	.740	41.4	1.630	41.4	1.630	85.4	3.362	84	3.307	1.4	.055	9	.354	4
					2	Int.	●	MVS0870X02S100PL	18.8	.740	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Ext.	★	MVE0870X03S090	27.7	1.091	56.6	2.228	56.6	2.228	99.6	3.921	98	3.858	1.6	.063	9	.354	2
					3	Ext.	★	MVE0870X03S100	27.7	1.091	56.6	2.228	58.6	2.307	99.6	3.921	98	3.858	1.6	.063	10	.394	2
					3	Int.	★	MVS0870X03S090	27.7	1.091	46.6	1.835	46.6	1.835	101.6	4.000	100	3.937	1.6	.063	9	.354	6
					3	Int.	●	MVS0870X03S100	27.7	1.091	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	★	MVS0870X05S090	45.1	1.776	73.6	2.898	73.6	2.898	128.6	5.063	127	5.000	1.6	.063	9	.354	6
					5	Int.	●	MVS0870X05S100	45.1	1.776	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	★	MVS0870X08S090	71.2	2.803	100.6	3.961	100.6	3.961	155.6	6.126	154	6.063	1.6	.063	9	.354	6
					8	Int.	●	MVS0870X08S100	71.2	2.803	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	★	MVS0870X10S090	88.6	3.488	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	9	.354	8
					10	Int.	●	MVS0870X10S100	88.6	3.488	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	★	MVS0870X15S090	132.1	5.201	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	9	.354	8
					15	Int.	●	MVS0870X15S100	132.1	5.201	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	★	MVS0870X20S090	175.6	6.913	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	9	.354	8
					20	Int.	●	MVS0870X20S100	175.6	6.913	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	★	MVS0870X25S090	219.1	8.626	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	9	.354	8
					25	Int.	●	MVS0870X25S100	219.1	8.626	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	★	MVS0870X30S090	262.6	10.339	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	9	.354	8
					30	Int.	●	MVS0870X30S100	262.6	10.339	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	□	MVS0870X35S090	306.1	12.051	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	9	.354	8
					35	Int.	□	MVS0870X35S100	306.1	12.051	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	□	MVS0870X40S090	349.6	13.764	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	9	.354	8
					40	Int.	□	MVS0870X40S100	349.6	13.764	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8
8.732	.3438	11/32			2	Ext.	●	MVE0873X02S100	19.0	.748	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	●	MVS0873X02S100PL	19.0	.748	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Int.	●	MVS0873X03S100	27.8	1.094	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	●	MVS0873X05S100	45.2	1.780	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	●	MVS0873X08S100	71.4	2.811	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	●	MVS0873X10S100	88.9	3.500	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	●	MVS0873X15S100	132.6	5.220	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	●	MVS0873X20S100	176.2	6.937	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	●	MVS0873X25S100	219.9	8.657	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	●	MVS0873X30S100	263.6	10.378	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	●	MVS0873X35S100	307.2	12.094	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	●	MVS0873X40S100	350.9	13.815	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC					L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size					mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
8.800	.3465				2	Ext.	★	MVE0880X02S090	19.2	.756	41.6	1.638	41.6	1.638	85.6	3.370	84	3.307	1.6	.063	9	.354	2
					2	Ext.	●	MVE0880X02S100	19.2	.756	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	★	MVS0880X02S090PL	19.0	.748	41.4	1.630	41.4	1.630	85.4	3.362	84	3.307	1.4	.055	9	.354	4
					2	Int.	●	MVS0880X02S100PL	19.0	.748	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Ext.	★	MVE0880X03S090	28.0	1.102	56.6	2.228	56.6	2.228	99.6	3.921	98	3.858	1.6	.063	9	.354	2
					3	Ext.	★	MVE0880X03S100	28.0	1.102	56.6	2.228	58.6	2.307	99.6	3.921	98	3.858	1.6	.063	10	.394	2
					3	Int.	★	MVS0880X03S090	28.0	1.102	46.6	1.835	46.6	1.835	101.6	4.000	100	3.937	1.6	.063	9	.354	6
					3	Int.	●	MVS0880X03S100	28.0	1.102	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	★	MVS0880X05S090	45.6	1.795	73.6	2.898	73.6	2.898	128.6	5.063	127	5.000	1.6	.063	9	.354	6
					5	Int.	●	MVS0880X05S100	45.6	1.795	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	★	MVS0880X08S090	72.0	2.835	100.6	3.961	100.6	3.961	155.6	6.126	154	6.063	1.6	.063	9	.354	6
					8	Int.	●	MVS0880X08S100	72.0	2.835	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	★	MVS0880X10S090	89.6	3.528	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	9	.354	8
					10	Int.	●	MVS0880X10S100	89.6	3.528	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	★	MVS0880X15S090	133.6	5.260	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	9	.354	8
					15	Int.	●	MVS0880X15S100	133.6	5.260	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	★	MVS0880X20S090	177.6	6.992	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	9	.354	8
					20	Int.	●	MVS0880X20S100	177.6	6.992	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	★	MVS0880X25S090	221.6	8.724	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	9	.354	8
					25	Int.	●	MVS0880X25S100	221.6	8.724	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	★	MVS0880X30S090	265.6	10.457	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	9	.354	8
					30	Int.	●	MVS0880X30S100	265.6	10.457	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	□	MVS0880X35S090	309.6	12.189	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	9	.354	8
					35	Int.	□	MVS0880X35S100	309.6	12.189	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	□	MVS0880X40S090	353.6	13.921	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	9	.354	8
					40	Int.	□	MVS0880X40S100	353.6	13.921	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8
8.900	.3504				2	Ext.	★	MVE0890X02S090	19.4	.764	41.6	1.638	41.6	1.638	85.6	3.370	84	3.307	1.6	.063	9	.354	2
					2	Ext.	●	MVE0890X02S100	19.4	.764	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	★	MVS0890X02S090PL	19.2	.756	41.4	1.630	41.4	1.630	85.4	3.362	84	3.307	1.4	.055	9	.354	4
					2	Int.	●	MVS0890X02S100PL	19.2	.756	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Ext.	★	MVE0890X03S090	28.3	1.114	56.6	2.228	56.6	2.228	99.6	3.921	98	3.858	1.6	.063	9	.354	2
					3	Ext.	★	MVE0890X03S100	28.3	1.114	56.6	2.228	58.6	2.307	99.6	3.921	98	3.858	1.6	.063	10	.394	2
					3	Int.	★	MVS0890X03S090	28.3	1.114	46.6	1.835	46.6	1.835	101.6	4.000	100	3.937	1.6	.063	9	.354	6
					3	Int.	●	MVS0890X03S100	28.3	1.114	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	★	MVS0890X05S090	46.1	1.815	73.6	2.898	73.6	2.898	128.6	5.063	127	5.000	1.6	.063	9	.354	6
					5	Int.	●	MVS0890X05S100	46.1	1.815	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	★	MVS0890X08S090	72.8	2.866	100.6	3.961	100.6	3.961	155.6	6.126	154	6.063	1.6	.063	9	.354	6
					8	Int.	●	MVS0890X08S100	72.8	2.866	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	★	MVS0890X10S090	90.6	3.567	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	9	.354	8
					10	Int.	●	MVS0890X10S100	90.6	3.567	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	★	MVS0890X15S090	135.1	5.319	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	9	.354	8
					15	Int.	●	MVS0890X15S100	135.1	5.319	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	★	MVS0890X20S090	179.6	7.071	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	9	.354	8
					20	Int.	●	MVS0890X20S100	179.6	7.071	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	★	MVS0890X25S090	224.1	8.823	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	9	.354	8
					25	Int.	●	MVS0890X25S100	224.1	8.823	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	★	MVS0890X30S090	268.6	10.575	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	9	.354	8
					30	Int.	●	MVS0890X30S100	268.6	10.575	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	□	MVS0890X35S090	313.1	12.327	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	9	.354	8
					35	Int.	□	MVS0890X35S100	313.1	12.327	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	□	MVS0890X40S090	357.6	14.079	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	9	.354	8
					40	Int.	□	MVS0890X40S100	357.6	14.079	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8

● : USA Stock ★ : Stocked in Japan □ : Made to Order

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
									mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
9.000	.3543				2	Ext.	★	MVE0900X02S090	19.6	.772	41.6	1.638	41.6	1.638	85.6	3.370	84	3.307	1.6	.063	9	.354	2
					2	Ext.	●	MVE0900X02S100	19.6	.772	41.6	1.638	43.6	1.717	85.6	3.370	84	3.307	1.6	.063	10	.394	2
					2	Int.	★	MVS0900X02S090PL	19.4	.764	41.4	1.630	41.4	1.630	85.4	3.362	84	3.307	1.4	.055	9	.354	4
					2	Int.	●	MVS0900X02S100PL	19.4	.764	41.4	1.630	43.4	1.709	85.4	3.362	84	3.307	1.4	.055	10	.394	4
					3	Ext.	★	MVE0900X03S090	28.6	1.126	56.6	2.228	56.6	2.228	99.6	3.921	98	3.858	1.6	.063	9	.354	2
					3	Ext.	★	MVE0900X03S100	28.6	1.126	56.6	2.228	58.6	2.307	99.6	3.921	98	3.858	1.6	.063	10	.394	2
					3	Int.	★	MVS0900X03S090	28.6	1.126	46.6	1.835	46.6	1.835	101.6	4.000	100	3.937	1.6	.063	9	.354	6
					3	Int.	●	MVS0900X03S100	28.6	1.126	46.6	1.835	48.6	1.913	101.6	4.000	100	3.937	1.6	.063	10	.394	6
					5	Int.	★	MVS0900X05S090	46.6	1.835	73.6	2.898	73.6	2.898	128.6	5.063	127	5.000	1.6	.063	9	.354	6
					5	Int.	●	MVS0900X05S100	46.6	1.835	73.6	2.898	75.6	2.976	128.6	5.063	127	5.000	1.6	.063	10	.394	6
					8	Int.	★	MVS0900X08S090	73.6	2.898	100.6	3.961	100.6	3.961	155.6	6.126	154	6.063	1.6	.063	9	.354	6
					8	Int.	●	MVS0900X08S100	73.6	2.898	100.6	3.961	102.6	4.039	155.6	6.126	154	6.063	1.6	.063	10	.394	6
					10	Int.	★	MVS0900X10S090	91.6	3.606	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	9	.354	8
					10	Int.	●	MVS0900X10S100	91.6	3.606	118.6	4.669	121.6	4.787	176.6	6.953	175	6.890	1.6	.063	10	.394	8
					15	Int.	★	MVS0900X15S090	136.6	5.378	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	9	.354	8
					15	Int.	●	MVS0900X15S100	136.6	5.378	163.6	6.441	166.6	6.559	221.6	8.724	220	8.661	1.6	.063	10	.394	8
					20	Int.	★	MVS0900X20S090	181.6	7.150	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	9	.354	8
					20	Int.	●	MVS0900X20S100	181.6	7.150	208.6	8.213	211.6	8.331	266.6	10.496	265	10.433	1.6	.063	10	.394	8
					25	Int.	★	MVS0900X25S090	226.6	8.921	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	9	.354	8
					25	Int.	●	MVS0900X25S100	226.6	8.921	253.6	9.984	256.6	10.102	311.6	12.268	310	12.205	1.6	.063	10	.394	8
					30	Int.	★	MVS0900X30S090	271.6	10.693	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	9	.354	8
					30	Int.	●	MVS0900X30S100	271.6	10.693	298.6	11.756	301.6	11.874	356.6	14.039	355	13.976	1.6	.063	10	.394	8
					35	Int.	★	MVS0900X35S090	316.6	12.465	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	9	.354	8
					35	Int.	●	MVS0900X35S100	316.6	12.465	343.6	13.528	346.6	13.646	401.6	15.811	400	15.748	1.6	.063	10	.394	8
					40	Int.	★	MVS0900X40S090	361.6	14.236	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	9	.354	8
					40	Int.	●	MVS0900X40S100	361.6	14.236	391.6	15.417	394.6	15.535	449.6	17.701	448	17.638	1.6	.063	10	.394	8
9.100	.3583		T		2	Ext.	●	MVE0910X02S100	19.9	.783	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0910X02S100PL	19.6	.772	41.4	1.630	44.4	1.748	90.4	3.559	89	3.504	1.4	.055	10	.394	4
					3	Ext.	★	MVE0910X03S100	29.0	1.142	59.7	2.350	62.7	2.469	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0910X03S100	29.0	1.142	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0910X05S100	47.2	1.858	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0910X08S100	74.5	2.933	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	★	MVS0910X10S100	92.7	3.650	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	★	MVS0910X15S100	138.2	5.441	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	★	MVS0910X20S100	183.7	7.232	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	★	MVS0910X25S100	229.2	9.024	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	★	MVS0910X30S100	274.7	10.815	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	□	MVS0910X35S100	320.2	12.606	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8
9.129	.3594	23/64			2	Ext.	●	MVE0913X02S100	19.8	.780	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0913X02S100PL	19.8	.780	41.4	1.630	44.4	1.748	90.4	3.559	89	3.504	1.4	.055	10	.394	4
					3	Int.	●	MVS0913X03S100	29.0	1.142	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0913X05S100	47.3	1.862	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0913X08S100	74.7	2.941	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	●	MVS0913X10S100	92.9	3.657	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	●	MVS0913X15S100	138.6	5.457	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	●	MVS0913X20S100	184.2	7.252	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	●	MVS0913X25S100	229.8	9.047	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	●	MVS0913X30S100	275.5	10.846	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	●	MVS0913X35S100	321.1	12.642	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan □ : Made to Order

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
									mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
9.200	.3622				2	Ext.	●	MVE0920X02S100	20.1	.791	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0920X02S100PL	19.9	.783	41.5	1.634	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0920X03S100	29.3	1.154	59.7	2.350	62.7	2.469	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0920X03S100	29.3	1.154	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0920X05S100	47.7	1.878	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0920X08S100	75.3	2.965	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	★	MVS0920X10S100	93.7	3.689	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	★	MVS0920X15S100	139.7	5.500	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	★	MVS0920X20S100	185.7	7.311	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	★	MVS0920X25S100	231.7	9.122	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	★	MVS0920X30S100	277.7	10.933	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	□	MVS0920X35S100	323.7	12.744	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8
9.300	.3661				2	Ext.	●	MVE0930X02S100	20.3	.799	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0930X02S100PL	20.1	.791	41.5	1.634	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0930X03S100	29.6	1.165	59.7	2.350	62.7	2.469	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0930X03S100	29.6	1.165	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0930X05S100	48.2	1.898	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0930X08S100	76.1	2.996	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	★	MVS0930X10S100	94.7	3.728	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	★	MVS0930X15S100	141.2	5.559	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	★	MVS0930X20S100	187.7	7.390	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	★	MVS0930X25S100	234.2	9.220	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	★	MVS0930X30S100	280.7	11.051	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	□	MVS0930X35S100	327.2	12.882	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8
9.348	.3680		U	7/16-14	2	Ext.	●	MVE0935X02S100	20.3	.799	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0935X02S100PL	20.3	.799	41.5	1.634	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Int.	●	MVS0935X03S100	29.7	1.169	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0935X05S100	48.4	1.906	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0935X08S100	76.5	3.012	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	●	MVS0935X10S100	95.2	3.748	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	●	MVS0935X15S100	141.9	5.587	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	●	MVS0935X20S100	188.6	7.425	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	●	MVS0935X25S100	235.4	9.268	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	●	MVS0935X30S100	282.1	11.106	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	●	MVS0935X35S100	328.8	12.945	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8
9.400	.3701				2	Ext.	●	MVE0940X02S100	20.5	.807	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0940X02S100PL	20.3	.799	41.5	1.634	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0940X03S100	29.9	1.177	59.7	2.350	62.7	2.469	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0940X03S100	29.9	1.177	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0940X05S100	48.7	1.917	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0940X08S100	76.9	3.028	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	★	MVS0940X10S100	95.7	3.768	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	★	MVS0940X15S100	142.7	5.618	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	★	MVS0940X20S100	189.7	7.469	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	★	MVS0940X25S100	236.7	9.319	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	★	MVS0940X30S100	283.7	11.169	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	□	MVS0940X35S100	330.7	13.020	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8

MVE/MVS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
9.500	.3740				2	Ext.	●	MVE0950X02S100	20.7	.815	41.7	1.642	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0950X02S100PL	20.5	.807	41.5	1.634	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0950X03S100	30.2	1.189	59.7	2.350	62.7	2.469	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0950X03S100	30.2	1.189	49.2	1.937	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0950X05S100	49.2	1.937	77.7	3.059	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0950X08S100	77.7	3.059	106.7	4.201	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	★	MVS0950X10S100	96.7	3.807	125.7	4.949	128.7	5.067	183.7	7.232	182	7.165	1.7	.067	10	.394	8
					15	Int.	★	MVS0950X15S100	144.2	5.677	172.7	6.799	175.7	6.917	230.7	9.083	229	9.016	1.7	.067	10	.394	8
					20	Int.	●	MVS0950X20S100	191.7	7.547	220.7	8.689	223.7	8.807	278.7	10.972	277	10.906	1.7	.067	10	.394	8
					25	Int.	★	MVS0950X25S100	239.2	9.417	267.7	10.539	270.7	10.657	325.7	12.823	324	12.756	1.7	.067	10	.394	8
					30	Int.	★	MVS0950X30S100	286.7	11.287	315.7	12.429	318.7	12.547	373.7	14.713	372	14.646	1.7	.067	10	.394	8
					35	Int.	●	MVS0950X35S100	334.2	13.157	362.7	14.280	365.7	14.398	420.7	16.563	419	16.496	1.7	.067	10	.394	8
9.525	.3750	3/8			2	Ext.	●	MVE0953X02S100	20.7	.815	44.7	1.760	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0953X02S100PL	20.7	.815	44.5	1.752	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Int.	●	MVS0953X03S100	30.3	1.193	51.7	2.035	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0953X05S100	49.3	1.941	81.7	3.217	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0953X08S100	77.9	3.067	111.7	4.398	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	●	MVS0953X10S100	97.0	3.819	131.7	5.185	134.7	5.303	189.7	7.469	188	7.402	1.7	.067	10	.394	8
					15	Int.	●	MVS0953X15S100	144.6	5.693	181.7	7.154	184.7	7.272	239.7	9.437	238	9.370	1.7	.067	10	.394	8
					20	Int.	●	MVS0953X20S100	192.2	7.567	231.7	9.122	234.7	9.240	289.7	11.406	288	11.339	1.7	.067	10	.394	8
					25	Int.	●	MVS0953X25S100	239.8	9.441	281.7	11.091	284.7	11.209	339.7	13.374	338	13.307	1.7	.067	10	.394	8
					30	Int.	●	MVS0953X30S100	287.5	11.319	331.7	13.059	334.7	13.177	389.7	15.343	388	15.276	1.7	.067	10	.394	8
					35	Int.	●	MVS0953X35S100	335.1	13.193	381.7	15.028	384.7	15.146	439.7	17.311	438	17.244	1.7	.067	10	.394	8
9.600	.3780				2	Ext.	●	MVE0960X02S100	20.9	.823	44.7	1.760	44.7	1.760	90.7	3.571	89	3.504	1.7	.067	10	.394	2
					2	Int.	●	MVS0960X02S100PL	20.7	.815	44.5	1.752	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0960X03S100	30.5	1.201	61.7	2.429	61.7	2.429	106.7	4.201	105	4.134	1.7	.067	10	.394	2
					3	Int.	●	MVS0960X03S100	30.5	1.201	51.7	2.035	51.7	2.035	107.7	4.240	106	4.173	1.7	.067	10	.394	6
					5	Int.	●	MVS0960X05S100	49.7	1.957	81.7	3.217	81.7	3.217	137.7	5.421	136	5.354	1.7	.067	10	.394	6
					8	Int.	●	MVS0960X08S100	78.5	3.091	111.7	4.398	111.7	4.398	167.7	6.602	166	6.535	1.7	.067	10	.394	6
					10	Int.	●	MVS0960X10S100	97.7	3.846	131.7	5.185	134.7	5.307	189.7	7.469	188	7.402	1.7	.067	10	.394	8
					15	Int.	★	MVS0960X15S100	145.7	5.736	181.7	7.154	184.7	7.276	239.7	9.437	238	9.370	1.7	.067	10	.394	8
					20	Int.	★	MVS0960X20S100	193.7	7.626	231.7	9.122	234.7	9.244	289.7	11.406	288	11.339	1.7	.067	10	.394	8
					25	Int.	★	MVS0960X25S100	241.7	9.516	281.7	11.091	284.7	11.213	339.7	13.374	338	13.307	1.7	.067	10	.394	8
					30	Int.	★	MVS0960X30S100	289.7	11.406	331.7	13.059	334.7	13.181	389.7	15.343	388	15.276	1.7	.067	10	.394	8
					35	Int.	□	MVS0960X35S100	337.7	13.295	381.7	15.028	384.7	15.150	439.7	17.311	438	17.244	1.7	.067	10	.394	8
9.700	.3819		Tube Sheet		2	Ext.	●	MVE0970X02S100	21.2	.835	44.8	1.764	44.8	1.764	90.8	3.575	89	3.504	1.8	.071	10	.394	2
					2	Int.	●	MVS0970X02S100PL	20.9	.823	44.5	1.752	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0970X03S100	30.9	1.217	61.8	2.433	61.8	2.433	106.8	4.205	105	4.134	1.8	.071	10	.394	2
					3	Int.	●	MVS0970X03S100	30.9	1.217	51.8	2.039	51.8	2.039	107.8	4.244	106	4.173	1.8	.071	10	.394	6
					5	Int.	●	MVS0970X05S100	50.3	1.980	81.8	3.220	81.8	3.220	137.8	5.425	136	5.354	1.8	.071	10	.394	6
					8	Int.	●	MVS0970X08S100	79.4	3.126	111.8	4.402	111.8	4.402	167.8	6.606	166	6.535	1.8	.071	10	.394	6
					10	Int.	★	MVS0970X10S100	98.8	3.890	131.8	5.189	134.8	5.307	189.8	7.472	188	7.402	1.8	.071	10	.394	8
					15	Int.	●	MVS0970X15S100	147.3	5.799	181.8	7.157	184.8	7.276	239.8	9.441	238	9.370	1.8	.071	10	.394	8
					20	Int.	★	MVS0970X20S100	195.8	7.709	231.8	9.126	234.8	9.244	289.8	11.409	288	11.339	1.8	.071	10	.394	8
					25	Int.	★	MVS0970X25S100	244.3	9.618	281.8	11.094	284.8	11.213	339.8	13.378	338	13.307	1.8	.071	10	.394	8
					30	Int.	★	MVS0970X30S100	292.8	11.528	331.8	13.063	334.8	13.181	389.8	15.346	388	15.276	1.8	.071	10	.394	8
					35	Int.	□	MVS0970X35S100	341.3	13.437	381.8	15.031	384.8	15.150	439.8	17.315	438	17.244	1.8	.071	10	.394	8

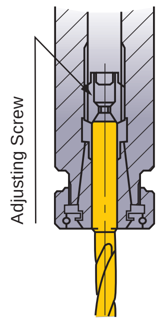
Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
9.800	.3858		W		2	Ext.	●	MVE0980X02S100	21.4	.843	44.8	1.764	44.8	1.764	90.8	3.575	89	3.504	1.8	.071	10	.394	2
					2	Int.	●	MVS0980X02S100PL	21.1	.831	44.5	1.752	44.5	1.752	90.5	3.563	89	3.504	1.5	.059	10	.394	4
					3	Ext.	★	MVE0980X03S100	31.2	1.228	61.8	2.433	61.8	2.433	106.8	4.205	105	4.134	1.8	.071	10	.394	2
					3	Int.	●	MVS0980X03S100	31.2	1.228	51.8	2.039	51.8	2.039	107.8	4.244	106	4.173	1.8	.071	10	.394	6
					5	Int.	●	MVS0980X05S100	50.8	2.000	81.8	3.220	81.8	3.220	137.8	5.425	136	5.354	1.8	.071	10	.394	6
					8	Int.	●	MVS0980X08S100	80.2	3.157	111.8	4.402	111.8	4.402	167.8	6.606	166	6.535	1.8	.071	10	.394	6
					10	Int.	●	MVS0980X10S100	99.8	3.929	131.8	5.189	134.8	5.307	189.8	7.472	188	7.402	1.8	.071	10	.394	8
					15	Int.	★	MVS0980X15S100	148.8	5.858	181.8	7.157	184.8	7.276	239.8	9.441	238	9.370	1.8	.071	10	.394	8
					20	Int.	★	MVS0980X20S100	197.8	7.787	231.8	9.126	234.8	9.244	289.8	11.409	288	11.339	1.8	.071	10	.394	8
					25	Int.	★	MVS0980X25S100	246.8	9.717	281.8	11.094	284.8	11.213	339.8	13.378	338	13.307	1.8	.071	10	.394	8
					30	Int.	★	MVS0980X30S100	295.8	11.646	331.8	13.063	334.8	13.181	389.8	15.346	388	15.276	1.8	.071	10	.394	8
					35	Int.	□	MVS0980X35S100	344.8	13.575	381.8	15.031	384.8	15.150	439.8	17.315	438	17.244	1.8	.071	10	.394	8
9.900	.3898				2	Ext.	●	MVE0990X02S100	21.6	.850	44.8	1.764	44.8	1.764	90.8	3.575	89	3.504	1.8	.071	10	.394	2
					2	Int.	●	MVS0990X02S100PL	21.4	.843	44.6	1.756	44.6	1.756	90.6	3.567	89	3.504	1.6	.063	10	.394	4
					3	Ext.	★	MVE0990X03S100	31.5	1.240	61.8	2.433	61.8	2.433	106.8	4.205	105	4.134	1.8	.071	10	.394	2
					3	Int.	●	MVS0990X03S100	31.5	1.240	51.8	2.039	51.8	2.039	107.8	4.244	106	4.173	1.8	.071	10	.394	6
					5	Int.	●	MVS0990X05S100	51.3	2.020	81.8	3.220	81.8	3.220	137.8	5.425	136	5.354	1.8	.071	10	.394	6
					8	Int.	●	MVS0990X08S100	81.0	3.189	111.8	4.402	111.8	4.402	167.8	6.606	166	6.535	1.8	.071	10	.394	6
					10	Int.	★	MVS0990X10S100	100.8	3.969	131.8	5.189	134.8	5.307	189.8	7.472	188	7.402	1.8	.071	10	.394	8
					15	Int.	★	MVS0990X15S100	150.3	5.917	181.8	7.157	184.8	7.276	239.8	9.441	238	9.370	1.8	.071	10	.394	8
					20	Int.	★	MVS0990X20S100	199.8	7.866	231.8	9.126	234.8	9.244	289.8	11.409	288	11.339	1.8	.071	10	.394	8
					25	Int.	★	MVS0990X25S100	249.3	9.815	281.8	11.094	284.8	11.213	339.8	13.378	338	13.307	1.8	.071	10	.394	8
					30	Int.	★	MVS0990X30S100	298.8	11.764	331.8	13.063	334.8	13.181	389.8	15.346	388	15.276	1.8	.071	10	.394	8
					35	Int.	□	MVS0990X35S100	348.3	13.713	381.8	15.031	384.8	15.150	439.8	17.315	438	17.244	1.8	.071	10	.394	8
9.922	.3907	25/64		7/16-20	2	Ext.	●	MVE0992X02S100	21.5	.846	44.8	1.764	44.9	1.768	90.8	3.575	89	3.504	1.8	.071	10	.394	2
					2	Int.	●	MVS0992X02S100PL	21.5	.846	44.6	1.756	44.6	1.756	90.6	3.567	89	3.504	1.6	.063	10	.394	4
					3	Int.	●	MVS0992X03S100	31.5	1.240	51.8	2.039	51.9	2.043	107.8	4.244	106	4.173	1.8	.071	10	.394	6
					5	Int.	●	MVS0992X05S100	51.4	2.024	81.8	3.220	81.9	3.224	137.8	5.425	136	5.354	1.8	.071	10	.394	6
					8	Int.	●	MVS0992X08S100	81.2	3.197	111.8	4.402	111.9	4.406	167.8	6.606	166	6.535	1.8	.071	10	.394	6
					10	Int.	●	MVS0992X10S100	101.0	3.976	131.8	5.189	134.8	5.307	189.8	7.472	188	7.402	1.8	.071	10	.394	8
					15	Int.	●	MVS0992X15S100	150.6	5.929	181.8	7.157	184.8	7.276	239.8	9.441	238	9.370	1.8	.071	10	.394	8
					20	Int.	●	MVS0992X20S100	200.2	7.882	231.8	9.126	234.8	9.244	289.8	11.409	288	11.339	1.8	.071	10	.394	8
					25	Int.	●	MVS0992X25S100	249.8	9.835	281.8	11.094	284.8	11.213	339.8	13.378	338	13.307	1.8	.071	10	.394	8
					30	Int.	●	MVS0992X30S100	299.4	11.787	331.8	13.063	334.8	13.181	389.8	15.346	388	15.276	1.8	.071	10	.394	8
					35	Int.	●	MVS0992X35S100	349.0	13.740	381.8	15.031	384.8	15.150	439.8	17.315	438	17.244	1.8	.071	10	.394	8
10.000	.3937				2	Ext.	●	MVE1000X02S100	21.8	.858	44.8	1.764	44.8	1.764	90.8	3.575	89	3.504	1.8	.071	10	.394	2
					2	Int.	●	MVS1000X02S100PL	21.6	.850	44.6	1.756	44.6	1.756	90.6	3.567	89	3.504	1.6	.063	10	.394	4
					3	Ext.	★	MVE1000X03S100	31.8	1.252	61.8	2.433	61.8	2.433	106.8	4.205	105	4.134	1.8	.071	10	.394	2
					3	Int.	●	MVS1000X03S100	31.8	1.252	51.8	2.039	51.8	2.039	107.8	4.244	106	4.173	1.8	.071	10	.394	6
					5	Int.	●	MVS1000X05S100	51.8	2.039	81.8	3.220	81.8	3.220	137.8	5.425	136	5.354	1.8	.071	10	.394	6
					8	Int.	●	MVS1000X08S100	81.8	3.220	111.8	4.402	111.8	4.402	167.8	6.606	166	6.535	1.8	.071	10	.394	6
					10	Int.	●	MVS1000X10S100	101.8	4.008	131.8	5.189	134.8	5.307	189.8	7.472	188	7.402	1.8	.071	10	.394	8
					15	Int.	●	MVS1000X15S100	151.8	5.976	181.8	7.157	184.8	7.276	239.8	9.441	238	9.370	1.8	.071	10	.394	8
					20	Int.	★	MVS1000X20S100	201.8	7.945	231.8	9.126	234.8	9.244	289.8	11.409	288	11.339	1.8	.071	10	.394	8
					25	Int.	★	MVS1000X25S100	251.8	9.913	281.8	11.094	284.8	11.213	339.8	13.378	338	13.307	1.8	.071	10	.394	8
					30	Int.	★	MVS1000X30S100	301.8	11.882	331.8	13.063	334.8	13.181	389.8	15.346	388	15.276	1.8	.071	10	.394	8
					35	Int.	●	MVS1000X35S100	351.8	13.850	381.8	15.031	384.8	15.150	439.8	17.315	438	17.244	1.8	.071	10	.394	8

● : USA Stock ★ : Stocked in Japan □ : Made to Order

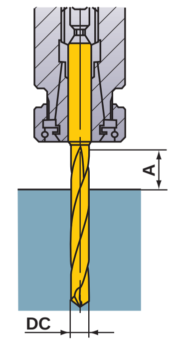
■ OPERATIONAL GUIDANCE

Drill Holding



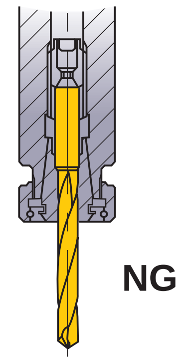
Thrust bearing type collet chuck holds the drill securely.

Drill Length



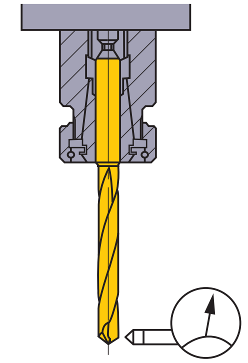
A > DC x 1.5(DC×over .079" for DC<.118")

Drill Installation



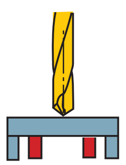
Do not clamp on the flutes.

Installation Tolerance



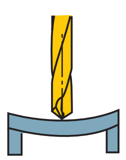
Run-out ≤ .0012 inch

Thin Work Material



Support the Work Material

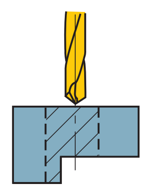
OK



If Bending Occurs

NG

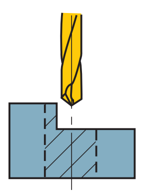
Interrupted Cutting



One Process

OK

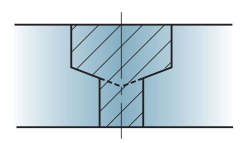
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

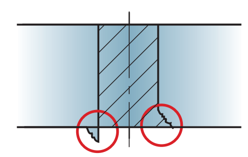
①Spot face with an end mill prior to drilling.

Stepped Holes



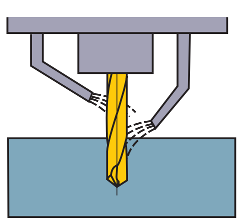
①Divide the two processes.
②Drill the larger hole first.
*A tool for machining both chamfer and spot face can be produced to order.

Burring and Work Material Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

Coolant Method (MVE)

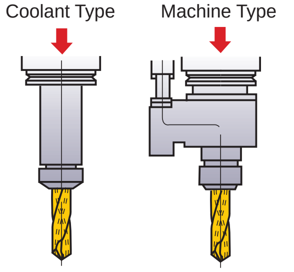


Two coolant positions, at the end and at the center are ideal.

Through Coolant Type (MVS)

Spindles Through Coolant Type

Revolving Coolant Machine Type



Less than ø.118 inch : 225PSI-1000PSI
More than ø.118 inch : 75PSI-1000PSI
More than 450PSI is recommended.

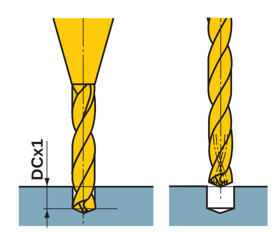
Coolant Handling

<MVS Type>

①Small chip particles can jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

②Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Drill Installation



①Drill a prepared hole about DCx1 using the shortest flute length of MVS. (DC=drill diameter)
②Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.

■ CAUTIONS FOR USE (For DC<.118")

Please use a fine mesh filter (5 microns or less) for coolant to prevent chips from jamming in the coolant hole.
For deep drilling with the long type drill, machining a pilot hole is recommended.
(Otherwise, centrifugal forces may cause drill breakage.)

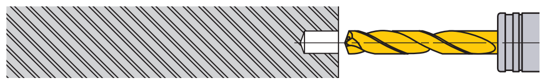
Memo

MVE/MVS

■ OPERATIONAL GUIDANCE FOR THE MVS LONG TYPE DRILL (L/D≥10)

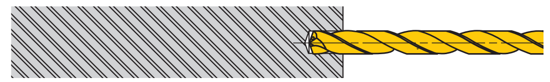
Flat Face Drilling ●Drilling a blind hole

■ 1. Drilling a Pilot Hole



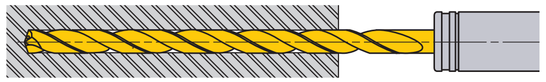
①Use a drill with the same or larger point angle than the long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DCx1.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 2. Initial Cutting with the Long Type Drill



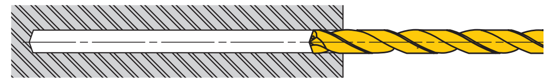
①Penetrate the guide hole at low revolution.
(Revolution 500-1000 min^{-1}, feed rate .008–.012 IPR)
②Stop the long type drill .020–.039 inch short of the guide hole bottom.

■ 3. Drill the Deep Hole



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

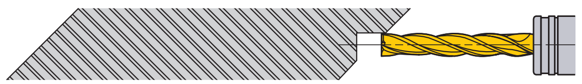
■ 4. Drill Retraction



①After drilling, lower the cutting revolution about .020–.039 inch short of the hole end. (Revolution 500-1000 min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 IPM.
③Finally, clear the hole at a cutting speed of 65–100 SFM and feed rate of .008–.012 IPR.

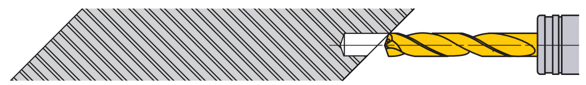
Interrupted Drilling ●Drilling and breaking through on irregular faces or angles

■ 1. Spot Facing



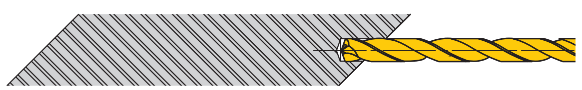
①Machine a flat on the irregular face by using an MFE (flat bottom drill) or an end mill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a Pilot Hole



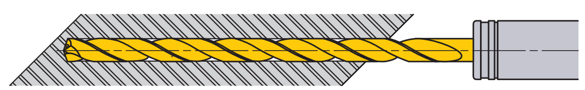
①Use a drill with the same or larger point angle than the long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DCx1.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 3. Initial Cutting with the Long Type Drill



①Penetrate the guide hole at a low revolution.
(Revolution 500-1000 min^{-1}, feed rate .008–.012 IPR)
②Stop the long type drill .020–.039 inch short of the guide hole bottom.

■ 4. Drill the Deep Hole

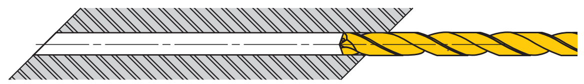


①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.
②Feed as usual until breaking through.

■ 5. Breaking Through

①When breaking through, the cutting edge can be damaged.
②Recommend about half rate of the usual feed rate after breaking through.

■ 6. Drill Retraction



①Finally clear the hole at a revolution speed 500-1000 min^{-1} and feed rate of .008–.012 IPR.
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 IPM.

RECOMMENDED CUTTING CONDITIONS

■ MVE

(inch)

Work Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180−280HB) AISI 1045, 4140 etc.	
DC		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)
inch	mm				
.1260	3.2	215 (165–245)	.0039 (.0024−.0051)	195 (150–230)	.0039 (.0024−.0051)
.1575	4.0	230 (180–260)	.0047 (.0031−.0063)	215 (165–245)	.0047 (.0031−.0063)
.1969	5.0	230 (180–260)	.0059 (.0039−.0079)	215 (165–245)	.0059 (.0039−.0079)
.2480	6.3	265 (195–295)	.0079 (.0051−.0102)	245 (195–280)	.0079 (.0051−.0102)
.3150	8.0	280 (215–330)	.0091 (.0071−.0110)	265 (195–295)	.0091 (.0071−.0110)
.3937	10.0	295 (230–345)	.0106 (.0087−.0126)	280 (215–330)	.0106 (.0087−.0126)
.4724	12.0	310 (245–360)	.0122 (.0110−.0134)	295 (230–345)	.0122 (.0110−.0134)
.6299	16.0	330 (260–375)	.0130 (.0110−.0150)	295 (230–345)	.0130 (.0110−.0150)
.7874	20.0	330 (260–375)	.0118 (.0118−.0157)	295 (230–345)	.0118 (.0118−.0157)

Work Material		Carbon Steel, Alloy Steel (280−350HB) AISI 4340 etc.		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.	
DC		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)
inch	mm				
.1260	3.2	180 (130–215)	.0035 (.0024−.0047)	65 (50–80)	.0028 (.0020−.0031)
.1575	4.0	195 (150–230)	.0043 (.0028−.0055)	65 (50–80)	.0031 (.0024−.0039)
.1969	5.0	195 (150–230)	.0055 (.0035−.0071)	65 (50–80)	.0039 (.0028−.0051)
.2480	6.3	230 (180–260)	.0071 (.0043−.0094)	80 (65–100)	.0051 (.0035−.0067)
.3150	8.0	245 (195–280)	.0083 (.0063−.0098)	80 (65–100)	.0055 (.0039−.0071)
.3937	10.0	265 (195–295)	.0091 (.0075−.0106)	80 (65–100)	.0063 (.0047−.0075)
.4724	12.0	280 (215–330)	.0102 (.0091−.0114)	80 (65–100)	.0071 (.0059−.0079)
.6299	16.0	280 (215–330)	.0114 (.0094−.0130)	80 (65–100)	.0075 (.0059−.0091)
.7874	20.0	280 (215–330)	.0118 (.0102−.0134)	80 (65–100)	.0079 (.0059−.0094)

Work Material		Gray Cast Iron (≤350MPa) AISI No.45B etc.		Ductile Cast Iron (≤450MPa) AISI 60-40-18 etc.	
DC		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)
inch	mm				
.1260	3.2	230 (180–260)	.0039 (.0024−.0051)	215 (165–245)	.0039 (.0024−.0051)
.1575	4.0	230 (180–260)	.0047 (.0031−.0063)	215 (165–245)	.0047 (.0031−.0063)
.1969	5.0	230 (180–260)	.0059 (.0039−.0079)	215 (165–245)	.0059 (.0039−.0079)
.2480	6.3	245 (195–280)	.0079 (.0051−.0102)	230 (180–260)	.0079 (.0051−.0102)
.3150	8.0	245 (195–280)	.0098 (.0071−.0122)	230 (180–260)	.0091 (.0071−.0110)
.3937	10.0	245 (195–280)	.0114 (.0087−.0138)	230 (180–260)	.0106 (.0087−.0126)
.4724	12.0	265 (195–295)	.0130 (.0110−.0146)	245 (195–280)	.0122 (.0110−.0134)
.6299	16.0	265 (195–295)	.0138 (.0110−.0165)	245 (195–280)	.0130 (.0110−.0150)
.7874	20.0	280 (215–330)	.0146 (.0118−.0173)	265 (195–295)	.0138 (.0118−.0157)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MVE/MVS

RECOMMENDED CUTTING CONDITIONS

■ MVE

(inch)

Work Material		Aluminum Alloy (Si<5%) ASTM A6061, 7075 etc.		Heat Resistant Alloy Inconel718 etc.	
DC		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1260	3.2	265 (195–295)	.0039 (.0024–.0051)	65 (50–80)	.0028 (.0020–.0035)
.1575	4.0	265 (195–295)	.0047 (.0031–.0063)	65 (50–80)	.0035 (.0024–.0043)
.1969	5.0	265 (195–295)	.0059 (.0039–.0079)	65 (50–80)	.0043 (.0031–.0055)
.2480	6.3	295 (230–360)	.0079 (.0051–.0102)	80 (65–100)	.0055 (.0035–.0075)
.3150	8.0	295 (230–360)	.0091 (.0071–.0110)	80 (65–100)	.0055 (.0043–.0067)
.3937	10.0	295 (230–360)	.0106 (.0087–.0126)	80 (65–100)	.0063 (.0047–.0075)
.4724	12.0	330 (260–395)	.0122 (.0110–.0134)	80 (65–100)	.0063 (.0051–.0071)
.6299	16.0	330 (260–395)	.0130 (.0110–.0150)	80 (65–100)	.0071 (.0055–.0083)
.7874	20.0	360 (280–425)	.0138 (.0118–.0157)	100 (65–115)	.0075 (.0059–.0087)

Work Material		Hardened Steel (40–55HRC) AISI H13, L6 etc.	
DC		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm		
.1260	3.2	65 (50–80)	.0028 (.0020–.0035)
.1575	4.0	65 (50–80)	.0035 (.0024–.0043)
.1969	5.0	65 (50–80)	.0043 (.0031–.0055)
.2480	6.3	80 (65–100)	.0055 (.0035–.0075)
.3150	8.0	80 (65–100)	.0055 (.0043–.0067)
.3937	10.0	80 (65–100)	.0063 (.0047–.0075)
.4724	12.0	80 (65–100)	.0063 (.0051–.0071)
.6299	16.0	80 (65–100)	.0071 (.0055–.0083)
.7874	20.0	100 (65–115)	.0075 (.0059–.0087)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

■ MVS

(inch)

Work Material			Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180–280HB) AISI 1045, 4140 etc.	
DC		L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm					
.0394	1.0	**2,7DC**	165 (130–195)	.0016 (.0008–.0020)	165 (130–195)	.0016 (.0008–.0020)
		≥12DC	165 (130–195)	.0008 (.0004–.0012)	130 (100–150)	.0008 (.0004–.0012)
.0591	1.5	**2,7DC**	165 (130–195)	.0020 (.0012–.0031)	165 (130–195)	.0020 (.0012–.0031)
		≥12DC	165 (130–195)	.0020 (.0008–.0031)	130 (100–150)	.0020 (.0012–.0031)
.0787	2.0	**2,7DC**	165 (130–195)	.0028 (.0016–.0039)	165 (130–195)	.0028 (.0016–.0039)
		≥12DC	165 (130–195)	.0028 (.0016–.0039)	165 (130–195)	.0028 (.0016–.0039)
.0984	2.5	**2,7DC**	195 (150–230)	.0035 (.0020–.0051)	195 (150–230)	.0035 (.0020–.0051)
		≥12DC	195 (150–230)	.0035 (.0024–.0051)	165 (130–195)	.0031 (.0020–.0051)
.1260	3.2	**2DC**	295 (130–360)	.0067 (.0039–.0094)	295 (165–330)	.0067 (.0039–.0094)
		3,5,8DC	295 (230–345)	.0039 (.0024–.0051)	265 (195–295)	.0039 (.0024–.0051)
		10,15,20,25,30DC	295 (130–360)	.0067 (.0039–.0094)	295 (165–330)	.0067 (.0039–.0094)
		35,40DC	245 (130–310)	.0055 (.0031–.0075)	245 (130–280)	.0055 (.0031–.0075)
.1575	4.0	**2DC**	330 (165–395)	.0079 (.0047–.0118)	295 (165–330)	.0079 (.0047–.0118)
		3,5,8DC	330 (260–375)	.0047 (.0031–.0063)	295 (230–345)	.0047 (.0031–.0063)
		10,15,20,25,30DC	295 (130–360)	.0079 (.0047–.0118)	295 (165–330)	.0079 (.0047–.0118)
		35,40DC	245 (130–310)	.0063 (.0039–.0094)	245 (130–280)	.0063 (.0039–.0094)
.1969	5.0	**2DC**	330 (165–395)	.0098 (.0059–.0138)	295 (165–330)	.0098 (.0059–.0138)
		3,5,8DC	330 (260–375)	.0059 (.0039–.0079)	295 (230–345)	.0059 (.0039–.0079)
		10,15,20,25,30DC	295 (130–360)	.0098 (.0059–.0138)	295 (165–330)	.0098 (.0059–.0138)
		35,40DC	245 (130–310)	.0079 (.0047–.0110)	245 (130–280)	.0079 (.0047–.0110)
.2480	6.3	**2DC**	360 (195–425)	.0106 (.0067–.0146)	330 (195–360)	.0106 (.0067–.0146)
		3,5,8DC	360 (280–410)	.0079 (.0051–.0102)	330 (260–375)	.0079 (.0051–.0102)
		10,15,20,25,30DC	360 (195–425)	.0106 (.0067–.0146)	330 (195–360)	.0106 (.0067–.0146)
		35,40DC	295 (130–360)	.0087 (.0055–.0118)	260 (130–295)	.0087 (.0055–.0118)
.3150	8.0	**2DC**	395 (230–460)	.0118 (.0079–.0157)	360 (230–395)	.0118 (.0079–.0157)
		3,5,8DC	395 (310–445)	.0091 (.0071–.0110)	360 (280–410)	.0091 (.0071–.0110)
		10,15,20,25,30DC	360 (195–425)	.0118 (.0079–.0157)	330 (195–360)	.0118 (.0079–.0157)
		35,40DC	295 (130–360)	.0094 (.0063–.0126)	260 (130–295)	.0094 (.0063–.0126)
.3937	10.0	**2DC**	425 (260–490)	.0126 (.0087–.0165)	395 (260–425)	.0126 (.0087–.0165)
		3,5,8DC	425 (330–490)	.0106 (.0087–.0126)	395 (310–445)	.0106 (.0087–.0126)
		10,15,20,25,30DC	360 (195–425)	.0126 (.0087–.0165)	330 (195–360)	.0126 (.0087–.0165)
		35,40DC	295 (130–360)	.0102 (.0071–.0134)	260 (130–295)	.0102 (.0071–.0134)
.4724	12.0	**2DC**	460 (295–525)	.0134 (.0094–.0173)	425 (295–460)	.0134 (.0094–.0173)
		3,5,8DC	460 (360–525)	.0118 (.0102–.0134)	425 (330–490)	.0118 (.0102–.0134)
		10,15,20,25,30DC	425 (260–490)	.0134 (.0094–.0173)	395 (260–425)	.0134 (.0094–.0173)
		35,40DC	345 (180–410)	.0106 (.0075–.0138)	310 (180–345)	.0106 (.0075–.0138)
.6299	16.0	**2DC**	525 (360–590)	.0142 (.0102–.0181)	460 (330–490)	.0142 (.0102–.0181)
		3,5,8DC	525 (410–590)	.0130 (.0106–.0150)	460 (360–525)	.0130 (.0106–.0150)
		10,15,20,25,30DC	425 (260–490)	.0142 (.0102–.0181)	395 (260–425)	.0142 (.0102–.0181)
		35,40DC	345 (180–410)	.0114 (.0083–.0146)	310 (180–345)	.0114 (.0083–.0146)
.7874	20.0	**3,5,8DC**	525 (410–590)	.0138 (.0118–.0157)	460 (360–525)	.0138 (.0118–.0157)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

M
DRILLING

MVE/MVS

RECOMMENDED CUTTING CONDITIONS

■ MVS

(inch)

DC inch	DC mm	L/D	Carbon Steel, Alloy Steel (280—350HB) AISI 4340 etc. Cutting Speed vc (Min.—Max.) (SFM)	Carbon Steel, Alloy Steel Feed fr (Min.—Max.) (IPR)	Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc. Cutting Speed vc (Min.—Max.) (SFM)	Austenitic Stainless Steel Feed fr (Min.—Max.) (IPR)
.0394	1.0	**2,7DC**	130 (100—150)	.0016 (.0008—.0020)	100 (65—115)	.0012 (.0008—.0020)
		≥12DC	100 (65—115)	.0008 (.0004—.0012)	100 (65—115)	.0008 (.0004—.0012)
.0591	1.5	**2,7DC**	130 (100—150)	.0020 (.0012—.0031)	100 (65—115)	.0020 (.0012—.0028)
		≥12DC	100 (65—115)	.0020 (.0008—.0031)	100 (65—115)	.0020 (.0008—.0031)
.0787	2.0	**2,7DC**	130 (100—150)	.0028 (.0016—.0039)	100 (65—115)	.0024 (.0016—.0031)
		≥12DC	165 (130—195)	.0028 (.0016—.0039)	100 (65—115)	.0028 (.0016—.0039)
.0984	2.5	**2,7DC**	165 (130—195)	.0035 (.0020—.0051)	130 (100—150)	.0031 (.0020—.0039)
		≥12DC	165 (130—195)	.0031 (.0020—.0051)	100 (65—115)	.0031 (.0020—.0047)
.1260	3.2	**2DC**	295 (165—330)	.0059 (.0035—.0087)	130 (65—195)	.0028 (.0020—.0035)
		3,5,8DC	230 (180—260)	.0039 (.0024—.0051)	130 (100—150)	.0031 (.0024—.0039)
		10,15,20,25,30DC	260 (130—295)	.0059 (.0035—.0087)	130 (65—195)	.0028 (.0020—.0035)
		35,40DC	210 (130—245)	.0059 (.0028—.0071)	100 (65—165)	.0024 (.0016—.0028)
.1575	4.0	**2DC**	295 (165—330)	.0071 (.0043—.0106)	130 (65—195)	.0031 (.0024—.0039)
		3,5,8DC	265 (195—295)	.0043 (.0028—.0055)	130 (100—150)	.0035 (.0024—.0043)
		10,15,20,25,30DC	260 (130—295)	.0071 (.0043—.0106)	130 (65—195)	.0031 (.0024—.0039)
		35,40DC	210 (130—245)	.0071 (.0035—.0087)	100 (65—165)	.0024 (.0020—.0031)
.1969	5.0	**2DC**	295 (165—330)	.0087 (.0055—.0126)	130 (65—195)	.0039 (.0028—.0047)
		3,5,8DC	265 (195—295)	.0055 (.0035—.0071)	130 (100—150)	.0043 (.0031—.0055)
		10,15,20,25,30DC	260 (130—295)	.0087 (.0055—.0126)	130 (65—195)	.0039 (.0028—.0047)
		35,40DC	210 (130—245)	.0087 (.0043—.0102)	100 (65—165)	.0031 (.0024—.0039)
.2480	6.3	**2DC**	330 (195—360)	.0094 (.0059—.0130)	165 (100—230)	.0047 (.0031—.0063)
		3,5,8DC	295 (230—345)	.0071 (.0043—.0094)	165 (130—195)	.0055 (.0035—.0071)
		10,15,20,25,30DC	295 (165—330)	.0094 (.0059—.0130)	165 (100—230)	.0047 (.0031—.0063)
		35,40DC	245 (130—280)	.0094 (.0047—.0102)	130 (65—195)	.0039 (.0024—.0051)
.3150	8.0	**2DC**	330 (230—360)	.0106 (.0071—.0142)	165 (65—195)	.0055 (.0039—.0067)
		3,5,8DC	330 (260—375)	.0083 (.0063—.0098)	165 (130—195)	.0059 (.0039—.0075)
		10,15,20,25,30DC	295 (195—330)	.0106 (.0071—.0142)	165 (65—195)	.0055 (.0039—.0067)
		35,40DC	245 (150—280)	.0106 (.0055—.0114)	130 (65—165)	.0043 (.0031—.0055)
.3937	10.0	**2DC**	330 (195—395)	.0114 (.0079—.0150)	165 (65—195)	.0059 (.0047—.0071)
		3,5,8DC	360 (280—410)	.0091 (.0075—.0106)	165 (130—195)	.0063 (.0047—.0079)
		10,15,20,25,30DC	295 (195—360)	.0114 (.0079—.0150)	165 (65—195)	.0059 (.0047—.0071)
		35,40DC	245 (150—310)	.0114 (.0063—.0118)	130 (65—165)	.0047 (.0039—.0055)
.4724	12.0	**2DC**	395 (295—460)	.0118 (.0087—.0157)	195 (65—230)	.0067 (.0055—.0075)
		3,5,8DC	395 (310—445)	.0102 (.0087—.0114)	195 (150—230)	.0071 (.0059—.0083)
		10,15,20,25,30DC	330 (195—395)	.0118 (.0087—.0157)	195 (65—230)	.0067 (.0055—.0075)
		35,40DC	260 (130—330)	.0118 (.0071—.0126)	165 (65—195)	.0055 (.0043—.0059)
.6299	16.0	**2DC**	395 (260—460)	.0126 (.0091—.0161)	195 (65—230)	.0067 (.0055—.0075)
		3,5,8DC	425 (330—490)	.0110 (.0091—.0130)	195 (150—230)	.0075 (.0055—.0094)
		10,15,20,25,30DC	330 (195—395)	.0126 (.0091—.0161)	195 (65—230)	.0067 (.0055—.0075)
		35,40DC	260 (130—330)	.0126 (.0071—.0130)	165 (65—195)	.0055 (.0043—.0059)
.7874	20.0	**3,5,8DC**	425 (330—490)	.0118 (.0102—.0134)	195 (150—230)	.0083 (.0059—.0102)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

M

DRILLING

(inch)

DC inch	DC mm	L/D	Gray Cast Iron (≤350MPa) No45B etc. Cutting Speed vc (Min.—Max.) (SFM)	Gray Cast Iron Feed fr (Min.—Max.) (IPR)	Ductile Cast Iron (≤450MPa) 60-60-8 etc. Cutting Speed vc (Min.—Max.) (SFM)	Ductile Cast Iron Feed fr (Min.—Max.) (IPR)
.0394	1.0	**2,7DC**	165 (130—195)	.0016 (.0008—.0020)	130 (100—150)	.0016 (.0008—.0020)
		≥12DC	130 (100—150)	.0008 (.0004—.0012)	100 (65—115)	.0008 (.0004—.0012)
.0591	1.5	**2,7DC**	165 (130—195)	.0020 (.0012—.0031)	130 (100—150)	.0020 (.0012—.0031)
		≥12DC	130 (100—150)	.0020 (.0008—.0031)	100 (65—115)	.0020 (.0008—.0031)
.0787	2.0	**2,7DC**	165 (130—195)	.0028 (.0016—.0039)	130 (100—150)	.0028 (.0016—.0039)
		≥12DC	165 (130—195)	.0028 (.0016—.0039)	165 (130—195)	.0028 (.0016—.0039)
.0984	2.5	**2,7DC**	195 (150—230)	.0035 (.0020—.0051)	165 (130—195)	.0035 (.0020—.0051)
		≥12DC	165 (130—195)	.0035 (.0024—.0051)	165 (130—195)	.0031 (.0020—.0047)
.1260	3.2	**2DC**	295 (195—360)	.0075 (.0043—.0102)	295 (195—360)	.0067 (.0039—.0094)
		3,5,8DC	295 (230—345)	.0039 (.0024—.0051)	215 (165—245)	.0039 (.0024—.0051)
		10,15,20,25,30DC	295 (195—360)	.0075 (.0043—.0102)	295 (195—360)	.0067 (.0039—.0094)
		35,40DC	245 (150—310)	.0059 (.0035—.0083)	100 (65—165)	.0055 (.0031—.0075)
.1575	4.0	**2DC**	330 (230—395)	.0087 (.0051—.0130)	295 (195—360)	.0079 (.0047—.0118)
		3,5,8DC	330 (260—375)	.0047 (.0031—.0063)	215 (165—245)	.0047 (.0031—.0063)
		10,15,20,25,30DC	295 (195—360)	.0087 (.0051—.0130)	295 (195—360)	.0079 (.0047—.0118)
		35,40DC	245 (150—310)	.0071 (.0039—.0102)	100 (65—165)	.0063 (.0039—.0094)
.1969	5.0	**2DC**	330 (230—395)	.0110 (.0028—.0154)	295 (195—360)	.0098 (.0059—.0138)
		3,5,8DC	330 (260—375)	.0059 (.0039—.0079)	215 (165—245)	.0059 (.0039—.0079)
		10,15,20,25,30DC	295 (195—360)	.0110 (.0028—.0154)	295 (195—360)	.0098 (.0059—.0138)
		35,40DC	245 (150—310)	.0087 (.0024—.0122)	100 (65—165)	.0079 (.0047—.0110)
.2480	6.3	**2DC**	360 (260—425)	.0118 (.0075—.0161)	330 (230—395)	.0106 (.0067—.0146)
		3,5,8DC	360 (280—410)	.0079 (.0051—.0102)	230 (180—260)	.0079 (.0051—.0102)
		10,15,20,25,30DC	360 (260—425)	.0118 (.0075—.0161)	330 (230—395)	.0106 (.0067—.0146)
		35,40DC	295 (195—360)	.0094 (.0059—.0130)	130 (100—195)	.0087 (.0055—.0118)
.3150	8.0	**2DC**	395 (295—460)	.0130 (.0087—.0173)	330 (230—395)	.0118 (.0079—.0157)
		3,5,8DC	395 (310—445)	.0098 (.0071—.0122)	230 (180—260)	.0091 (.0071—.0110)
		10,15,20,25,30DC	360 (260—395)	.0130 (.0087—.0173)	330 (230—395)	.0118 (.0079—.0157)
		35,40DC	295 (195—330)	.0102 (.0071—.0138)	130 (100—195)	.0094 (.0063—.0126)
.3937	10.0	**2DC**	425 (330—460)	.0138 (.0094—.0181)	330 (230—395)	.0126 (.0087—.0165)
		3,5,8DC	425 (330—490)	.0114 (.0087—.0138)	230 (180—260)	.0106 (.0087—.0126)
		10,15,20,25,30DC	360 (260—395)	.0138 (.0094—.0181)	330 (230—395)	.0126 (.0087—.0165)
		35,40DC	295 (195—330)	.0110 (.0075—.0146)	130 (100—195)	.0102 (.0071—.0134)
.4724	12.0	**2DC**	460 (330—490)	.0146 (.0102—.0189)	395 (295—460)	.0134 (.0094—.0173)
		3,5,8DC	460 (360—525)	.0126 (.0102—.0146)	295 (230—345)	.0118 (.0102—.0134)
		10,15,20,25,30DC	425 (295—460)	.0146 (.0102—.0189)	395 (295—460)	.0134 (.0094—.0173)
		35,40DC	345 (210—375)	.0118 (.0083—.0150)	165 (130—230)	.0106 (.0075—.0138)
.6299	16.0	**2DC**	525 (395—560)	.0157 (.0114—.0189)	395 (295—460)	.0142 (.0102—.0181)
		3,5,8DC	525 (410—590)	.0138 (.0110—.0165)	295 (230—345)	.0130 (.0110—.0150)
		10,15,20,25,30DC	425 (295—460)	.0157 (.0114—.0189)	395 (295—460)	.0142 (.0102—.0181)
		35,40DC	345 (210—375)	.0126 (.0091—.0150)	165 (130—230)	.0114 (.0083—.0146)
.7874	20.0	**3,5,8DC**	525 (410—590)	.0146 (.0118—.0173)	330 (260—375)	.0138 (.0118—.0157)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

M

DRILLING

MVE/MVS

RECOMMENDED CUTTING CONDITIONS

■ MVS (inch)

Work Material			Aluminum Alloy (Si<5%) ASTM 6061, 7075 etc.		Heat Resistant Alloy Inconel718 etc.	
DC		L/D	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm					
.0394	1.0	**2,7DC**	195 (150—230)	.0020 (.0012—.0031)	35 (15—50)	.0008 (.0004—.0012)
		≥12DC	165 (130—195)	.0020 (.0012—.0031)	35 (15—50)	.0008 (.0004—.0012)
.0591	1.5	**2,7DC**	260 (195—295)	.0028 (.0020—.0047)	35 (15—50)	.0012 (.0008—.0016)
		≥12DC	230 (180—260)	.0031 (.0020—.0047)	35 (15—50)	.0012 (.0008—.0016)
.0787	2.0	**2,7DC**	295 (230—345)	.0039 (.0024—.0059)	50 (35—65)	.0016 (.0012—.0020)
		≥12DC	260 (195—295)	.0043 (.0024—.0059)	50 (35—65)	.0016 (.0012—.0020)
.0984	2.5	**2,7DC**	330 (260—375)	.0051 (.0031—.0079)	50 (35—65)	.0020 (.0016—.0024)
		≥12DC	295 (230—345)	.0055 (.0031—.0079)	50 (35—65)	.0020 (.0016—.0024)
.1260	3.2	**2DC**	395 (260—490)	.0091 (.0039—.0138)	65 (30—80)	.0028 (.0020—.0035)
		3,5,8DC	395 (310—460)	.0091 (.0039—.0138)	65 (50—80)	.0028 (.0020—.0035)
		10,15,20,25,30DC	330 (195—425)	.0091 (.0039—.0138)	65 (30—80)	.0028 (.0020—.0035)
		35,40DC	260 (130—360)	.0071 (.0031—.0110)	50 (30—65)	.0024 (.0016—.0028)
.1575	4.0	**2DC**	395 (260—490)	.0094 (.0047—.0138)	65 (30—80)	.0035 (.0024—.0043)
		3,5,8DC	395 (310—460)	.0094 (.0047—.0138)	65 (50—80)	.0035 (.0024—.0043)
		10,15,20,25,30DC	330 (195—425)	.0094 (.0047—.0138)	65 (30—80)	.0035 (.0024—.0043)
		35,40DC	260 (130—360)	.0075 (.0039—.0110)	50 (30—65)	.0028 (.0020—.0035)
.1969	5.0	**2DC**	395 (260—490)	.0098 (.0059—.0138)	65 (30—80)	.0043 (.0031—.0055)
		3,5,8DC	395 (310—460)	.0098 (.0059—.0138)	65 (50—80)	.0043 (.0031—.0055)
		10,15,20,25,30DC	330 (195—425)	.0098 (.0059—.0138)	65 (30—80)	.0043 (.0031—.0055)
		35,40DC	260 (130—360)	.0079 (.0047—.0110)	50 (30—65)	.0035 (.0024—.0043)
.2480	6.3	**2DC**	490 (360—590)	.0138 (.0079—.0197)	80 (50—100)	.0051 (.0035—.0063)
		3,5,8DC	490 (395—560)	.0138 (.0079—.0197)	80 (65—100)	.0051 (.0035—.0063)
		10,15,20,25,30DC	425 (295—525)	.0138 (.0079—.0197)	65 (30—80)	.0051 (.0035—.0063)
		35,40DC	345 (210—440)	.0110 (.0063—.0157)	50 (30—65)	.0039 (.0028—.0051)
.3150	8.0	**2DC**	490 (330—560)	.0138 (.0079—.0197)	80 (50—100)	.0055 (.0043—.0063)
		3,5,8DC	490 (395—560)	.0138 (.0079—.0197)	80 (65—100)	.0055 (.0043—.0067)
		10,15,20,25,30DC	425 (260—490)	.0138 (.0079—.0197)	65 (30—80)	.0055 (.0043—.0063)
		35,40DC	345 (180—410)	.0110 (.0063—.0157)	50 (30—65)	.0043 (.0035—.0051)
.3937	10.0	**2DC**	490 (330—560)	.0197 (.0079—.0315)	80 (50—100)	.0059 (.0047—.0067)
		3,5,8DC	490 (395—560)	.0197 (.0079—.0315)	80 (65—100)	.0059 (.0047—.0067)
		10,15,20,25,30DC	425 (260—490)	.0197 (.0079—.0315)	65 (30—80)	.0059 (.0047—.0067)
		35,40DC	345 (180—410)	.0157 (.0063—.0252)	50 (30—65)	.0047 (.0039—.0055)
.4724	12.0	**2DC**	525 (330—560)	.0197 (.0079—.0315)	80 (50—100)	.0063 (.0051—.0071)
		3,5,8DC	525 (410—590)	.0197 (.0079—.0315)	80 (65—100)	.0063 (.0051—.0071)
		10,15,20,25,30DC	460 (260—490)	.0197 (.0079—.0315)	65 (30—80)	.0063 (.0051—.0071)
		35,40DC	375 (180—410)	.0157 (.0063—.0252)	50 (30—65)	.0051 (.0039—.0055)
.6299	16.0	**2DC**	525 (330—560)	.0197 (.0079—.0315)	80 (50—100)	.0067 (.0055—.0075)
		3,5,8DC	525 (410—590)	.0236 (.0079—.0394)	80 (65—100)	.0071 (.0055—.0083)
		10,15,20,25,30DC	460 (260—490)	.0197 (.0079—.0315)	65 (30—80)	.0067 (.0055—.0075)
		35,40DC	375 (180—410)	.0157 (.0063—.0252)	50 (30—65)	.0055 (.0043—.0059)
.7874	20.0	**3,5,8DC**	560 (445—655)	.0236 (.0079—.0394)	100 (65—115)	.0075 (.0059—.0087)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

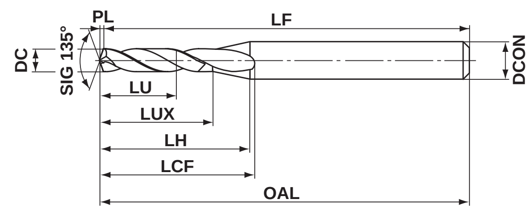
Memo

DWAE Mini Size NEW

UWC DP1A 135° XR DC<.0787 X DC≥.0787

P M K N S H

External Coolant



Type1

DC≤.1181			
0 / − .00055			
DCON=.1181	DCON=.1575		
0 / − .00024	0 / − .00031		

DC Metric (mm)	DC Decimal (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP102A	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.0	.0394			2	Ext.	DWAE0100X02S030	●	2.2	.087	5.0	.197	7.7	.303	8.7	.343	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0100X04S030	●	4.2	.165	7.0	.276	9.9	.390	10.7	.421	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.1	.0433			2	Ext.	DWAE0110X02S030	●	2.4	.094	5.4	.213	8.1	.319	8.9	.350	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0110X04S030	●	4.6	.181	7.6	.299	10.5	.413	11.1	.437	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.2	.0472			2	Ext.	DWAE0120X02S030	●	2.6	.102	5.8	.228	8.5	.335	9.2	.362	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0120X04S030	●	5.0	.197	8.2	.323	11.1	.437	11.6	.457	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.3	.0512			2	Ext.	DWAE0130X02S030	●	2.9	.114	6.3	.248	9.0	.354	9.5	.374	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0130X04S030	●	5.5	.217	8.9	.350	11.9	.469	12.1	.476	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.4	.0551			2	Ext.	DWAE0140X02S030	●	3.1	.122	6.7	.264	9.4	.370	9.7	.382	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0140X04S030	●	5.9	.232	9.5	.374	12.5	.492	12.5	.492	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.5	.0591		#1-64	2	Ext.	DWAE0150X02S030	●	3.3	.130	7.1	.280	9.8	.386	9.9	.390	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0150X04S030	●	6.3	.248	10.1	.398	13.1	.516	12.9	.508	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.6	.0630			2	Ext.	DWAE0160X02S030	●	3.5	.138	7.5	.295	10.2	.402	10.1	.398	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0160X04S030	●	6.7	.264	10.7	.421	13.7	.539	13.3	.524	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.7	.0669			2	Ext.	DWAE0170X02S030	●	3.8	.150	8.0	.315	10.7	.421	10.4	.409	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0170X04S030	●	7.2	.283	11.4	.449	14.4	.567	13.8	.543	45	1.772	44.6	1.756	0.4	.016	3	.118	1
1.8	.0709			2	Ext.	DWAE0180X02S030	●	4.0	.157	8.4	.331	11.1	.437	10.6	.417	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0180X04S030	●	7.6	.299	12.0	.472	15.1	.594	14.2	.559	45	1.772	44.6	1.756	0.4	.016	3	.118	1
1.9	.0748			2	Ext.	DWAE0190X02S030	●	4.2	.165	8.8	.346	11.5	.453	10.9	.429	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0190X04S030	●	8.0	.315	12.6	.496	15.7	.618	14.7	.579	45	1.772	44.6	1.756	0.4	.016	3	.118	1
2.0	.0787		#3-48	2	Ext.	DWAE0200X02S040	●	4.4	.173	9.2	.362	12.8	.504	12.9	.508	50	1.969	49.6	1.953	0.4	.016	4	.157	1
				4	Ext.	DWAE0200X04S040	●	8.4	.331	13.2	.520	17.2	.677	16.9	.665	50	1.969	49.6	1.953	0.4	.016	4	.157	1
2.1	.0827			2	Ext.	DWAE0210X02S040	●	4.6	.181	9.6	.378	13.2	.520	13.1	.516	50	1.969	49.6	1.953	0.4	.016	4	.157	1
				4	Ext.	DWAE0210X04S040	●	8.8	.346	13.8	.543	17.8	.701	17.3	.681	50	1.969	49.6	1.953	0.4	.016	4	.157	1
2.2	.0866			2	Ext.	DWAE0220X02S040	●	4.9	.193	10.1	.398	13.7	.539	13.5	.531	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0220X04S040	●	9.3	.366	14.5	.571	18.5	.728	17.9	.705	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.3	.0906			2	Ext.	DWAE0230X02S040	●	5.1	.201	10.5	.413	14.1	.555	13.7	.539	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0230X04S040	●	9.7	.382	15.1	.594	19.2	.756	18.3	.720	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.4	.0945			2	Ext.	DWAE0240X02S040	●	5.3	.209	10.9	.429	14.5	.571	13.9	.547	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0240X04S040	●	10.1	.398	15.7	.618	19.8	.780	18.7	.736	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.5	.0984			2	Ext.	DWAE0250X02S040	●	5.5	.217	11.3	.445	14.9	.587	14.1	.555	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0250X04S040	●	10.5	.413	16.3	.642	20.4	.803	19.1	.752	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.6	.1024			2	Ext.	DWAE0260X02S040	●	5.7	.224	11.7	.461	15.3	.602	14.3	.563	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0260X04S040	●	10.9	.429	16.9	.665	21.0	.827	19.5	.768	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.7	.1063	36	#6-32	2	Ext.	DWAE0270X02S040	●	6.0	.236	12.2	.480	15.8	.622	14.6	.575	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0270X04S040	●	11.4	.449	17.6	.693	21.7	.854	20.0	.787	50	1.969	49.4	1.945	0.6	.024	4	.157	1
2.8	.1102	35		2	Ext.	DWAE0280X02S040	●	6.2	.244	12.6	.496	16.2	.638	14.8	.583	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0280X04S040	●	11.8	.465	18.2	.717	22.4	.882	20.4	.803	50	1.969	49.4	1.945	0.6	.024	4	.157	1
2.9	.1142			2	Ext.	DWAE0290X02S040	●	6.4	.252	13.0	.512	16.6	.654	15.1	.594	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0290X04S040	●	12.2	.480	18.8	.740	23.0	.906	20.9	.823	50	1.969	49.4	1.945	0.6	.024	4	.157	1

DC = Cutting Diameter
LU = Usable Length
LUX = Max. Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

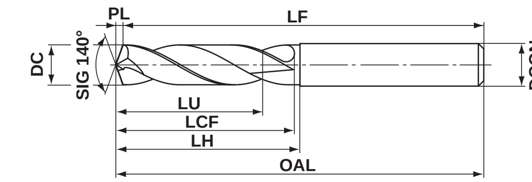
M

DRILLING

DWAE

UWC DP1A 140° Z

P M K N S H



Type1

DC=.1181	.1181<DC≤.2362	.2362<DC≤.3937	.3937<DC≤.5512
0 / − .00055	0 / − .00071	0 / − .00087	0 / − .00106
DCON=.1181	.1181<DCON≤.2362	.2362<DCON≤.3937	.3937<DCON≤.5512
0 / − .00024	0 / − .00031	0 / − .00035	0 / − .00043

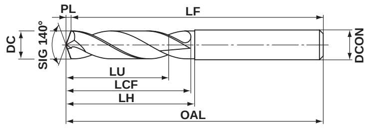
DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP102A	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.0	.1181				2	Ext.	DWAE0300X02S030	●	6.5	.256	12.5	.492	14.5	.571	45.5	1.791	45	1.772	0.5	.020	3	.118	1
					4	Ext.	DWAE0300X04S030	●	12.5	.492	21.5	.846	23.5	.925	55.5	2.185	55	2.165	0.5	.020	3	.118	1
3.1	.1220				2	Ext.	DWAE0310X02S040	●	6.8	.268	12.6	.496	14.6	.575	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0310X04S040	●	13.0	.512	21.6	.850	23.6	.929	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.2	.1260				2	Ext.	DWAE0320X02S040	●	7.0	.276	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0320X04S040	●	13.4	.528	22.6	.890	24.6	.969	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.3	.1299			M4x.7	2	Ext.	DWAE0330X02S040	●	7.2	.283	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0330X04S040	●	13.8	.543	23.6	.929	25.6	1.008	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.4	.1339				2	Ext.	DWAE0340X02S040	●	7.4	.291	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0340X04S040	●	14.2	.559	23.6	.929	25.6	1.008	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.5	.1378				2	Ext.	DWAE0350X02S040	●	7.6	.299	14.6	.575	16.6	.654	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0350X04S040	●	14.6	.575	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.6	.1417				2	Ext.	DWAE0360X02S040	●	7.9	.311	14.7	.579	16.7	.657	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0360X04S040	●	15.1	.594	25.7	1.012	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.7	.1457			M4.5x.75	2	Ext.	DWAE0370X02S040	●	8.1	.319	14.7	.579	16.7	.657	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0370X04S040	●	15.5	.610	25.7	1.012	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.8	.1496		25	#10-24	2	Ext.	DWAE0380X02S040	●	8.3	.327	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0380X04S040	●	15.9	.626	26.7	1.051	28.7	1.130	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.9	.1535				2	Ext.	DWAE0390X02S040	●	8.5	.335	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0390X04S040	●	16.3	.642	27.7	1.091	29.7	1.169	60.7	2.390	60	2.362	0.7	.028	4	.157	1
4.0	.1575				2	Ext.	DWAE0400X02S040	●	8.7	.343	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0400X04S040	●	16.7	.657	27.7	1.091	29.7	1.169	60.7	2.390	60	2.362	0.7	.028	4	.157	1
4.1	.1614				2	Ext.	DWAE0410X02S050	●	8.9	.350	16.7	.657	18.7	.736	62.7	2.469	62	2.441	0.7	.028	5	.197	1
					4	Ext.	DWAE0410X04S050	●	17.1	.673	28.7	1.130	30.7	1.209	80.7	3.177	80	3.150	0.7	.028	5	.197	1
4.2	.1654			M5x.8	2	Ext.	DWAE0420X02S050	●	9.2	.362	16.8	.661	18.8	.740	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0420X04S050	●	17.6	.693	29.8	1.173	31.8	1.252	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.3	.1693				2	Ext.	DWAE0430X02S050	●	9.4	.370	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0430X04S050	●	18.0	.709	30.8	1.213	32.8	1.291	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.4	.1732		17		2	Ext.	DWAE0440X02S050	●	9.6	.378	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0440X04S050	●	18.4	.724	30.8	1.213	32.8	1.291	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.5	.1772		16	#12-24	2	Ext.	DWAE0450X02S050	●	9.8	.386	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0450X04S050	●	18.8	.740	31.8	1.252	33.8	1.331	80.8	3.181	80	3.150	0.8	.031	5	.197	1

● : USA Stock

M

DRILLING

DWAE

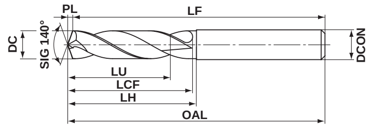


DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP102A	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.6	.1811				2	Ext.	DWAE0460X02S050	●	10.0	.394	18.8	.740	20.8	.819	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0460X04S050	●	19.2	.756	32.8	1.291	34.8	1.370	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.7	.1850		13		2	Ext.	DWAE0470X02S050	●	10.3	.406	18.9	.744	20.9	.823	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0470X04S050	●	19.7	.776	32.9	1.295	34.9	1.374	80.9	3.185	80	3.150	0.9	.035	5	.197	1
4.8	.1890		12		2	Ext.	DWAE0480X02S050	●	10.5	.413	18.9	.744	20.9	.823	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0480X04S050	●	20.1	.791	33.9	1.335	35.9	1.413	80.9	3.185	80	3.150	0.9	.035	5	.197	1
4.9	.1929				2	Ext.	DWAE0490X02S050	●	10.7	.421	19.9	.783	21.9	.862	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0490X04S050	●	20.5	.807	34.9	1.374	36.9	1.453	80.9	3.185	80	3.150	0.9	.035	5	.197	1
5.0	.1969			M6x1.0	2	Ext.	DWAE0500X02S050	●	10.9	.429	19.9	.783	21.9	.862	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0500X04S050	●	20.9	.823	34.9	1.374	36.9	1.453	80.9	3.185	80	3.150	0.9	.035	5	.197	1
5.1	.2008		7	1/4-20	2	Ext.	DWAE0510X02S060	●	11.1	.437	21.9	.862	23.9	.941	66.9	2.634	66	2.598	0.9	.035	6	.236	1
					4	Ext.	DWAE0510X04S060	●	21.3	.839	35.9	1.413	37.9	1.492	80.9	3.185	80	3.150	0.9	.035	6	.236	1
5.2	.2047				2	Ext.	DWAE0520X02S060	●	11.3	.445	21.9	.862	23.9	.941	66.9	2.634	66	2.598	0.9	.035	6	.236	1
					4	Ext.	DWAE0520X04S060	●	21.7	.854	36.9	1.453	38.9	1.531	80.9	3.185	80	3.150	0.9	.035	6	.236	1
5.3	.2087		4		2	Ext.	DWAE0530X02S060	●	11.6	.457	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0530X04S060	●	22.2	.874	37.0	1.457	39.0	1.535	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.4	.2126		3	1/4-28	2	Ext.	DWAE0540X02S060	●	11.8	.465	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0540X04S060	●	22.6	.890	38.0	1.496	40.0	1.575	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.5	.2165				2	Ext.	DWAE0550X02S060	●	12.0	.472	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0550X04S060	●	23.0	.906	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.6	.2205		2		2	Ext.	DWAE0560X02S060	●	12.2	.480	24.0	.945	26.0	1.024	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0560X04S060	●	23.4	.921	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.7	.2244				2	Ext.	DWAE0570X02S060	●	12.4	.488	24.0	.945	26.0	1.024	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0570X04S060	●	23.8	.937	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.8	.2283		1		2	Ext.	DWAE0580X02S060	●	12.7	.500	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0580X04S060	●	24.3	.957	41.1	1.618	43.1	1.697	81.1	3.193	80	3.150	1.1	.043	6	.236	1
5.9	.2323				2	Ext.	DWAE0590X02S060	●	12.9	.508	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0590X04S060	●	24.7	.972	41.1	1.618	43.1	1.697	81.1	3.193	80	3.150	1.1	.043	6	.236	1
6.0	.2362			M7x1.0	2	Ext.	DWAE0600X02S060	●	13.1	.516	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0600X04S060	●	25.1	.988	42.1	1.657	44.1	1.736	81.1	3.193	80	3.150	1.1	.043	6	.236	1
6.1	.2402				2	Ext.	DWAE0610X02S070	●	13.3	.524	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0610X04S070	●	25.5	1.004	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.2	.2441				2	Ext.	DWAE0620X02S070	●	13.5	.531	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0620X04S070	●	25.9	1.020	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.3	.2480				2	Ext.	DWAE0630X02S070	●	13.7	.539	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0630X04S070	●	26.3	1.035	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.4	.2520				2	Ext.	DWAE0640X02S070	●	14.0	.551	26.2	1.031	28.2	1.110	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0640X04S070	●	26.8	1.055	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.5	.2559				2	Ext.	DWAE0650X02S070	●	14.2	.559	26.2	1.031	28.2	1.110	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0650X04S070	●	27.2	1.071	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.6	.2598				2	Ext.	DWAE0660X02S070	●	14.4	.567	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0660X04S070	●	27.6	1.087	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.7	.2638				2	Ext.	DWAE0670X02S070	●	14.6	.575	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0670X04S070	●	28.0	1.102	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.8	.2677				2	Ext.	DWAE0680X02S070	●	14.8	.583	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0680X04S070	●	28.4	1.118	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.9	.2717		I	5/16-24	2	Ext.	DWAE0690X02S070	●	15.1	.594	28.3	1.114	30.3	1.193	75.3	2.965	74	2.913	1.3	.051	7	.276	1
					4	Ext.	DWAE0690X04S070	●	28.9	1.138	46.3	1.823	48.3	1.902	84.3	3.319	83	3.268	1.3	.051	7	.276	1
7.0	.2756			M8x1.0	2	Ext.	DWAE0700X02S070	●	15.3	.602	28.3	1.114	30.3	1.193	75.3	2.965	74	2.913	1.3	.051	7	.276	1
					4	Ext.	DWAE0700X04S070	●	29.3	1.154	46.3	1.823	48.3	1.902	84.3	3.319	83	3.268	1.3	.051	7	.276	1
7.1	.2795				2	Ext.	DWAE0710X02S080	●	15.5	.610	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0710X04S080	●	29.7	1.169	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.2	.2835				2	Ext.	DWAE0720X02S080	●	15.7	.618	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0720X04S080	●	30.1	1.185	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.3	.2874				2	Ext.	DWAE0730X02S080	●	15.9	.626	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0730X04S080	●	30.5	1.201	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.4	.2913				2	Ext.	DWAE0740X02S080	●	16.1	.634	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0740X04S080	●	30.9	1.217	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.5	.2953		M		2	Ext.	DWAE0750X02S080	●	16.4	.646	29.4	1.157	31.4	1.236	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0750X04S080	●	31.4	1.236	51.4	2.024	53.4	2.102	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.6	.2992				2	Ext.	DWAE0760X02S080	●	16.6	.654	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0760X04S080	●	31.8	1.252	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.7	.3031				2	Ext.	DWAE0770X02S080	●	16.8	.661	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0770X04S080	●	32.2	1.268	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.8	.3071				2	Ext.	DWAE0780X02S080	●	17.0	.669	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0780X04S080	●	32.6	1.283	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.9	.3110				2	Ext.	DWAE0790X02S080	●	17.2	.677	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0790X04S080	●	33.0	1.299	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
8.0	.3150				2	Ext.	DWAE0800X02S080	●	17.5	.689	31.5	1.240	33.5	1.319	80.5	3.169	79	3.110	1.5	.059	8	.315	1
					4	Ext.	DWAE0800X04S080	●	33.5	1.319	53.5	2.106	55.5	2.185	91.5	3.602	90	3.543	1.5	.059	8	.315	1
8.1	.3189				2	Ext.	DWAE0810X02S090	●	17.7	.697	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0810X04S090	●	33.9	1.335	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.2	.3228		P		2	Ext.	DWAE0820X02S090	●	17.9	.705	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0820X04S090	●	34.3	1.350	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.3	.3268				2	Ext.	DWAE0830X02S090	●	18.1	.713	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0830X04S090	●	34.7	1.366	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.4	.3307				2	Ext.	DWAE0840X02S090	●	18.3	.720	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0840X04S090	●	35.1	1.382	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.5	.3346			M10x1.5	2	Ext.	DWAE0850X02S090	●	18.5	.728	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0850X04S090	●	35.5	1.398	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.6	.3386		R		2	Ext.	DWAE0860X02S090	●	18.8	.740	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0860X04S090	●	36.0	1.417	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.7	.3425			M10x1.25	2	Ext.	DWAE0870X02S090	●	19.0	.748	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0870X04S090	●	36.4	1.433	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.8	.3465				2	Ext.	DWAE0880X02S090	●	19.2	.756	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0880X04S090	●	36.8	1.449	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.9	.3504				2	Ext.	DWAE0890X02S090	●	19.4	.764	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0890X04S090	●	37.2	1.465	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
9.0	.3543				2	Ext.	DWAE0900X02S090	●	19.6	.772	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0900X04S090	●	37.6	1.480	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
9.1	.3583		T		2	Ext.	DWAE0910X02S100	●	19.9	.783	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0910X04S100	●	38.1	1.500	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.2	.3622				2	Ext.	DWAE0920X02S100	●	20.1	.791	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0920X04S100	●	38.5	1.516	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.3	.3661				2	Ext.	DWAE0930X02S100	●	20.3	.799	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0930X04S100	●	38.9	1.531	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.4	.3701				2	Ext.	DWAE0940X02S100	●	20.5	.807	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0940X04S100	●	39.3	1.547	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.5	.3740				2	Ext.	DWAE0950X02S100	●	20.7	.815	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0950X04S100	●	39.7	1.563	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

DWAE



Type1

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP102A	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
9.6	.3780				2	Ext.	DWAE0960X02S100	●	20.9	.823	37.7	1.484	39.7	1.563	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0960X04S100	●	40.1	1.579	66.7	2.626	68.7	2.705	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.7	.3819		Tube Sheet		2	Ext.	DWAE0970X02S100	●	21.2	.835	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0970X04S100	●	40.6	1.598	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
9.8	.3858		W		2	Ext.	DWAE0980X02S100	●	21.4	.843	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0980X04S100	●	41.0	1.614	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
9.9	.3898				2	Ext.	DWAE0990X02S100	●	21.6	.850	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0990X04S100	●	41.4	1.630	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
10.0	.3937				2	Ext.	DWAE1000X02S100	●	21.8	.858	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE1000X04S100	●	41.8	1.646	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
10.1	.3976				2	Ext.	DWAE1010X02S110	●	22.0	.866	40.8	1.606	42.8	1.685	101.8	4.008	100	3.937	1.8	.071	11	.433	1
					4	Ext.	DWAE1010X04S110	●	42.2	1.661	71.8	2.827	73.8	2.906	115.8	4.559	114	4.488	1.8	.071	11	.433	1
10.2	.4016			M12x1.75	2	Ext.	DWAE1020X02S110	●	22.3	.878	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1020X04S110	●	42.7	1.681	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.3	.4055				2	Ext.	DWAE1030X02S110	●	22.5	.886	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1030X04S110	●	43.1	1.697	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.4	.4094				2	Ext.	DWAE1040X02S110	●	22.7	.894	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1040X04S110	●	43.5	1.713	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.5	.4134		Z		2	Ext.	DWAE1050X02S110	●	22.9	.902	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1050X04S110	●	43.9	1.728	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.6	.4173				2	Ext.	DWAE1060X02S110	●	23.1	.909	41.9	1.650	43.9	1.728	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1060X04S110	●	44.3	1.744	72.9	2.870	74.9	2.949	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.7	.4213				2	Ext.	DWAE1070X02S110	●	23.3	.917	41.9	1.650	43.9	1.728	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1070X04S110	●	44.7	1.760	72.9	2.870	74.9	2.949	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.8	.4252			M12x1.25	2	Ext.	DWAE1080X02S110	●	23.6	.929	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1080X04S110	●	45.2	1.780	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
10.9	.4291				2	Ext.	DWAE1090X02S110	●	23.8	.937	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1090X04S110	●	45.6	1.795	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
11.0	.4331				2	Ext.	DWAE1100X02S110	●	24.0	.945	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1100X04S110	●	46.0	1.811	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
11.1	.4370				2	Ext.	DWAE1110X02S120	●	24.2	.953	45.0	1.772	47.0	1.850	102.0	4.016	100	3.937	2.0	.079	12	.472	1
					4	Ext.	DWAE1110X04S120	●	46.4	1.827	77.0	3.031	79.0	3.110	123.0	4.843	121	4.764	2.0	.079	12	.472	1
11.2	.4409				2	Ext.	DWAE1120X02S120	●	24.4	.961	45.0	1.772	47.0	1.850	102.0	4.016	100	3.937	2.0	.079	12	.472	1
					4	Ext.	DWAE1120X04S120	●	46.8	1.843	77.0	3.031	79.0	3.110	123.0	4.843	121	4.764	2.0	.079	12	.472	1
11.3	.4449				2	Ext.	DWAE1130X02S120	●	24.7	.972	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1130X04S120	●	47.3	1.862	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.4	.4488				2	Ext.	DWAE1140X02S120	●	24.9	.980	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1140X04S120	●	47.7	1.878	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.5	.4528				2	Ext.	DWAE1150X02S120	●	25.1	.988	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1150X04S120	●	48.1	1.894	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.6	.4567				2	Ext.	DWAE1160X02S120	●	25.3	.996	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1160X04S120	●	48.5	1.909	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.7	.4606				2	Ext.	DWAE1170X02S120	●	25.5	1.004	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1170X04S120	●	48.9	1.925	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.8	.4646				2	Ext.	DWAE1180X02S120	●	25.7	1.012	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1180X04S120	●	49.3	1.941	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.9	.4685				2	Ext.	DWAE1190X02S120	●	26.0	1.024	47.2	1.858	49.2	1.937	102.2	4.024	100	3.937	2.2	.087	12	.472	1
					4	Ext.	DWAE1190X04S120	●	49.8	1.961	79.2	3.118	81.2	3.197	123.2	4.850	121	4.764	2.2	.087	12	.472	1
12.0	.4724			M14x2.0	2	Ext.	DWAE1200X02S120	●	26.2	1.031	47.2	1.858	49.2	1.937	102.2	4.024	100	3.937	2.2	.087	12	.472	1
					4	Ext.	DWAE1200X04S120	●	50.2	1.976	79.2	3.118	81.2	3.197	123.2	4.850	121	4.764	2.2	.087	12	.472	1
12.1	.4764				2	Ext.	DWAE1210X02S130	●	26.4	1.039	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1210X04S130	●	50.6	1.992	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.2	.4803				2	Ext.	DWAE1220X02S130	●	26.6	1.047	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1220X04S130	●	51.0	2.008	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.3	.4843			9/16-12	2	Ext.	DWAE1230X02S130	●	26.8	1.055	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1230X04S130	●	51.4	2.024	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.4	.4882				2	Ext.	DWAE1240X02S130	●	27.1	1.067	49.3	1.941	51.3	2.020	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1240X04S130	●	51.9	2.043	82.3	3.240	84.3	3.319	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.5	.4921			M14x1.5	2	Ext.	DWAE1250X02S130	●	27.3	1.075	49.3	1.941	51.3	2.020	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1250X04S130	●	52.3	2.059	82.3	3.240	84.3	3.319	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.6	.4961				2	Ext.	DWAE1260X02S130	●	27.5	1.083	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1260X04S130	●	52.7	2.075	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.7	.5000	1/2			2	Ext.	DWAE1270X02S130	●	27.7	1.091	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1270X04S130	●	53.1	2.091	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.8	.5039				2	Ext.	DWAE1280X02S130	●	27.9	1.098	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1280X04S130	●	53.5	2.106	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.9	.5079				2	Ext.	DWAE1290X02S130	●	28.1	1.106	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1290X04S130	●	53.9	2.122	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
13.0	.5118				2	Ext.	DWAE1300X02S130	●	28.4	1.118	52.4	2.063	54.4	2.142	102.4	4.031	100	3.937	2.4	.094	13	.512	1
					4	Ext.	DWAE1300X04S130	●	54.4	2.142	84.4	3.323	86.4	3.402	139.4	5.488	137	5.394	2.4	.094	13	.512	1
13.1	.5157			9/16-18	2	Ext.	DWAE1310X02S140	●	28.6	1.126	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1310X04S140	●	54.8	2.157	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.2	.5197				2	Ext.	DWAE1320X02S140	●	28.8	1.134	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1320X04S140	●	55.2	2.173	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.3	.5236				2	Ext.	DWAE1330X02S140	●	29.0	1.142	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1330X04S140	●	55.6	2.189	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.4	.5276				2	Ext.	DWAE1340X02S140	●	29.2	1.150	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1340X04S140	●	56.0	2.205	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.5	.5315			5/8-11	2	Ext.	DWAE1350X02S140	●	29.5	1.161	55.5	2.185	57.5	2.264	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1350X04S140	●	56.5	2.224	92.5	3.642	94.5	3.720	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.6	.5354				2	Ext.	DWAE1360X02S140	●	29.7	1.169	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1360X04S140	●	56.9	2.240	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.7	.5394				2	Ext.	DWAE1370X02S140	●	29.9	1.177	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1370X04S140	●	57.3	2.256	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.8	.5433				2	Ext.	DWAE1380X02S140	●	30.1	1.185	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1380X04S140	●	57.7	2.272	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.9	.5472				2	Ext.	DWAE1390X02S140	●	30.3	1.193	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1390X04S140	●	58.1	2.287	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
14.0	.5512			M16x2.0	2	Ext.	DWAE1400X02S140	●	30.5	1.201	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1400X04S140	●	58.5	2.303	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

DC = Cutting Diameter
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OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

DWAE

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material			Mild Steels (≦180HB) AISI 1010 etc.		Carbon Steels, Alloy Steels (180−250HB) AISI 1045,4140 etc.	
DC mm	DC inch	L/D	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)
1.0	.0394	2, 4	100	.0012 (.0008−.0016)	100	.0012 (.0008−.0016)
1.5	.0591	2, 4	100	.0020 (.0012−.0024)	100	.0020 (.0012−.0024)
2.0	.0787	2, 4	180	.0024 (.0016−.0031)	180	.0024 (.0016−.0031)
2.5	.0984	2, 4	180	.0031 (.0020−.0039)	180	.0031 (.0020−.0039)
3.0	.1181	2, 4	210	.0035 (.0028−.0043)	195	.0035 (.0028−.0043)
4.0	.1575	2, 4	230	.0045 (.0035−.0055)	210	.0045 (.0035−.0055)
5.0	.1969	2, 4	230	.0057 (.0043−.0071)	210	.0057 (.0043−.0071)
6.0	.2362	2, 4	260	.0069 (.0055−.0083)	245	.0069 (.0055−.0083)
7.0	.2756	2, 4	260	.0081 (.0063−.0098)	245	.0081 (.0063−.0098)
8.0	.3150	2, 4	280	.0091 (.0071−.0110)	260	.0091 (.0071−.0110)
10.0	.3937	2, 4	295	.0104 (.0083−.0126)	280	.0104 (.0083−.0126)
12.0	.4724	2, 4	310	.0110 (.0087−.0134)	295	.0110 (.0087−.0134)
14.0	.5512	2, 4	310	.0114 (.0091−.0138)	295	.0114 (.0091−.0138)

Workpiece Material			Carbon Steels, Alloy Steels (280−350HB) AISI 4340 etc.		Austenitic Stainless Steels (≦200HB) Ferritic, Precipitation Hardening Stainless Steels (>200HB) with water-insoluble coolant AISI 304, 431 etc.	
DC mm	DC inch	L/D	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)
1.0	.0394	2, 4	80	.0008 (.0004−.0012)	100	.0008 (.0004−.0012)
1.5	.0591	2, 4	80	.0016 (.0008−.0020)	100	.0016 (.0008−.0020)
2.0	.0787	2, 4	165	.0020 (.0012−.0028)	115	.0016 (.0008−.0024)
2.5	.0984	2, 4	165	.0028 (.0016−.0035)	115	.0024 (.0012−.0031)
3.0	.1181	2, 4	180	.0030 (.0024−.0035)	130	.0028 (.0016−.0039)
4.0	.1575	2, 4	195	.0041 (.0031−.0051)	130	.0030 (.0020−.0039)
5.0	.1969	2, 4	195	.0051 (.0039−.0063)	130	.0039 (.0020−.0059)
6.0	.2362	2, 4	230	.0061 (.0047−.0075)	130	.0041 (.0024−.0059)
7.0	.2756	2, 4	230	.0071 (.0055−.0087)	130	.0047 (.0024−.0071)
8.0	.3150	2, 4	245	.0081 (.0063−.0098)	130	.0051 (.0024−.0079)
10.0	.3937	2, 4	260	.0094 (.0079−.0110)	130	.0055 (.0031−.0079)
12.0	.4724	2, 4	280	.0098 (.0079−.0118)	130	.0069 (.0039−.0098)
14.0	.5512	2, 4	280	.0098 (.0079−.0118)	130	.0069 (.0039−.0098)

Note 1) The above cutting conditions is with the water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: .2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within .0012".
Note 7) Do not clamp the flute part of the drill.

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material			Gray Cast Irons (≦350MPa) AISI No.45B etc.		Ductile Cast Irons (≦450MPa) AISI 60-40-18 etc.	
DC mm	DC inch	L/D	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)	Cutting Speed vc (SFM)	Feed fr (Min.−Max.) (IPR)
1.0	.0394	2, 4	100	.0012 (.0008−.0016)	80	.0008 (.0004−.0012)
1.5	.0591	2, 4	100	.0020 (.0012−.0024)	80	.0016 (.0008−.0020)
2.0	.0787	2, 4	180	.0024 (.0016−.0031)	165	.0020 (.0012−.0028)
2.5	.0984	2, 4	180	.0031 (.0020−.0039)	165	.0028 (.0016−.0035)
3.0	.1181	2, 4	195	.0041 (.0024−.0059)	180	.0033 (.0020−.0047)
4.0	.1575	2, 4	210	.0051 (.0031−.0071)	195	.0047 (.0028−.0067)
5.0	.1969	2, 4	210	.0059 (.0039−.0079)	195	.0055 (.0031−.0079)
6.0	.2362	2, 4	245	.0069 (.0047−.0091)	230	.0059 (.0039−.0079)
7.0	.2756	2, 4	245	.0069 (.0047−.0091)	230	.0069 (.0047−.0091)
8.0	.3150	2, 4	260	.0083 (.0067−.0098)	245	.0079 (.0059−.0098)
10.0	.3937	2, 4	280	.0091 (.0071−.0110)	260	.0091 (.0071−.0110)
12.0	.4724	2, 4	295	.0098 (.0079−.0118)	280	.0098 (.0079−.0118)
14.0	.5512	2, 4	295	.0098 (.0079−.0118)	280	.0098 (.0079−.0118)

Note 1) The above cutting conditions is with the water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: .2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within .0012".
Note 7) Do not clamp the flute part of the drill.

Solid Carbide Drill for Swiss-type Automatic & Small CNC Lathes

WSTAR **Drill Series**

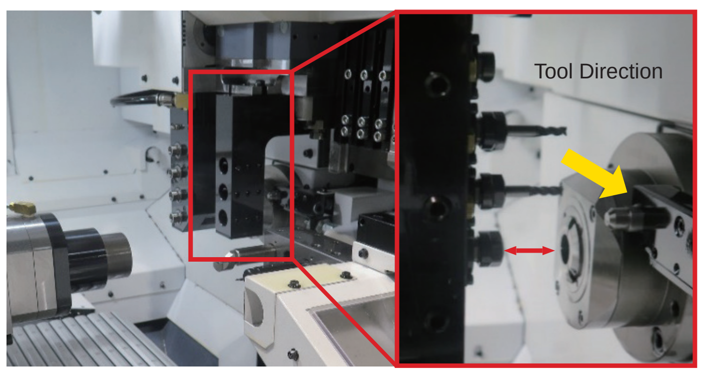
DWAE

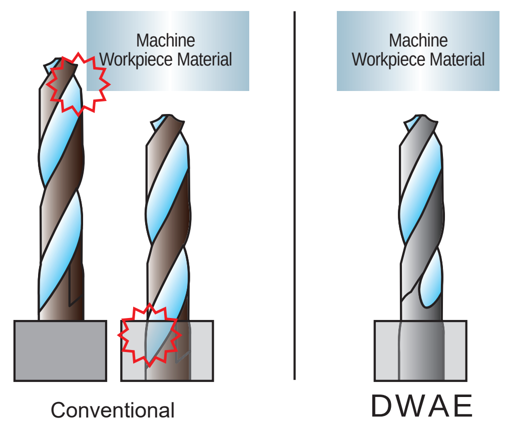
3.0mm–14.0mm (.1181"–.5512")

Features

Optimal Flute Length

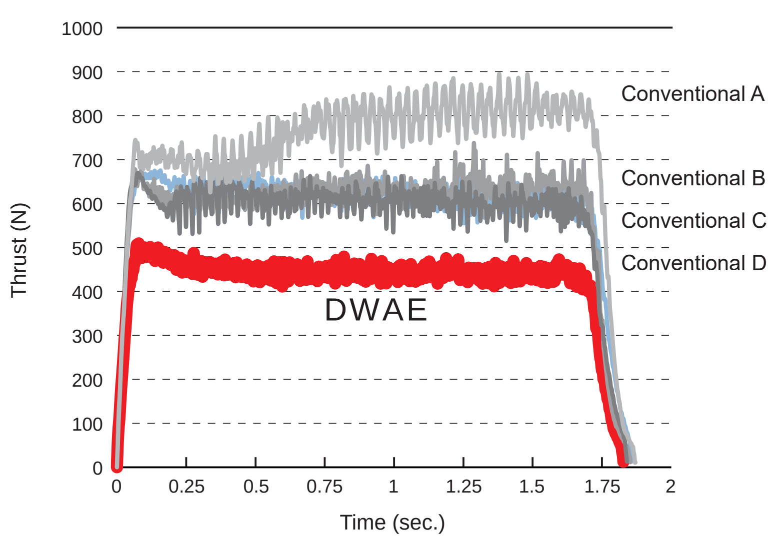
External coolant type carbide drill with ideal tool length for Swiss-type automatic and small CNC lathes.





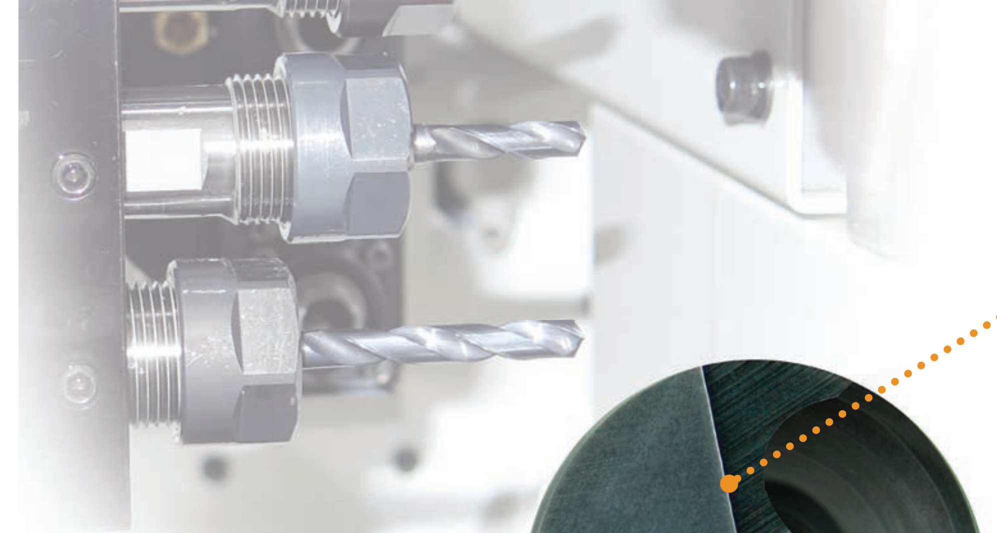
Low Cutting Resistance Design

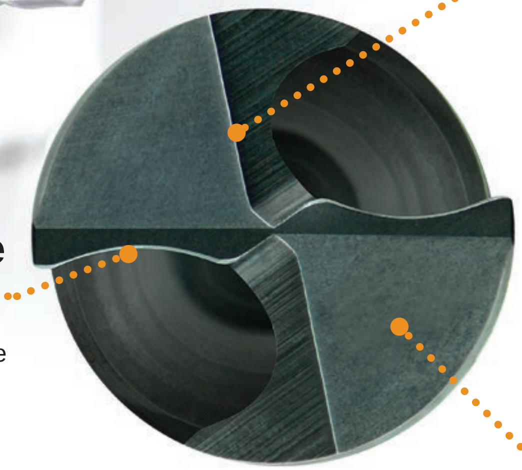
Low cutting resistance design provides for highly stable drilling even in situations where rigidity of workpiece material and or clamping is difficult to secure.



<Cutting Conditions>

Workpiece Material	: AISI 1010
Tool	: DWAE0600X04S060
Cutting Speed	: vc= 260 SFM
Feed per Rev.	: fr= .008 IPR
Hole Depth	: .945"
Cutting Mode	: Wet Cutting External Coolant (Water-soluble Coolants)





Z Thinning

The proprietary web thinning geometry ensures wide space for chip evacuation and offers low cutting resistance.

Wave Cutting Edge

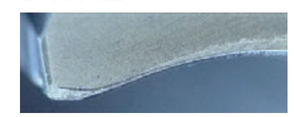
The wave cutting edge provides both sharpness and cutting edge strength, resisting wear to outer cutting edge, which is easily damaged with conventional drills, while efficiently cutting chips into smaller pieces.

Coated Grade DP102A

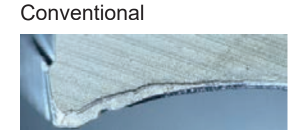
DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low-medium cutting speeds.

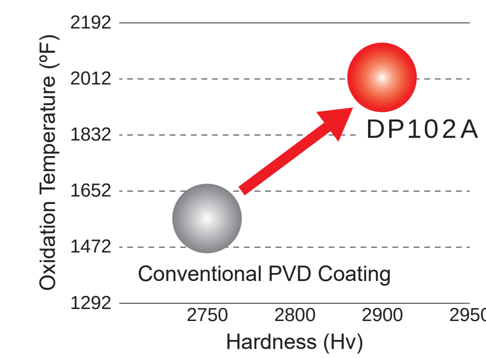
Wear comparison when drilling AISI 1050

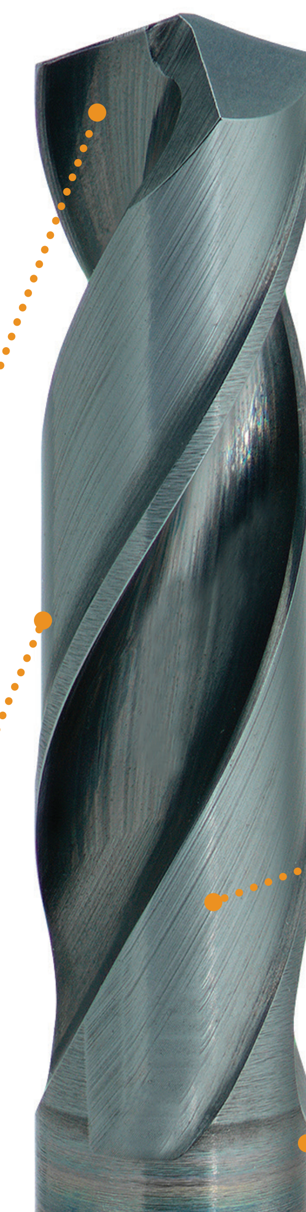
DWAE



Conventional







Flute Shape

Specially designed flute shape breaks up chips into smaller pieces preventing them from clogging during drilling operations.

Optimal Flute Length for Swiss-type Automatic and Small CNC Lathes

The flute length has been specifically engineered to meet the compact needs and limited machining space requirements of small CNC lathes with a lineup of shanks compatible with ER collet mounting available.

DCON(Connection Diameter)	.197 inch=ER8
DCON	.276 inch=ER11

ZERO-μ Surface

A smoothing surface treatment is applied to the drill surface further reducing cutting resistance while facilitating excellent chip evacuation.

Solid Carbide Drill for Swiss-type Automatic & Small CNC Lathes

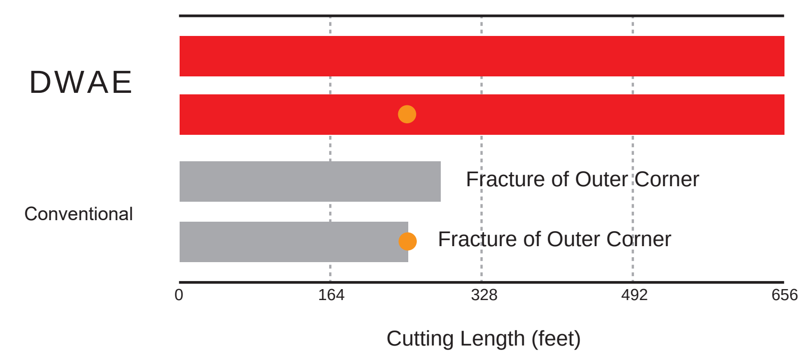
WSTAR **Drill Series**

DWAE

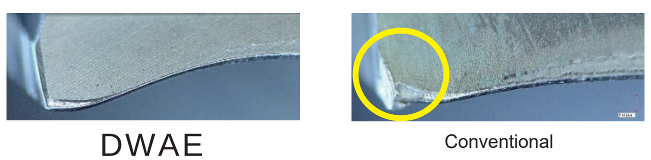
Cutting Performance

AISI 1050 Fracture Resistance Comparison

DP102A offers excellent lubricity and heat resistance, providing more fracture resistance and achieving longer tool life than conventional drills under medium cutting speed conditions making stable machining possible even with external coolant.



Cutting Length 246 feet



<Cutting Conditions>

Workpiece Material	: AISI 1050
Tool	: DWAE0600X04S060
Cutting Speed	: vc= 260 SFM
Feed per Rev.	: fr= .008 IPR
Hole Depth	: .945"
Cutting Mode	: Wet Cutting External Coolant (Water-soluble Coolants)

AISI1010 Chips Comparison

DWAE specially designed to break up chips into smaller pieces to prevent flutes from clogging during machining operations.

DWAE

<Cutting Conditions>

Workpiece Material	: AISI 1010
Tool	: DWAE0600X04S060
Cutting Speed	: vc= 195 SFM
Feed per Rev.	: fr= .012 IPR
Hole Depth	: .945"
Cutting Mode	: Wet Cutting External Coolant (Water-soluble Coolants)

Conventional A

Conventional B

M DRILLING

DWAE

NEW

Mini Size 1.0mm–2.9mm (.0394"–.1142")

Featuring High Precision and Long Tool Life for Small Diameter Drilling

New Cutting Edge Treatment That Achieves Both Sharpness and Durability

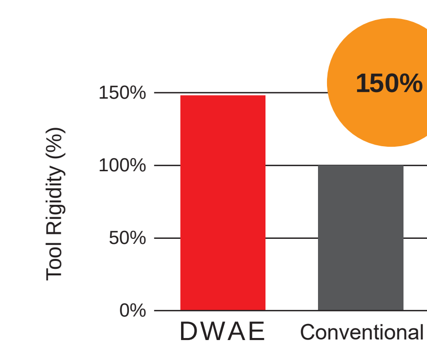
Mitsubishi's new proprietary cutting edge treatment maintains the stability of the cutting edge while exhibiting excellent fracture and wear resistance.

Coated Grade DP102A

DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low to medium cutting speeds.

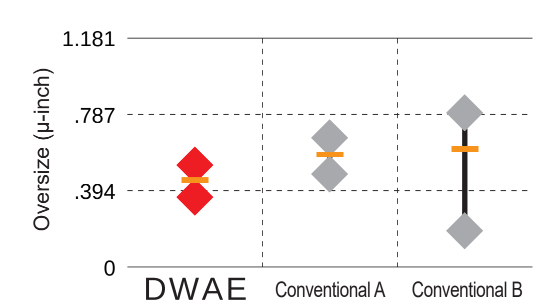
Unique Flute Form for Greater Rigidity

The Mini Size is uniquely designed for rigidity and good chip evacuation by minimizing the neck length. A chip discharge area is provided through the taper neck. This increases tool rigidity by 50% compared to conventional drills and also improves hole positional accuracy.



<Analysis Conditions>

Analysis Model	: DC=2mm (.0787"), L/D=4
Overall Length	: OAL = 50mm (1.969")
Load	: Distributed load of 130N in Z axis direction.



<Cutting Conditions>

Workpiece Material	: AISI 1010
Tool	: DC=2mm (.0787"), L/D=4
Cutting Speed	: vc= 100 SFM
Feed per Rev.	: fr= .0016 IPR
Hole Depth	: .315 inch
Cutting Mode	: Water-soluble Coolants

M DRILLING

MICRO-MWS

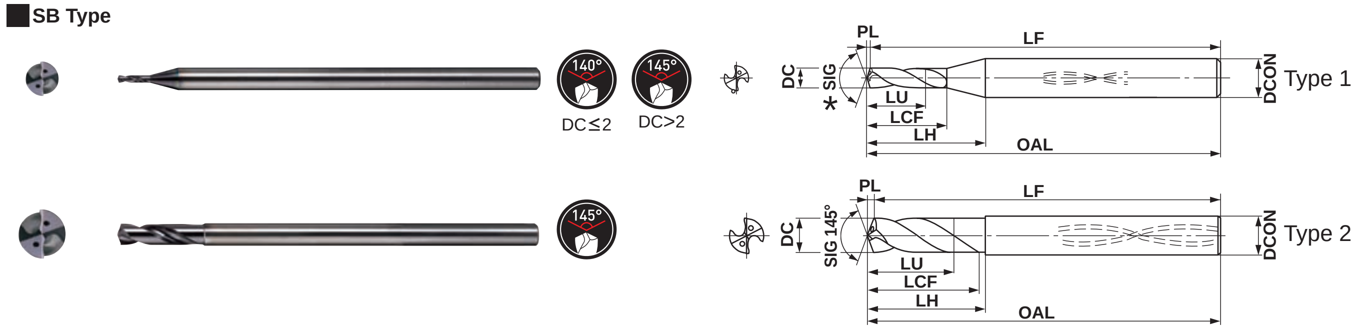
● For high accuracy and efficient drilling of carbon steels through to difficult-to-cut materials.

P | M | K | N | S | H

Internal Coolant

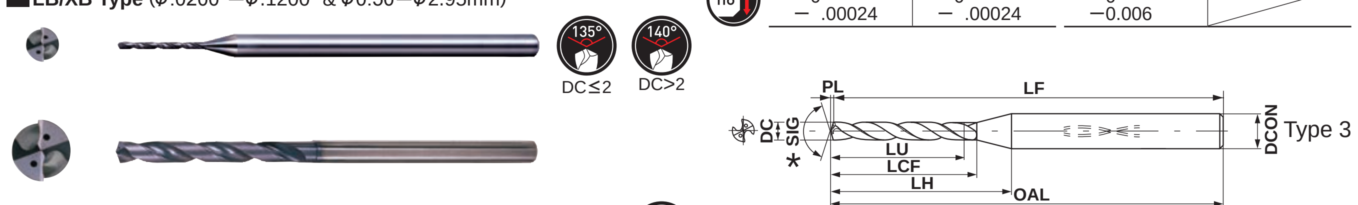
	(inch)		(mm)	
DC	.0197≦DC<.03	.0304≦DC<.1161	0.5≦DC<1	1≦DC<2.95
Tolerance	+ .00035 / 0	+ .00055 / 0	+0.009 / 0	+0.014 / 0
DCON	.0197≦DCON<.03	.0304≦DCON<.1161	DCON=3	
h6	0 / − .00024	0 / − .00024	0 / −0.006	

■SB Type

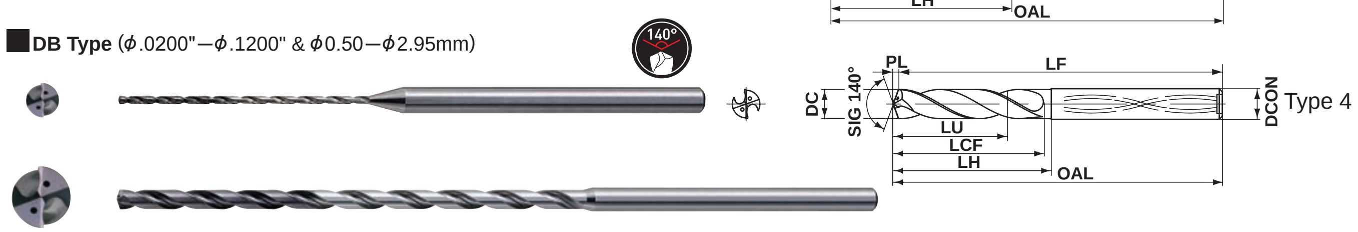


	(inch)		(mm)	
DC	.0197≦DC<.03	.0304≦DC<.1161	0.5≦DC<1	1≦DC<2.95
Tolerance	0 / − .00035	0 / − .00035	0 / −0.009	0 / −0.014
DCON	.0197≦DCON<.03	.0304≦DCON<.1161	DCON=3	
h6	0 / − .00024	0 / − .00024	0 / −0.006	

■LB/XB Type (ϕ.0200"−ϕ.1200" & ϕ0.50−ϕ2.95mm)



■DB Type (ϕ.0200"−ϕ.1200" & ϕ0.50−ϕ2.95mm)



∗ Point Angle:Type 1 140° for drill diameter ϕ0.50-2.0 and 145° for ϕ2.05-2.95.
Type 3 135° for drill diameter ϕ0.50-2.0 and 140° for ϕ2.05-2.95.

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
0.500	.0197				1	★	MWS0050SB	0.6	.024	2.59	.102	7.29	.287	47.09	1.854	47	1.850	0.09	.004	3.0	.118	1
					5	★	MWS0050LB	2.6	.102	8.10	.319	13.10	.516	47.10	1.854	47	1.850	0.10	.004	3.0	.118	3
					12	★	MWS0050XB	6.1	.240	16.10	.634	21.10	.831	47.10	1.854	47	1.850	0.10	.004	3.0	.118	3
0.508	.0200		76		1	●	MWS00200SB	0.6	.024	2.59	.102	7.59	.299	45.09	1.775	45	1.772	0.09	.004	3.175	.125	1
					5	●	MWS00200LB	2.6	.102	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.175	.125	3
					12	●	MWS00200XB	6.2	.244	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.175	.125	3
0.510	.0201				1	★	MWS0051SB	0.6	.024	2.69	.106	7.29	.287	47.09	1.854	47	1.850	0.09	.004	3.0	.118	1
					5	★	MWS0051LB	2.7	.106	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					12	★	MWS0051XB	6.2	.244	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
0.520	.0205				1	●	MWS0052SB	0.6	.024	2.69	.106	7.29	.287	47.09	1.854	47	1.850	0.09	.004	3.0	.118	1
					5	★	MWS0052LB	2.7	.106	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					12	●	MWS0052XB	6.4	.252	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
0.530	.0209				1	★	MWS0053SB	0.6	.024	2.70	.106	7.30	.287	47.1	1.854	47	1.850	0.10	.004	3.0	.118	1
					5	★	MWS0053LB	2.8	.110	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					12	★	MWS0053XB	6.5	.256	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
0.534	.0210		75		1	●	MWS00210SB	0.6	.024	2.70	.106	7.60	.299	45.1	1.776	45	1.772	0.10	.004	3.175	.125	1
					5	●	MWS00210LB	2.8	.110	8.11	.319	13.01	.512	47.11	1.855	47	1.850	0.11	.004	3.175	.125	3
					12	●	MWS00210XB	6.5	.256	16.11	.634	21.01	.827	47.11	1.855	47	1.850	0.11	.004	3.175	.125	3
0.540	.0213				1	★	MWS0054SB	0.6	.024	2.70	.106	7.30	.287	47.1	1.854	47	1.850	0.10	.004	3.0	.118	1
					5	★	MWS0054LB	2.8	.110	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					12	★	MWS0054XB	6.6	.260	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
0.550	.0217				1	●	MWS0055SB	0.7	.028	2.70	.106	7.30	.287	47.10	1.854	47	1.850	0.10	.004	3.0	.118	1
					5	★	MWS0055LB	2.9	.114	8.11	.319	13.11	.516	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					12	●	MWS0055XB	6.7	.264	16.11	.634	21.11	.831	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
0.560	.0220				1	●	MWS0056SB	0.7	.028	3.00	.118	7.60	.299	47.10	1.854	47	1.850	0.10	.004	3.0	.118	1
					5	★	MWS0056LB	2.9	.114	8.12	.320	13.12	.517	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
					12	●	MWS0056XB	6.8	.268	16.12	.635	21.12	.831	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
0.570	.0224				1	●	MWS0057SB	0.7	.028	3.00	.118	7.50	.295	47.10	1.854	47	1.850	0.10	.004	3.0	.118	1
					5	★	MWS0057LB	3.0	.118	8.12	.320	13.12	.517	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
					12	●	MWS0057XB	7.0	.276	16.12	.635	21.12	.831	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
0.572	.0225		74		1	●	MWS00225SB	0.7	.028	3.00	.118	7.90	.311	45.10	1.776	45	1.772	0.10	.004	3.175	.125	1
					5	●	MWS00225LB	3.0	.118	8.12	.320	13.02	.513	47.12	1.855	47	1.850	0.12	.005	3.175	.125	3
					12	●	MWS00225XB	7.0	.276	16.12	.635	21.02	.828	47.12	1.855	47	1.850	0.12	.005	3.175	.125	3
0.580	.0228				1	★	MWS0058SB	0.7	.028	3.01	.119	7.51	.296	47.11	1.855	47	1.850	0.11	.004	3.0	.118	1
					5	★	MWS0058LB	3.0	.118	8.12	.320	13.12	.517	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
					12	★	MWS0058XB	7.1	.280	16.12	.635	21.12	.831	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
0.590	.0232				1	★	MWS0059SB	0.7	.028	3.01	.119	7.51	.296	47.11	1.855	47	1.850	0.11	.004	3.0	.118	1
					5	★	MWS0059LB	3.1	.122	8.12	.320	12.12	.477	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
					12	★	MWS0059XB	7.2	.283	16.12	.635	20.12	.792	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
0.600	.0236				1	●	MWS0060SB	0.7	.028	3.01	.119	7.51	.296	47.11	1.855	47	1.850	0.11	.004	3.0	.118	1
					5	★	MWS0060LB	3.1	.122	8.12	.320	12.12	.477	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
					12	●	MWS0060XB	7.3	.287	16.12	.635	20.12	.792	47.12	1.855	47	1.850	0.12	.005	3.0	.118	3
0.610	.0240		73		1	●	MWS00240SB	0.7	.028	3.21	.126	8.01	.315	45.11	1.776	45	1.772	0.11	.004	3.175	.125	1
					1	★	MWS0061SB	0.7	.028	3.21	.126	7.71	.304	47.11	1.855	47	1.850	0.11	.004	3.0	.118	3
					5	●	MWS00240LB	3.2	.126	8.13	.320	12.93	.509	47.13	1.856	47	1.850	0.13	.005	3.175	.125	3
					5	★	MWS0061LB	3.2	.126	8.13	.320	12.13	.478	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
					12	●	MWS00240XB	7.4	.291	16.13	.635	20.93	.824	47.13	1.856	47	1.850	0.13	.005	3.175	.125	3
					12	★	MWS0061XB	7.5	.295	16.13	.635	20.13	.793	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
0.620	.0244				1	★	MWS0062SB	0.7	.028	3.21	.126	7.61	.300	47.11	1.855	47	1.850	0.11	.004	3.0	.118	1
					5	★	MWS0062LB	3.2	.126	8.13	.320	12.13	.478	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
					12	★	MWS0062XB	7.6	.299	16.13	.635	20.13	.793	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
0.630	.0248				1	★	MWS0063SB	0.7	.028	3.21	.126	7.61	.300	47.11	1.855	47	1.850	0.11	.004	3.0	.118	1
					5	★	MWS0063LB	3.3	.130	8.13	.320	12.13	.478	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
					12	★	MWS0063XB	7.7	.303	16.13	.635	20.13	.793	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
0.635	.0250		72		1	●	MWS00250SB	0.8	.031	3.22	.127	7.92	.312	45.12	1.776	45	1.772	0.12	.005	3.175	.125	1
					5	●	MWS00250LB	3.3	.130	8.13	.320	12.83	.505	47.13	1.856	47	1.850	0.13	.005	3.175	.125	3
					12	●	MWS00250XB	7.8	.307	16.13	.635	20.83	.820	47.13	1.856	47	1.850	0.13	.005	3.175	.125	3
0.640	.0252				1	★	MWS0064SB	0.8	.031	3.22	.127	7.62	.300	47.12	1.855	47	1.850	0.12	.005	3.0	.118	1
					5	★	MWS0064LB	3.3	.130	8.13	.320	12.13	.478	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
					12	★	MWS0064XB	7.8	.307	16.13	.635	20.13	.793	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3

MICRO-MWS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
0.650	.0256				1	●	MWS0065SB	0.8	.031	3.22	.127	7.62	.300	47.12	1.855	47	1.850	0.12	.005	3.0	.118	1
					5	★	MWS0065LB	3.4	.134	8.13	.320	12.13	.478	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
					12	●	MWS0065XB	7.9	.311	16.13	.635	20.13	.793	47.13	1.856	47	1.850	0.13	.005	3.0	.118	3
0.660	.0260		71		1	●	MWS00260SB	0.8	.031	3.52	.139	8.22	.324	45.12	1.776	45	1.772	0.12	.005	3.175	.125	1
					1	●	MWS0066SB	0.8	.031	3.52	.139	7.92	.312	47.12	1.855	47	1.850	0.12	.005	3.0	.118	1
					5	●	MWS00260LB	3.4	.134	8.14	.320	12.84	.506	47.14	1.856	47	1.850	0.14	.006	3.175	.125	3
					5	●	MWS0066LB	3.4	.134	8.14	.320	12.14	.478	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
					12	●	MWS00260XB	8.1	.319	16.14	.635	20.84	.820	47.14	1.856	47	1.850	0.14	.006	3.175	.125	3
					12	★	MWS0066XB	8.1	.319	16.14	.635	20.14	.793	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
0.670	.0264				1	★	MWS0067SB	0.8	.031	3.52	.139	7.82	.308	47.12	1.855	47	1.850	0.12	.005	3.0	.118	1
					5	★	MWS0067LB	3.5	.138	8.14	.320	12.14	.478	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
					12	★	MWS0067XB	8.2	.323	16.14	.635	20.14	.793	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
0.680	.0268				1	★	MWS0068SB	0.8	.031	3.52	.139	7.82	.308	47.12	1.855	47	1.850	0.12	.005	3.0	.118	1
					5	★	MWS0068LB	3.5	.138	8.14	.320	12.14	.478	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
					12	★	MWS0068XB	8.3	.327	16.14	.635	20.14	.793	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
0.690	.0272				1	★	MWS0069SB	0.8	.031	3.53	.139	7.83	.308	47.13	1.856	47	1.850	0.13	.005	3.0	.118	1
					5	★	MWS0069LB	3.6	.142	8.14	.320	12.14	.478	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
					12	★	MWS0069XB	8.4	.331	16.14	.635	20.14	.793	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
0.700	.0276				1	●	MWS0070SB	0.8	.031	3.53	.139	7.83	.308	47.13	1.856	47	1.850	0.13	.005	3.0	.118	1
					5	★	MWS0070LB	3.6	.142	8.14	.320	12.14	.478	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
					12	★	MWS0070XB	8.5	.335	16.14	.635	20.14	.793	47.14	1.856	47	1.850	0.14	.006	3.0	.118	3
0.710	.0280		70		1	★	MWS0071SB	0.8	.031	3.73	.147	8.03	.316	50.13	1.974	50	1.969	0.13	.005	3.0	.118	1
					5	★	MWS0071LB	3.7	.146	20.15	.793	14.15	.557	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
					12	★	MWS0071XB	8.7	.343	20.15	.793	24.15	.951	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
0.712	.0280		70		1	●	MWS00280SB	0.8	.031	3.73	.147	8.33	.328	50.13	1.974	50	1.969	0.13	.005	3.175	.125	1
					5	●	MWS00280LB	3.7	.146	10.15	.400	14.75	.581	50.15	1.974	50	1.969	0.15	.006	3.175	.125	3
					12	●	MWS00280XB	8.7	.343	20.15	.793	24.75	.974	50.15	1.974	50	1.969	0.15	.006	3.175	.125	3
0.720	.0283				1	★	MWS0072SB	0.9	.035	3.73	.147	8.03	.316	50.13	1.974	50	1.969	0.13	.005	3.0	.118	1
					5	★	MWS0072LB	3.8	.150	10.15	.400	14.15	.557	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
					12	★	MWS0072XB	8.8	.346	20.15	.793	24.15	.951	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
0.730	.0287				1	★	MWS0073SB	0.9	.035	3.73	.147	7.93	.312	50.13	1.974	50	1.969	0.13	.005	3.0	.118	1
					5	★	MWS0073LB	3.8	.150	10.15	.400	14.15	.557	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
					12	★	MWS0073XB	8.9	.350	20.15	.793	24.15	.951	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
0.740	.0291				1	★	MWS0074SB	0.9	.035	3.73	.147	7.93	.312	50.13	1.974	50	1.969	0.13	.005	3.0	.118	1
					5	★	MWS0074LB	3.9	.154	10.15	.400	14.15	.557	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
					12	★	MWS0074XB	9.0	.354	20.15	.793	24.15	.951	50.15	1.974	50	1.969	0.15	.006	3.0	.118	3
0.742	.0292		69		1	●	MWS00292SB	0.9	.035	3.74	.147	8.24	.324	50.14	1.974	50	1.969	0.14	.006	3.175	.125	1
					5	●	MWS00292LB	3.9	.154	10.15	.400	14.65	.577	50.15	1.974	50	1.969	0.15	.006	3.175	.125	3
					12	●	MWS00292XB	9.1	.358	20.15	.793	24.65	.970	50.15	1.974	50	1.969	0.15	.006	3.175	.125	3
0.750	.0295				1	●	MWS0075SB	0.9	.035	3.74	.147	7.94	.313	50.14	1.974	50	1.969	0.14	.006	3.0	.118	1
					5	●	MWS0075LB	3.9	.154	10.16	.400	14.16	.557	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
					12	●	MWS0075XB	9.2	.362	20.16	.794	24.16	.951	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
0.760	.0299				1	●	MWS0076SB	0.9	.035	4.04	.159	8.24	.324	50.14	1.974	50	1.969	0.14	.006	3.0	.118	1
					5	●	MWS0076LB	4.0	.157	10.16	.400	14.16	.557	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
					12	●	MWS0076XB	9.3	.366	20.16	.794	24.16	.951	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
0.770	.0303				1	★	MWS0077SB	0.9	.035	4.04	.159	8.24	.324	50.14	1.974	50	1.969	0.14	.006	3.0	.118	1
					5	★	MWS0077LB	4.0	.157	10.16	.400	14.16	.557	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
					12	★	MWS0077XB	9.4	.370	20.16	.794	24.16	.951	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
0.780	.0307				1	●	MWS0078SB	0.9	.035	4.04	.159	8.14	.320	50.14	1.974	50	1.969	0.14	.006	3.0	.118	1
					5	★	MWS0078LB	4.1	.161	10.16	.400	14.16	.557	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
					12	●	MWS0078XB	9.5	.374	20.16	.794	24.16	.951	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
0.788	.0310		68		1	●	MWS00310SB	0.9	.035	4.04	.159	8.54	.336	50.14	1.974	50	1.969	0.14	.006	3.175	.125	1
					5	●	MWS00310LB	4.1	.161	10.16	.400	14.66	.577	50.16	1.975	50	1.969	0.16	.006	3.175	.125	3
					12	●	MWS00310XB	9.6	.378	20.16	.794	24.66	.971	50.16	1.975	50	1.969	0.16	.006	3.175	.125	3
0.790	.0311				1	★	MWS0079SB	0.9	.035	4.04	.159	8.14	.320	50.14	1.974	50	1.969	0.14	.006	3.0	.118	1
					5	★	MWS0079LB	4.1	.161	10.16	.400	14.16	.557	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
					12	★	MWS0079XB	9.6	.378	20.16	.794	24.16	.951	50.16	1.975	50	1.969	0.16	.006	3.0	.118	3
0.794	.0313	1/32			1	●	MWS00312SB	0.9	.035	4.04	.159	8.44	.332	50.14	1.974	50	1.969	0.14	.006	3.175	.125	1
					5	●	MWS00312LB	4.1	.161	10.16	.400	14.56	.573	50.16	1.975	50	1.969	0.16	.006	3.175	.125	3
					12	●	MWS00312XB	9.7	.382	20.16	.794	24.56	.967	50.16	1.975	50	1.969	0.16	.006	3.175	.125	3
0.800	.0315				1	●	MWS0080SB	1.0	.039	4.05	.159	8.15	.321	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	●	MWS0080LB	4.2	.165	10.17	.400	14.17	.558	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
					12	●	MWS0080XB	9.8	.386	20.17	.794	24.17	.952	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
0.810	.0319				1	★	MWS0081SB	1.0	.039	4.25	.167	8.35	.329	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	★	MWS0081LB	4.2	.165	10.17	.400	14.17	.558	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
					12	★	MWS0081XB	9.9	.390	20.17	.794	24.17	.952	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
0.813	.0320		67		1	●	MWS00320SB	1.0	.039	4.25	.167	8.65	.341	50.15	1.974	50	1.969	0.15	.006	3.175	.125	1
					5	●	MWS00320LB	4.2	.165	10.17	.400	14.57	.574	50.17	1.975	50	1.969	0.17	.007	3.175	.125	3
					12	●	MWS00320XB	9.9	.390	20.17	.794	24.57	.967	50.17	1.975	50	1.969	0.17	.007	3.175	.125	3
0.820	.0323				1	●	MWS0082SB	1.0	.039	4.25	.167	8.35	.329	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	●	MWS0082LB	4.3	.169	10.17	.400	14.17	.558	50.17	1.975	50	1.969	0.17	.007	3.0.	.118	3
					12	★	MWS0082XB	10.0	.394	20.17	.794	24.17	.952	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
0.830	.0327				1	●	MWS0083SB	1.0	.039	4.25	.167	8.25	.325	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	●	MWS0083LB	4.3	.169	10.17	.400	14.17	.558	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
					12	★	MWS0083XB	10.1	.398	20.17	.794	24.17	.952	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
0.839	.0330		66		1	●	MWS00330SB	1.0	.039	4.25	.167	8.65	.341	50.15	1.974	50	1.969	0.15	.006	3.175	.125	1
					5	●	MWS00330LB	4.4	.173	10.17	.400	14.57	.574	50.17	1.975	50	1.969	0.17	.007	3.175	.125	3
					12	●	MWS00330XB	10.2	.402	20.17	.794	24.57	.967	50.17	1.975	50	1.969	0.17	.007	3.175	.125	3
0.840	.0331				1	★	MWS0084SB	1.0	.039	4.25	.167	8.25	.325	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	★	MWS0084LB	4.4	.173	10.17	.400	14.17	.558	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
					12	★	MWS0084XB	10.3	.406	20.17	.794	24.17	.952	50.17	1.975	50	1.969	0.17	.007	3.0	.118	3
0.850	.0335				1	●	MWS0085SB	1.0	.039	4.25	.167	8.25	.325	50.15	1.974	50	1.969	0.15	.006	3.0	.118	1
					5	●	MWS0085LB	4.4	.173	10.18	.401	14.18	.558	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
					12	★	MWS0085XB	10.4	.409	20.18	.794	24.18	.952	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
0.860	.0339				1	●	MWS0086SB	1.0	.039	4.56	.180	8.56	.337	50.16	1.975	50	1.969	0.16	.006	3.0	.118	1
					5	★	MWS0086LB	4.5	.177	10.18	.401	14.18	.558	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
					12	★	MWS0086XB	10.5	.413	20.18	.794	24.18	.952	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
0.870	.0343				1	★	MWS0087SB	1.0	.039	4.56	.180	8.56	.337	50.16	1.975	50	1.969	0.16	.006	3.0	.118	1
					5	★	MWS0087LB	4.5	.177	10.18	.401	14.18	.558	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
					12	★	MWS0087XB	10.6	.417	20.18	.794	24.18	.952	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
0.880	.0346				1	★	MWS0088SB	1.0	.039	4.56	.180	8.56	.337	50.16	1.975	50	1.969	0.16	.006	3.0	.118	1
					5	★	MWS0088LB	4.6	.181	10.18	.401	14.18	.558	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
					12	★	MWS0088XB	10.7	.421	20.18	.794	24.18	.952	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
0.889	.0350		65		1	●	MWS00350SB	1.1	.043	4.56	.180	8.86	.349	50.16	1.975	50	1.969	0.16	.006	3.175	.125	1
					5	●	MWS00350LB	4.6	.181	10.18	.401	14.48	.570	50.18	1.976	50	1.969	0.18	.007	3.175	.125	3
					12	●	MWS00350XB	10.9	.429	20.18	.794	24.48	.964	50.18	1.976	50	1.969	0.18	.007	3.175	.125	3

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
● : USA Stock ★ : Stocked in Japan

M
DRILLING

MICRO-MWS

DC					L/D	Stock	Order Number	Dimensions														Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread size		VP15TF		LU		LCF		LH		OAL		LF		PL		DCON		
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
0.890	.0350		65		1	★	MWS0089SB	1.1	.043	4.56	.180	8.46	.333	50.16	1.975	50	1.969	0.16	.006	3.0	.118	1
					5	★	MWS0089LB	4.6	.181	10.18	.401	14.18	.558	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
					12	★	MWS0089XB	10.9	.429	20.18	.794	24.18	.952	50.18	1.976	50	1.969	0.18	.007	3.0	.118	3
0.900	.0354				1	●	MWS0090SB	1.1	.043	4.56	.180	8.46	.333	50.16	1.975	50	1.969	0.16	.006	3.0	.118	1
					5	●	MWS0090LB	4.7	.185	10.19	.401	14.19	.559	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
					12	★	MWS0090XB	11.0	.433	20.19	.795	24.19	.952	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
0.910	.0358				1	★	MWS0091SB	1.1	.043	4.77	.188	8.67	.341	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	★	MWS0091LB	4.7	.185	10.19	.401	14.19	.559	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
					12	★	MWS0091XB	11.1	.437	20.19	.795	24.19	.952	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
0.915	.0360		64		1	●	MWS00360SB	1.1	.043	4.77	.188	8.97	.353	50.17	1.975	50	1.969	0.17	.007	3.175	.125	1
					5	●	MWS00360LB	4.8	.189	10.19	.401	14.39	.567	50.19	1.976	50	1.969	0.19	.007	3.175	.125	3
					12	●	MWS00360XB	11.1	.437	20.19	.795	24.39	.960	50.19	1.976	50	1.969	0.19	.007	3.175	.125	3
0.920	.0362				1	★	MWS0092SB	1.1	.043	4.77	.188	8.67	.341	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	★	MWS0092LB	4.8	.189	10.19	.401	14.19	.559	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
					12	★	MWS0092XB	11.2	.441	20.19	.795	24.19	.952	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
0.930	.0366				1	●	MWS0093SB	1.1	.043	4.77	.188	8.67	.341	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	●	MWS0093LB	4.8	.189	10.19	.401	14.19	.559	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
					12	★	MWS0093XB	11.4	.449	20.19	.795	24.19	.952	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
0.940	.0370		63		1	●	MWS00370SB	1.1	.043	4.77	.188	8.97	.353	50.17	1.975	50	1.969	0.17	.007	3.175	.125	1
					1	★	MWS0094SB	1.1	.043	4.77	.188	8.57	.337	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	●	MWS00370LB	4.9	.193	10.19	.401	14.39	.567	50.19	1.976	50	1.969	0.19	.007	3.175	.125	3
					5	★	MWS0094LB	4.9	.193	10.19	.401	14.19	.559	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
					12	●	MWS00370XB	11.5	.453	20.19	.795	24.39	.960	50.19	1.976	50	1.969	0.19	.007	3.175	.125	3
					12	★	MWS0094XB	11.5	.453	20.19	.795	24.19	.952	50.19	1.976	50	1.969	0.19	.007	3.0	.118	3
0.950	.0374				1	★	MWS0095SB	1.1	.043	4.77	.188	8.57	.337	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	★	MWS0095LB	5.0	.197	10.20	.402	14.20	.559	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
					12	★	MWS0095XB	11.6	.457	20.20	.795	24.20	.953	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
0.960	.0378				1	★	MWS0096SB	1.1	.043	5.07	.200	8.87	.349	50.17	1.975	50	1.969	0.17	.007	3.0	.118	1
					5	★	MWS0096LB	5.0	.197	10.20	.402	14.20	.559	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
					12	★	MWS0096XB	11.7	.461	20.20	.795	24.20	.953	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
0.966	.0380		62		1	●	MWS00380SB	1.1	.043	5.08	.200	9.18	.361	50.18	1.976	50	1.969	0.18	.007	3.175	.125	1
					5	●	MWS00380LB	5.0	.197	10.20	.402	14.30	.563	50.20	1.976	50	1.969	0.20	.008	3.175	.125	3
					12	●	MWS00380XB	11.8	.465	20.20	.795	24.30	.957	50.20	1.976	50	1.969	0.20	.008	3.175	.125	3
0.970	.0382				1	●	MWS0097SB	1.2	.047	5.08	.200	8.88	.350	50.18	1.976	50	1.969	0.18	.007	3.0	.118	1
					5	●	MWS0097LB	5.1	.201	10.20	.402	14.20	.559	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
					12	★	MWS0097XB	11.8	.465	20.20	.795	24.20	.953	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
0.980	.0386				1	★	MWS0098SB	1.2	.047	5.08	.200	8.88	.350	50.18	1.976	50	1.969	0.18	.007	3.0	.118	1
					5	★	MWS0098LB	5.1	.201	10.20	.402	14.20	.559	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
					12	★	MWS0098XB	12.0	.472	20.20	.795	24.20	.953	50.20	1.976	50	1.969	0.20	.008	3.0	.118	3
0.990	.0390		61		1	●	MWS0099SB	1.2	.047	5.08	.200	8.88	.350	50.18	1.976	50	1.969	0.18	.007	3.0	.118	1
					5	★	MWS0099LB	5.2	.205	10.21	.402	14.21	.559	50.21	1.977	50	1.969	0.21	.008	3.0	.118	3
					12	★	MWS0099XB	12.1	.476	20.21	.796	24.21	.953	50.21	1.977	50	1.969	0.21	.008	3.0	.118	3
0.991	.0390		61		1	●	MWS00390SB	1.2	.047	5.08	.200	9.18	.361	50.18	1.976	50	1.969	0.18	.007	3.175	.125	1
					5	●	MWS00390LB	5.2	.205	10.21	.402	14.31	.563	50.21	1.977	50	1.969	0.21	.008	3.175	.125	3
					12	●	MWS00390XB	12.1	.476	20.21	.796	24.31	.957	50.21	1.977	50	1.969	0.21	.008	3.175	.125	3

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock ★ : Stocked in Japan

▲ : Micro-MWS inch & metric sizes 1.0mm - 2.95mm being phased out through 2022.
See new generation Micro-MVS drills for applicable replacement.

DC					L/D	Stock	Order Number	Dimensions														Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread size		VP15TF		LU		LCF		LH		OAL		LF		PL		DCON		
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
1.000	.0394				1	▲	MWS0100SB	1.2	.047	5.20	.205	8.9	.350	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					5	▲	MWS0100LB	5.2	.205	11.20	.441	15.2	.598	55.2	2.173	55	2.165	0.2	.008	3.0	.118	3
					12	▲	MWS0100XB	12.2	.480	23.20	.913	27.2	1.071	55.2	2.173	55	2.165	0.2	.008	3.0	.118	3
					20	▲	MWS0100X20DB	20.2	.795	24.20	.953	28.2	1.110	60.2	2.370	60	2.362	0.2	.008	3.0	.118	3
					25	▲	MWS0100X25DB	25.2	.992	28.20	1.110	32.2	1.268	66.2	2.606	66	2.598	0.2	.008	3.0	.118	3
					30	▲	MWS0100X30DB	30.2	1.189	33.20	1.307	37.2	1.465	72.2	2.843	72	2.835	0.2	.008	3.0	.118	3
1.001	.0394				1	▲	MWS00394SB	1.2	.047	5.20	.205	9.3	.366	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00394XB	12.2	.480	23.20	.913	27.3	1.075	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.016	.0400		60		1	▲	MWS00400SB	1.2	.047	5.20	.205	9.2	.362	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00400XB	12.4	.488	23.20	.913	27.2	1.071	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.042	.0410		59		1	▲	MWS00410SB	1.2	.047	5.40	.213	9.4	.370	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00410XB	12.7	.500	23.20	.913	27.2	1.071	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.050	.0413				1	▲	MWS0105SB	1.3	.051	5.4	.213	9.0	.354	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					20	▲	MWS0105X20DB	21.2	.835	24.2	.953	28.2	1.110	60.2	2.370	60	2.362	0.2	.008	3.0	.118	3
					25	▲	MWS0105X25DB	26.5	1.043	29.2	1.150	33.2	1.307	66.2	2.606	66	2.598	0.2	.008	3.0	.118	3
					30	▲	MWS0105X30DB	31.7	1.248	35.2	1.386	38.2	1.504	72.2	2.843	72	2.835	0.2	.008	3.0	.118	3
1.067	.0420		58		1	▲	MWS00420SB	1.3	.051	5.4	.213	9.3	.366	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00420XB	13.0	.512	23.2	.913	27.1	1.067	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.093	.0430		57		1	▲	MWS00430SB	1.3	.051	5.6	.220	9.5	.374	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00430XB	13.3	.524	23.2	.913	27.1	1.067	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.100	.0433				1	▲	MWS0110SB	1.3	.051	5.6	.220	9.1	.358	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					5	▲	MWS0110LB	5.7	.224	17.2	.677	21.2	.835	55.2	2.173	55	2.165	0.2	.008	3.0	.118	3
					12	▲	MWS0110XB	13.4	.528	23.2	.913	27.2	1.071	55.2	2.173	55	2.165	0.2	.008	3.0	.118	3
					20	▲	MWS0110X20DB	22.2	.874	25.2	.992	29.2	1.150	60.2	2.370	60	2.362	0.2	.008	3.0	.118	3
					25	▲	MWS0110X25DB	27.7	1.091	31.2	1.228	34.2	1.346	66.2	2.606	66	2.598	0.2	.008	3.0	.118	3
					30	▲	MWS0110X30DB	33.2	1.307	36.2	1.425	40.2	1.583	72.2	2.843	72	2.835	0.2	.008	3.0	.118	3
1.150	.0453				1	▲	MWS0115SB	1.4	.055	5.8	.228	9.3	.366	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					20	▲	MWS0115X20DB	23.2	.913	26.2	1.031	30.2	1.189	60.2	2.370	60	2.362	0.2	.008	3.0	.118	3
					25	▲	MWS0115X25DB	29.0	1.142	32.2	1.268	36.2	1.425	66.2	2.606	66	2.598	0.2	.008	3.0	.118	3
					30	▲	MWS0115X30DB	34.7	1.366	38.2	1.504	41.2	1.622	72.2	2.843	72	2.835	0.2	.008	3.0	.118	3
1.182	.0465		56		1	▲	MWS00465SB	1.4	.055	6.2	.244	9.9	.390	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00465XB	14.4	.567	23.2	.913	26.9	1.059	55.2	2.173	55	2.165	0.2	.008	3.175	.125	3
1.200	.0472				1	▲	MWS0120SB	1.4	.055	6.2	.244	9.6	.378	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					5	▲	MWS0120LB	6.3	.248	17.3	.681	20.3	.799	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					12	▲	MWS0120XB	14.7	.579	23.3	.917	26.3	1.035	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					20	▲	MWS0120X20DB	24.3	.957	28.2	1.110	31.2	1.228	60.2	2.370	60	2.362	0.2	.008	3.0	.118	3
					25	▲	MWS0120X25DB	30.3	1.193	34.2	1.346	37.2	1.465	66.2	2.606	66	2.598	0.2	.008	3.0	.118	3
					30	▲	MWS0120X30DB	36.3	1.429	40.2	1.583	43.2	1.701	72.2	2.843	72	2.835	0.2	.008	3.0	.118	3
1.250	.0492				1	▲	MWS0125SB	1.5	.059	6.4	.252	9.7	.382	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					20	▲	MWS0125X20DB	25.3	.996	29.2	1.150	32.2	1.268	68.2	2.685	68	2.677	0.2	.008	3.0	.118	3
					25	▲	MWS0125X25DB	31.6	1.244	35.2	1.386	38.2	1.504	74.2	2.921	74	2.913	0.2	.008	3.0	.118	3
					30	▲	MWS0125X30DB	37.8	1.488	41.2	1.622	45.2	1.780	82.2	3.236	82	3.228	0.2	.008	3.0	.118	3
1.300	.0512				1	▲	MWS0130SB	1.5	.059	6.6	.260	9.8	.386	55.2	2.173	55	2.165	0.2	.008	3.0	.118	1
					5	▲	MWS0130LB	6.8	.268	17.3	.681	20.3	.799	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					12	▲	MWS0130XB	15.9	.626	23.3	.917	26.3	1.035	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					20	▲	MWS0130X20DB	26.3	1.035	30.2	1.189	33.2	1.307	68.2	2.685	68	2.677	0.2	.008	3.0	.118	3
					25	▲	MWS0130X25DB	32.8	1.291	36.2	1.425	40.2	1.583	74.2	2.921	74	2.913	0.2	.008	3.0	.118	3
					30	▲	MWS0130X30DB	39.3	1.547	43.2	1.701	46.2	1.819	82.2	3.236	82	3.228	0.2	.008	3.0	.118	3

MICRO-MWS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.321	.0520		55		1	▲	MWS00520SB	1.6	.063	6.6	.260	10.1	.398	55.2	2.173	55	2.165	0.2	.008	3.175	.125	1
					12	▲	MWS00520XB	16.1	.634	23.3	.917	26.8	1.055	55.3	2.177	55	2.165	0.3	.012	3.175	.125	3
1.350	.0531				1	▲	MWS0135SB	1.7	.067	6.9	.272	10.0	.394	55.3	2.177	55	2.165	0.3	.012	3.0	.118	1
					20	▲	MWS0135X20DB	27.3	1.075	31.3	1.232	34.3	1.350	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					25	▲	MWS0135X25DB	34.1	1.343	38.3	1.508	41.3	1.626	74.3	2.925	74	2.913	0.3	.012	3.0	.118	3
					30	▲	MWS0135X30DB	40.8	1.606	45.3	1.783	48.3	1.902	82.3	3.240	82	3.228	0.3	.012	3.0	.118	3
1.397	.0550		54		1	▲	MWS00550SB	1.7	.067	7.3	.287	10.6	.417	55.3	2.177	55	2.165	0.3	.012	3.175	.125	1
					12	▲	MWS00550XB	17.1	.673	23.3	.917	26.6	1.047	55.3	2.177	55	2.165	0.3	.012	3.175	.125	3
1.400	.0551				1	▲	MWS0140SB	1.7	.067	7.3	.287	10.3	.406	55.3	2.177	55	2.165	0.3	.012	3.0	.118	1
					5	▲	MWS0140LB	7.3	.287	17.3	.681	20.3	.799	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					12	▲	MWS0140XB	17.1	.673	23.3	.917	26.3	1.035	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					20	▲	MWS0140X20DB	28.3	1.114	32.3	1.272	35.3	1.390	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					25	▲	MWS0140X25DB	35.3	1.390	39.3	1.547	42.3	1.665	74.3	2.925	74	2.913	0.3	.012	3.0	.118	3
					30	▲	MWS0140X30DB	42.3	1.665	46.3	1.823	49.3	1.941	82.3	3.240	82	3.228	0.3	.012	3.0	.118	3
1.450	.0571				1	▲	MWS0145SB	1.8	.071	7.5	.295	10.4	.409	55.3	2.177	55	2.165	0.3	.012	3.0	.118	1
					20	▲	MWS0145X20DB	29.3	1.154	33.3	1.311	36.3	1.429	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					25	▲	MWS0145X25DB	36.6	1.441	41.3	1.626	43.3	1.705	74.3	2.925	74	2.913	0.3	.012	3.0	.118	3
					30	▲	MWS0145X30DB	43.8	1.724	48.3	1.902	51.3	2.020	82.3	3.240	82	3.228	0.3	.012	3.0	.118	3
1.500	.0591			#1-64	1	▲	MWS0150SB	1.8	.071	7.7	.303	10.5	.413	55.3	2.177	55	2.165	0.3	.012	3.0	.118	1
					5	▲	MWS0150LB	7.8	.307	17.3	.681	20.3	.799	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					12	▲	MWS0150XB	18.3	.720	23.3	.917	26.3	1.035	55.3	2.177	55	2.165	0.3	.012	3.0	.118	3
					20	▲	MWS0150X20DB	30.3	1.193	35.3	1.390	37.3	1.469	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					25	▲	MWS0150X25DB	37.8	1.488	42.3	1.665	45.3	1.783	74.3	2.925	74	2.913	0.3	.012	3.0	.118	3
					30	▲	MWS0150X30DB	45.3	1.783	50.3	1.980	52.3	2.059	82.3	3.240	82	3.228	0.3	.012	3.0	.118	3
1.502	.0591			#1-64	1	▲	MWS00591SB	1.8	.071	7.7	.303	10.8	.425	55.3	2.177	55	2.165	0.3	.012	3.175	.125	1
					12	▲	MWS00591XB	18.3	.720	23.3	.917	26.4	1.039	55.3	2.177	55	2.165	0.3	.012	3.175	.125	3
1.550	.0610				1	▲	MWS0155SB	1.9	.075	7.9	.311	10.6	.417	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					20	▲	MWS0155X20DB	31.3	1.232	36.3	1.429	38.3	1.508	78.3	3.083	78	3.071	0.3	.012	3.0	.118	3
					25	▲	MWS0155X25DB	39.1	1.539	43.3	1.705	46.3	1.823	86.3	3.398	86	3.386	0.3	.012	3.0	.118	3
					30	▲	MWS0155X30DB	46.8	1.843	51.3	2.020	54.3	2.138	95.3	3.752	95	3.740	0.3	.012	3.0	.118	3
1.588	.0625	1/16			1	▲	MWS00625SB	1.9	.075	8.3	.327	11.3	.445	68.3	2.689	68	2.677	0.3	.012	3.175	.125	1
					12	▲	MWS00625XB	19.4	.764	30.3	1.193	33.3	1.311	68.3	2.689	68	2.677	0.3	.012	3.175	.125	3
1.600	.0630				1	▲	MWS0160SB	1.9	.075	8.3	.327	10.9	.429	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					5	▲	MWS0160LB	8.3	.327	22.3	.878	25.3	.996	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					12	▲	MWS0160XB	19.5	.768	30.3	1.193	33.3	1.311	68.3	2.689	68	2.677	0.3	.012	3.0	.118	3
					20	▲	MWS0160X20DB	32.3	1.272	37.3	1.469	39.3	1.547	78.3	3.083	78	3.071	0.3	.012	3.0	.118	3
					25	▲	MWS0160X25DB	40.3	1.587	45.3	1.783	47.3	1.862	86.3	3.398	86	3.386	0.3	.012	3.0	.118	3
					30	▲	MWS0160X30DB	48.3	1.902	53.3	2.098	55.3	2.177	95.3	3.752	95	3.740	0.3	.012	3.0	.118	3
1.613	.0635		52		1	▲	MWS00635SB	1.9	.075	8.3	.327	11.2	.441	68.3	2.689	68	2.677	0.3	.012	3.175	.125	1
					12	▲	MWS00635XB	19.7	.776	30.3	1.193	33.2	1.307	68.3	2.689	68	2.677	0.3	.012	3.175	.125	3
1.650	.0650				1	▲	MWS0165SB	2.0	.079	8.5	.335	11.0	.433	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					20	▲	MWS0165X20DB	33.3	1.311	38.3	1.508	40.3	1.587	78.3	3.083	78	3.071	0.3	.012	3.0	.118	3
					25	▲	MWS0165X25DB	41.6	1.638	46.3	1.823	49.3	1.941	86.3	3.398	86	3.386	0.3	.012	3.0	.118	3
					30	▲	MWS0165X30DB	49.8	1.961	54.3	2.138	57.3	2.256	95.3	3.752	95	3.740	0.3	.012	3.0	.118	3

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.700	.0669				1	▲	MWS0170SB	2.0	.079	8.7	.343	11.1	.437	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					5	▲	MWS0170LB	8.9	.350	22.4	.882	24.4	.961	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					12	▲	MWS0170XB	20.8	.819	30.4	1.197	32.4	1.276	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					20	▲	MWS0170X20DB	34.4	1.354	39.3	1.547	42.3	1.665	78.3	3.083	78	3.071	0.3	.012	3.0	.118	3
					25	▲	MWS0170X25DB	42.9	1.689	48.3	1.902	50.3	1.980	86.3	3.398	86	3.386	0.3	.012	3.0	.118	3
					30	▲	MWS0170X30DB	51.4	2.024	56.3	2.217	59.3	2.335	95.3	3.752	95	3.740	0.3	.012	3.0	.118	3
1.702	.0670		51		1	▲	MWS00670SB	2.0	.079	8.7	.343	11.4	.449	68.3	2.689	68	2.677	0.3	.012	3.175	.125	1
					12	▲	MWS00670XB	20.8	.819	30.4	1.197	33.1	1.303	68.4	2.693	68	2.677	0.4	.016	3.175	.125	3
1.750	.0689				1	▲	MWS0175SB	2.1	.083	8.9	.350	11.2	.441	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					20	▲	MWS0175X20DB	35.4	1.394	40.3	1.587	43.3	1.705	84.3	3.319	84	3.307	0.3	.012	3.0	.118	3
					25	▲	MWS0175X25DB	44.2	1.740	49.3	1.941	51.3	2.020	94.3	3.713	94	3.701	0.3	.012	3.0	.118	3
					30	▲	MWS0175X30DB	52.9	2.083	58.3	2.295	60.3	2.374	102.3	4.028	102	4.016	0.3	.012	3.0	.118	3
1.778	.0700		50	#2-56	1	▲	MWS00700SB	2.1	.083	9.3	.366	11.9	.469	68.3	2.689	68	2.677	0.3	.012	3.175	.125	1
					12	▲	MWS00700XB	21.7	.854	30.4	1.197	33.0	1.299	68.4	2.693	68	2.677	0.4	.016	3.175	.125	3
1.800	.0709				1	▲	MWS0180SB	2.1	.083	9.3	.366	11.5	.453	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					5	▲	MWS0180LB	9.4	.370	22.4	.882	24.4	.961	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					12	▲	MWS0180XB	22.0	.866	30.4	1.197	32.4	1.276	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					20	▲	MWS0180X20DB	36.4	1.433	41.3	1.626	44.3	1.744	84.3	3.319	84	3.307	0.3	.012	3.0	.118	3
					25	▲	MWS0180X25DB	45.4	1.787	50.3	1.980	53.3	2.098	94.3	3.713	94	3.701	0.3	.012	3.0	.118	3
					30	▲	MWS0180X30DB	54.4	2.142	59.3	2.335	62.3	2.453	102.3	4.028	102	4.016	0.3	.012	3.0	.118	3
1.850	.0728				1	▲	MWS0185SB	2.2	.087	9.5	.374	11.6	.457	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					20	▲	MWS0185X20DB	37.4	1.472	43.3	1.705	45.3	1.783	84.3	3.319	84	3.307	0.3	.012	3.0	.118	3
					25	▲	MWS0185X25DB	46.7	1.839	52.3	2.059	54.3	2.138	94.3	3.713	94	3.701	0.3	.012	3.0	.118	3
					30	▲	MWS0185X30DB	55.9	2.201	61.3	2.413	63.3	2.492	102.3	4.028	102	4.016	0.3	.012	3.0	.118	3
1.855	.0730		49		1	▲	MWS00730SB	2.2	.087	9.5	.374	12.0	.472	68.3	2.689	68	2.677	0.3	.012	3.175	.125	1
					12	▲	MWS00730XB	22.6	.890	30.4	1.197	32.9	1.295	68.4	2.693	68	2.677	0.4	.016	3.175	.125	3
1.900	.0748				1	▲	MWS0190SB	2.3	.091	9.8	.386	11.9	.469	68.4	2.693	68	2.677	0.4	.016	3.0	.118	1
					5	▲	MWS0190LB	9.9	.390	22.4	.882	24.4	.961	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					12	▲	MWS0190XB	23.2	.913	30.4	1.197	32.4	1.276	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					20	▲	MWS0190X20DB	38.4	1.512	44.4	1.748	46.4	1.827	84.4	3.323	84	3.307	0.4	.016	3.0	.118	3
					25	▲	MWS0190X25DB	47.9	1.886	53.4	2.102	55.4	2.181	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					30	▲	MWS0190X30DB	57.4	2.260	63.4	2.496	65.4	2.575	102.4	4.031	102	4.016	0.4	.016	3.0	.118	3
1.931	.0760		48		1	▲	MWS00760SB	2.3	.091	10.0	.394	12.3	.484	68.4	2.693	68	2.677	0.4	.016	3.175	.125	1
					12	▲	MWS00760XB	23.6	.929	30.4	1.197	32.7	1.287	68.4	2.693	68	2.677	0.4	.016	3.175	.125	3
1.950	.0768				1	▲	MWS0195SB	2.4	.094	10.0	.394	12.0	.472	68.4	2.693	68	2.677	0.4	.016	3.0	.118	1
					20	▲	MWS0195X20DB	39.4	1.551	45.4	1.787	47.4	1.866	84.4	3.323	84	3.307	0.4	.016	3.0	.118	3
					25	▲	MWS0195X25DB	49.2	1.937	55.4	2.181	57.4	2.260	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					30	▲	MWS0195X30DB	58.9	2.319	64.4	2.535	66.4	2.614	102.4	4.031	102	4.016	0.4	.016	3.0	.118	3
1.994	.0785				1	▲	MWS00785SB	2.4	.094	10.4	.409	12.6	.496	68.4	2.693	68	2.677	0.4	.016	3.175	.125	1
					12	▲	MWS00785XB	24.3	.957	30.4	1.197	32.6	1.283	68.4	2.693	68	2.677	0.4	.016	3.175	.125	3
2.000	.0787			#3-48	1	▲	MWS0200SB	2.4	.094	10.4	.409	12.3	.484	68.4	2.693	68	2.677	0.4	.016	3.0	.118	1
					5	▲	MWS0200LB	10.4	.409	22.4	.882	24.4	.961	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					12	▲	MWS0200XB	24.4	.961	30.4	1.197	32.4	1.276	68.4	2.693	68	2.677	0.4	.016	3.0	.118	3
					20	▲	MWS0200X20DB	40.4	1.591	46.4	1.827	48.4	1.906	84.4	3.323	84	3.307	0.4	.016	3.0	.118	3
					25	▲	MWS0200X25DB	50.4	1.984	56.4	2.220	58.4	2.299	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					30	▲	MWS0200X30DB	60.4	2.378	66.4	2.614	68.4	2.693	102.4	4.031	102	4.016	0.4	.016	3.0	.118	3

▲ : Micro-MWS inch & metric sizes 1.0mm - 2.95mm being phased out through 2022.
See new generation Micro-MVS drills for applicable replacement.

MICRO-MWS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
2.050	.0807				1	▲	MWS0205SB	2.4	.094	10.5	.413	12.3	.484	74.3	2.925	74	2.913	0.3	.012	3.0	.118	1
					20	▲	MWS0205X20DB	41.4	1.630	47.4	1.866	49.4	1.945	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0205X25DB	51.7	2.035	57.4	2.260	59.4	2.339	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0205X30DB	61.9	2.437	68.4	2.693	69.4	2.732	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.058	.0810		46		1	▲	MWS00810SB	2.4	.094	10.5	.413	12.6	.496	74.3	2.925	74	2.913	0.3	.012	3.175	.125	1
					12	▲	MWS00810XB	25.1	.988	38.4	1.512	40.5	1.594	74.4	2.929	74	2.913	0.4	.016	3.175	.125	3
2.100	.0827				1	▲	MWS0210SB	2.4	.094	10.7	.421	12.4	.488	68.3	2.689	68	2.677	0.3	.012	3.0	.118	1
					5	▲	MWS0210LB	10.9	.429	28.4	1.118	30.4	1.197	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					12	▲	MWS0210XB	25.6	1.008	38.4	1.512	40.4	1.591	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					20	▲	MWS0210X20DB	42.4	1.669	48.4	1.906	50.4	1.984	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0210X25DB	52.9	2.083	59.4	2.339	60.4	2.378	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0210X30DB	63.4	2.496	69.4	2.732	71.4	2.811	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.150	.0846				1	▲	MWS0215SB	2.5	.098	10.9	.429	12.5	.492	74.3	2.925	74	2.913	0.3	.012	3.0	.118	1
					20	▲	MWS0215X20DB	43.4	1.709	49.4	1.945	51.4	2.024	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0215X25DB	54.2	2.134	60.4	2.378	62.4	2.457	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0215X30DB	64.9	2.555	71.4	2.811	73.4	2.890	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.185	.0860		44		1	▲	MWS00860SB	2.5	.098	11.3	.445	13.1	.516	74.3	2.925	74	2.913	0.3	.012	3.175	.125	1
					12	▲	MWS00860XB	26.6	1.047	38.4	1.512	40.2	1.583	74.4	2.929	74	2.913	0.4	.016	3.175	.125	3
2.200	.0866				1	▲	MWS0220SB	2.6	.102	11.4	.449	12.9	.508	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					5	▲	MWS0220LB	11.4	.449	28.4	1.118	29.4	1.157	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					12	▲	MWS0220XB	26.8	1.055	38.4	1.512	39.4	1.551	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					20	▲	MWS0220X20DB	44.4	1.748	51.4	2.024	52.4	2.063	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0220X25DB	55.4	2.181	62.4	2.457	63.4	2.496	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0220X30DB	66.4	2.614	73.4	2.890	74.4	2.929	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.250	.0886				1	▲	MWS0225SB	2.7	.106	11.6	.457	13.0	.512	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					20	▲	MWS0225X20DB	45.4	1.787	52.4	2.063	53.4	2.102	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0225X25DB	56.7	2.232	63.4	2.496	64.4	2.535	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0225X30DB	67.9	2.673	74.4	2.929	76.4	3.008	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.261	.0890		43	#4-40	1	▲	MWS00890SB	2.6	.102	11.6	.457	13.3	.524	74.4	2.929	74	2.913	0.4	.016	3.175	.125	1
					12	▲	MWS00890XB	27.5	1.083	38.4	1.512	40.1	1.579	74.4	2.929	74	2.913	0.4	.016	3.175	.125	3
2.300	.0906				1	▲	MWS0230SB	2.7	.106	11.8	.465	13.1	.516	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					5	▲	MWS0230LB	11.9	.469	28.4	1.118	29.4	1.157	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					12	▲	MWS0230XB	28.0	1.102	38.4	1.512	39.4	1.551	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					20	▲	MWS0230X20DB	46.4	1.827	53.4	2.102	54.4	2.142	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0230X25DB	57.9	2.280	64.4	2.535	66.4	2.614	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0230X30DB	69.4	2.732	76.4	3.008	77.4	3.047	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.350	.0925				1	▲	MWS0235SB	2.8	.110	12.0	.472	13.2	.520	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					20	▲	MWS0235X20DB	47.4	1.866	54.4	2.142	55.4	2.181	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0235X25DB	59.2	2.331	66.4	2.614	67.4	2.654	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0235X30DB	70.9	2.791	78.4	3.087	79.4	3.126	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.382	.0938	3/32			1	▲	MWS00938SB	2.8	.110	12.4	.488	13.9	.547	74.4	2.929	74	2.913	0.4	.016	3.175	.125	1
					12	▲	MWS00938XB	29.0	1.142	38.4	1.512	39.9	1.571	74.4	2.929	74	2.913	0.4	.016	3.175	.125	3

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

M

DRILLING

▲ : Micro-MWS inch & metric sizes 1.0mm - 2.95mm being phased out through 2022.
See new generation Micro-MVS drills for applicable replacement.

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
2.400	.0945				1	▲	MWS0240SB	2.8	.110	12.4	.488	13.5	.531	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					5	▲	MWS0240LB	12.4	.488	28.4	1.118	29.4	1.157	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					12	▲	MWS0240XB	29.2	1.150	38.4	1.512	39.4	1.551	74.4	2.929	74	2.913	0.4	.016	3.0	.118	3
					20	▲	MWS0240X20DB	48.4	1.906	55.4	2.181	56.4	2.220	94.4	3.717	94	3.701	0.4	.016	3.0	.118	3
					25	▲	MWS0240X25DB	60.4	2.378	67.4	2.654	68.4	2.693	107.4	4.228	107	4.213	0.4	.016	3.0	.118	3
					30	▲	MWS0240X30DB	72.4	2.850	79.4	3.126	80.4	3.165	118.4	4.661	118	4.646	0.4	.016	3.0	.118	3
2.439	.0960		41		1	▲	MWS00960SB	2.8	.110	12.6	.496	14.0	.551	74.4	2.929	74	2.913	0.4	.016	3.175	.125	1
					12	▲	MWS00960XB	29.7	1.169	38.4	1.512	39.8	1.567	74.4	2.929	74	2.913	0.4	.016	3.175	.125	3
2.450	.0965				1	▲	MWS0245SB	2.9	.114	12.6	.496	13.6	.535	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					20	▲	MWS0245X20DB	49.5	1.949	56.5	2.224	57.5	2.264	94.5	3.720	94	3.701	0.5	.020	3.0	.118	3
					25	▲	MWS0245X25DB	61.8	2.433	69.5	2.736	70.5	2.776	107.5	4.232	107	4.213	0.5	.020	3.0	.118	3
					30	▲	MWS0245X30DB	74.0	2.913	81.5	3.209	82.5	3.248	118.5	4.665	118	4.646	0.5	.020	3.0	.118	3
2.500	.0984				1	▲	MWS0250SB	2.9	.114	12.8	.504	13.7	.539	74.4	2.929	74	2.913	0.4	.016	3.0	.118	1
					5	▲	MWS0250LB	13.0	.512	28.5	1.122	29.5	1.161	74.5	2.933	74	2.913	0.5	.020	3.0	.118	3
					12	▲	MWS0250XB	30.5	1.201	38.5	1.516	39.5	1.555	74.5	2.933	74	2.913	0.5	.020	3.0	.118	3
					20	▲	MWS0250X20DB	50.5	1.988	58.5	2.303	59.5	2.343	94.5	3.720	94	3.701	0.5	.020	3.0	.118	3
					25	▲	MWS0250X25DB	63.0	2.480	70.5	2.776	71.5	2.815	107.5	4.232	107	4.213	0.5	.020	3.0	.118	3
					30	▲	MWS0250X30DB	75.5	2.972	83.5	3.287	84.5	3.327	118.5	4.665	118	4.646	0.5	.020	3.0	.118	3
2.550	.1004				1	▲	MWS0255SB	3.1	.122	13.0	.512	13.0	.512	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					20	▲	MWS0255X20DB	51.5	2.028	59.5	2.343	59.5	2.343	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	MWS0255X25DB	64.3	2.531	71.5	2.815	71.5	2.815	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	MWS0255X30DB	77.0	3.031	84.5	3.327	84.5	3.327	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.566	.1010				1	▲	MWS01010SB	3.0	.118	13.0	.512	13.0	.512	81.4	3.205	81	3.189	0.4	.016	3.175	.125	2
					12	▲	MWS01010XB	31.3	1.232	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.175	.125	4
2.600	.1024				1	▲	MWS0260SB	3.1	.122	13.4	.528	13.4	.528	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					5	▲	MWS0260LB	13.5	.531	33.5	1.319	33.5	1.319	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					12	▲	MWS0260XB	31.7	1.248	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					20	▲	MWS0260X20DB	52.5	2.067	60.5	2.382	60.5	2.382	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	MWS0260X25DB	65.5	2.579	73.5	2.894	73.5	2.894	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	MWS0260X30DB	78.5	3.091	86.5	3.406	86.5	3.406	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.642	.1040		37	#5-44	1	▲	MWS01040SB	3.1	.122	13.6	.535	13.6	.535	81.4	3.205	81	3.189	0.4	.016	3.175	.125	2
					12	▲	MWS01040XB	32.2	1.268	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.175	.125	4
2.650	.1043				1	▲	MWS0265SB	3.2	.126	13.6	.535	13.6	.535	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					20	▲	MWS0265X20DB	53.5	2.106	61.5	2.421	61.5	2.421	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	MWS0265X25DB	66.8	2.630	74.5	2.933	74.5	2.933	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	MWS0265X30DB	80.0	3.150	87.5	3.445	87.5	3.445	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.693	.1060				1	▲	MWS01060SB	3.1	.122	13.8	.543	13.8	.543	81.4	3.205	81	3.189	0.4	.016	3.175	.125	2
					12	▲	MWS01060XB	32.8	1.291	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.175	.125	4
2.700	.1063		36	#6-32	1	▲	MWS0270SB	3.2	.126	13.8	.543	13.8	.543	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					5	▲	MWS0270LB	14.0	.551	33.5	1.319	33.5	1.319	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					12	▲	MWS0270XB	32.9	1.295	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					20	▲	MWS0270X20DB	54.5	2.146	62.5	2.461	62.5	2.461	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	MWS0270X25DB	68.0	2.677	76.5	3.012	76.5	3.012	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	MWS0270X30DB	81.5	3.209	89.5	3.524	89.5	3.524	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.750	.1083				1	▲	MWS0275SB	3.3	.130	14.0	.551	14.0	.551	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					20	▲	MWS0275X20DB	55.5	2.185	63.5	2.500	63.5	2.500	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	MWS0275X25DB	69.3	2.728	77.5	3.051	77.5	3.051	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	MWS0275X30DB	83.0	3.268	91.5	3.602	91.5	3.602	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4

M

DRILLING

MICRO-MWS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock VP15TF	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.779	**.1094**	**7/64**			1	▲	**MWS01094SB**	3.2	.126	14.4	.567	14.4	.567	81.4	3.205	81	3.189	0.4	.016	3.175	.125	2
					12	▲	**MWS01094XB**	33.9	1.335	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.175	.125	4
2.800	**.1102**		**35**		1	▲	**MWS0280SB**	3.3	.130	14.4	.567	14.4	.567	81.4	3.205	81	3.189	0.4	.016	3.0	.118	2
					5	▲	**MWS0280LB**	14.5	.571	33.5	1.319	33.5	1.319	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					12	▲	**MWS0280XB**	34.1	1.343	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					20	▲	**MWS0280X20DB**	56.5	2.224	64.5	2.539	64.5	2.539	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	**MWS0280X25DB**	70.5	2.776	78.5	3.091	78.5	3.091	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	**MWS0280X30DB**	84.5	3.327	92.5	3.642	92.5	3.642	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.850	**.1122**				1	▲	**MWS0285SB**	3.4	.134	14.7	.579	14.7	.579	81.5	3.209	81	3.189	0.5	.020	3.0	.118	2
					20	▲	**MWS0285X20DB**	57.5	2.264	66.5	2.618	66.5	2.618	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	**MWS0285X25DB**	71.8	2.827	80.5	3.169	80.5	3.169	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	**MWS0285X30DB**	86.0	3.386	94.5	3.720	94.5	3.720	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.900	**.1142**				1	▲	**MWS0290SB**	3.4	.134	14.9	.587	14.9	.587	81.5	3.209	81	3.189	0.5	.020	3.0	.118	2
					5	▲	**MWS0290LB**	15.0	.591	33.5	1.319	33.5	1.319	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					12	▲	**MWS0290XB**	35.3	1.390	45.5	1.791	45.5	1.791	81.5	3.209	81	3.189	0.5	.020	3.0	.118	4
					20	▲	**MWS0290X20DB**	58.5	2.303	67.5	2.657	67.5	2.657	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	**MWS0290X25DB**	73.0	2.874	81.5	3.209	81.5	3.209	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	**MWS0290X30DB**	87.5	3.445	96.5	3.799	96.5	3.799	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4
2.950	**.1161**		**32**		1	▲	**MWS0295SB**	3.5	.138	15.1	.594	15.1	.594	81.5	3.209	81	3.189	0.5	.020	3.0	.118	2
					20	▲	**MWS0295X20DB**	59.5	2.343	68.5	2.697	68.5	2.697	103.5	4.075	103	4.055	0.5	.020	3.0	.118	4
					25	▲	**MWS0295X25DB**	74.3	2.925	83.5	3.287	83.5	3.287	117.5	4.626	117	4.606	0.5	.020	3.0	.118	4
					30	▲	**MWS0295X30DB**	89.0	3.504	97.5	3.839	97.5	3.839	132.5	5.217	132	5.197	0.5	.020	3.0	.118	4

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

▲ : Micro-MWS inch & metric sizes 1.0mm - 2.95mm being phased out through 2022.
See new generation Micro-MVS drills for applicable replacement.

RECOMMENDED CUTTING CONDITIONS

■ MWS SB/LB/XB/DB Type (L/D<10)

Work Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180−280HB) AISI 1045, 4140 etc.	
Drill Dia. **DC** inch	mm	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)
.0197	0.50	130 (100–150)	.0004 (.0002−.0006)	130 (100–150)	.0004 (.0002−.0006)
.0248	0.63	130 (100–150)	.0006 (.0003−.0008)	130 (100–150)	.0006 (.0003−.0008)
.0315	0.80	150 (115–165)	.0011 (.0006−.0016)	150 (115–165)	.0011 (.0006−.0016)
.0394	1.00	165 (130–180)	.0014 (.0008−.0020)	165 (130–180)	.0014 (.0008−.0020)
.0472	1.20	165 (130–180)	.0018 (.0012−.0024)	165 (130–180)	.0018 (.0012−.0024)
.0630	1.60	165 (130–180)	.0022 (.0014−.0031)	165 (130–180)	.0022 (.0014−.0031)
.0787	2.00	165 (130–180)	.0028 (.0016−.0039)	165 (130–180)	.0028 (.0016−.0039)
.0984	2.50	195 (150–230)	.0033 (.0020−.0049)	195 (150–215)	.0033 (.0020−.0049)

Work Material		Carbon Steel, Alloy Steel (280−350HB) AISI 4340 etc.		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.	
Drill Dia. **DC** inch	mm	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)
.0197	0.50	100 (65–115)	.0004 (.0002−.0006)	65 (50–80)	.0003 (.0002−.0004)
.0248	0.63	100 (65–115)	.0006 (.0003−.0008)	65 (50–80)	.0004 (.0003−.0005)
.0315	0.80	115 (80–130)	.0011 (.0006−.0016)	80 (65–100)	.0008 (.0006−.0010)
.0394	1.00	130 (100–150)	.0014 (.0008−.0020)	100 (65–115)	.0012 (.0008−.0017)
.0472	1.20	130 (100–150)	.0018 (.0012−.0024)	100 (65–115)	.0016 (.0012−.0021)
.0630	1.60	130 (100–150)	.0022 (.0014−.0031)	100 (65–115)	.0020 (.0014−.0028)
.0787	2.00	130 (100–150)	.0028 (.0016−.0039)	100 (65–115)	.0024 (.0016−.0031)
.0984	2.50	165 (130–180)	.0033 (.0020−.0049)	130 (100–150)	.0030 (.0020−.0039)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MICRO-MWS

RECOMMENDED CUTTING CONDITIONS

■ MWS SB/LB/XB/DB Type (L/D<10)

Work Material		Gray Cast Iron (≤350MPa) No45B etc.		Ductile Cast Iron (≤450MPa) 60-40-8 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0197	0.50	130 (100—150)	.0004 (.0002—.0006)	100 (65—115)	.0004 (.0002—.0006)
.0248	0.63	130 (100—150)	.0006 (.0003—.0008)	100 (65—115)	.0006 (.0003—.0008)
.0315	0.80	150 (115—165)	.0011 (.0006—.0016)	115 (80—130)	.0011 (.0006—.0016)
.0394	1.00	165 (130—180)	.0014 (.0008—.0020)	130 (100—150)	.0014 (.0008—.0020)
.0472	1.20	165 (130—180)	.0018 (.0012—.0024)	130 (100—150)	.0018 (.0012—.0024)
.0630	1.60	165 (130—180)	.0022 (.0014—.0031)	130 (100—150)	.0022 (.0014—.0031)
.0787	2.00	165 (130—180)	.0028 (.0016—.0039)	130 (100—150)	.0028 (.0016—.0039)
.0984	2.50	195 (150—215)	.0033 (.0020—.0049)	165 (130—180)	.0033 (.0020—.0049)

Work Material		Aluminum Alloy (Si<5%) ASTM A6061, A7075 etc.		Heat Resistant Alloy Inconel718 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0197	0.50	130 (100—150)	.0006 (.0003—.0008)	35 (15—50)	.0002 (.0002—.0003)
.0248	0.63	130 (100—150)	.0008 (.0005—.0012)	35 (15—50)	.0003 (.0003—.0004)
.0315	0.80	150 (115—165)	.0014 (.0009—.0020)	35 (15—50)	.0006 (.0005—.0008)
.0394	1.00	195 (150—215)	.0020 (.0012—.0030)	35 (15—50)	.0008 (.0006—.0011)
.0472	1.20	230 (180—245)	.0026 (.0018—.0035)	35 (15—50)	.0010 (.0009—.0013)
.0630	1.60	260 (195—280)	.0033 (.0021—.0047)	35 (15—50)	.0012 (.0010—.0016)
.0787	2.00	295 (230—310)	.0041 (.0024—.0059)	50 (35—65)	.0016 (.0013—.0020)
.0984	2.50	330 (260—360)	.0053 (.0030—.0079)	50 (35—65)	.0020 (.0016—.0024)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

M

DRILLING

■ MWS DB Type (L/D≥10)

Work Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180—280HB) AISI 1045, 4140 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0394	1.0	165 (130—180)	.0008 (.0004—.0012)	130 (100—130)	.0008 (.0004—.0012)
.0472	1.2	165 (130—180)	.0010 (.0006—.0015)	130 (100—130)	.0010 (.0006—.0015)
.0630	1.6	165 (130—180)	.0022 (.0013—.0031)	130 (100—130)	.0022 (.0013—.0031)
.0787	2.0	195 (150—215)	.0028 (.0016—.0039)	165 (130—180)	.0028 (.0016—.0039)
.0984	2.5	195 (150—215)	.0035 (.0025—.0049)	165 (130—180)	.0035 (.0022—.0049)

Work Material		Carbon Steel, Alloy Steel (280—350HB) AISI 4340 etc.		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0394	1.0	100 (65—100)	.0006 (.0004—.0011)	100 (65—115)	.0006 (.0004—.0011)
.0472	1.2	100 (65—100)	.0008 (.0005—.0014)	100 (65—115)	.0008 (.0005—.0014)
.0630	1.6	100 (65—100)	.0020 (.0011—.0030)	100 (65—115)	.0020 (.0011—.0030)
.0787	2.0	165 (130—180)	.0026 (.0013—.0037)	100 (65—115)	.0026 (.0013—.0037)
.0984	2.5	165 (130—180)	.0031 (.0018—.0047)	130 (100—150)	.0031 (.0018—.0047)

Work Material		Gray Cast Iron (≤350MPa) No45B etc.		Ductile Cast Iron (≤450MPa) 60-40-8 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0394	1.0	130 (100—130)	.0008 (.0004—.0012)	100 (65—100)	.0006 (.0004—.0011)
.0472	1.2	130 (100—130)	.0010 (.0006—.0015)	100 (65—100)	.0008 (.0005—.0014)
.0630	1.6	130 (100—130)	.0022 (.0013—.0031)	100 (65—100)	.0020 (.0011—.0030)
.0787	2.0	165 (130—180)	.0028 (.0016—.0039)	165 (130—180)	.0026 (.0013—.0037)
.0984	2.5	165 (130—180)	.0035 (.0022—.0049)	165 (130—180)	.0031 (.0018—.0047)

Work Material		Aluminum Alloy (Si<5%) AISI A6061, A7075 etc.		Heat Resistant Alloy Inconel718 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0394	1.0	165 (130—180)	.0020 (.0012—.0030)	35 (15—50)	.0008 (.0006—.0011)
.0472	1.2	195 (150—215)	.0026 (.0018—.0035)	35 (15—50)	.0010 (.0009—.0013)
.0630	1.6	230 (180—245)	.0033 (.0021—.0047)	35 (15—50)	.0012 (.0010—.0016)
.0787	2.0	260 (195—280)	.0041 (.0024—.0059)	50 (35—65)	.0016 (.0013—.0020)
.0984	2.5	295 (230—310)	.0053 (.0030—.0079)	50 (35—65)	.0020 (.0016—.0024)

Note 1) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

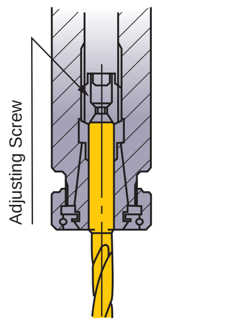
M

DRILLING

MICRO-MWS

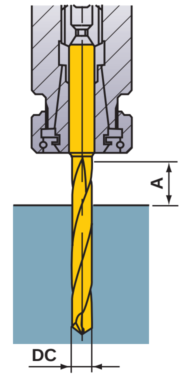
■ OPERATIONAL GUIDANCE FOR THE MICRO-MWS DRILLS (Φ.0200"-Φ.1200" & Φ0.50mm-Φ2.95mm)

Drill Holding



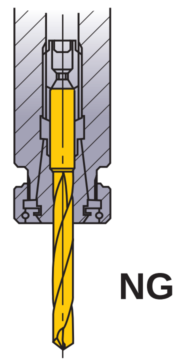
Thrust bearing type collet chuck holds the drill securely.

Drill Length



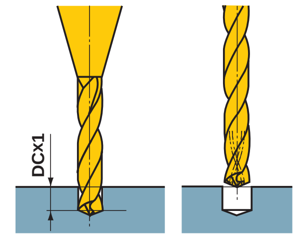
A ≥ DC x 2

Drill Installation



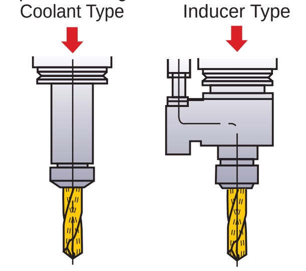
Do not clamp on the flutes.

Drill Installation



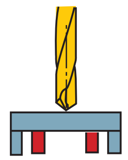
①A pilot hole must proceed application of XB or DB drill.
②Use SB drill for pilot hole.
③Depending on cutting conditions peck feeding may be necessary.

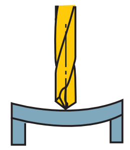
Through Coolant Type



Recommended coolant pressure: ≥ 435 PSI (3MPa)
At least 220 PSI (1.5MPa) is required.

Thin Work Material





Coolant Handling

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

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

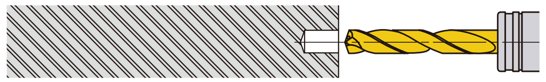
■ CAUTIONS FOR USE

- Please use a fine mesh filter (mesh ≤ 5 micron) for coolant to prevent jamming in the oil hole.
- For deep drilling with the long type drill, machining a pilot hole is recommended. (Otherwise, centrifugal forces may cause drill breakage.)

■ OPERATIONAL GUIDANCE FOR THE MICRO-MWS DRILL (Φ.0200"-Φ.1200" & Φ0.50mm-Φ2.95mm) (L/D ≥ 10)

Flat Face Drilling ●Drilling a blind hole

■ 1. Drilling a Pilot Hole

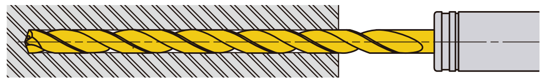


①Use the SB type drill.
②Use a drill with the same diameter as the deep hole drill.
③Drill depth : Approx 1DC.
④Ensure a high precision hole is drilled for the guide pilot.

■ 2. Initial Cutting with the Long Type Drill

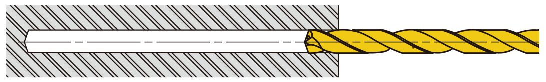
①Penetrate the pilot hole at a low revolution. (Revolution speed 500-1000 min^{-1}, feed rate .008-.012 IPR)
②Stop the long type drill .020-.039 inch short of the pilot hole bottom.

■ 3. Drill the Deep Hole



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

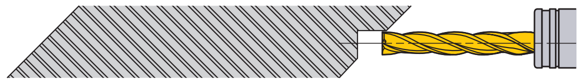
■ 4. Drill Retraction



①After drilling, lower the cutting revolution about .020-.039 inch short of the hole end. (Revolution speed of around 500-1000 min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 inch/min.
③Finally clear the hole at a cutting speed of 65-100 SFM and feed rate of .008-.012 IPR.

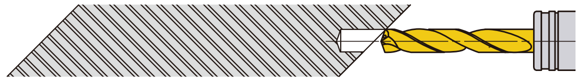
Irregular Face Drilling ●Drilling and breaking through on irregular faces or angles

■ 1. Spot Facing



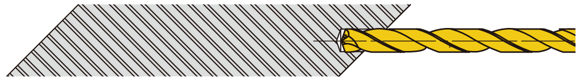
①Machine a flat on the irregular face by using an MFE (flat bottom drill) or an end mill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a Pilot Hole



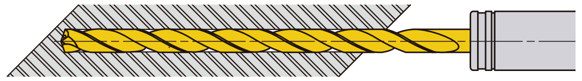
①Use a drill with the same or larger point angle than XB or DB type. The MWS-SB type is recommended.
②Ensure a high precision hole is drilled for the pilot.
③Drill depth : Approx 1DC.

■ 3. Initial Cutting with the Long Type Drill



①Penetrate the pilot hole at a low revolution. (Revolution speed 500-1000 min^{-1}, feed rate .008-.012 IPR)
②Stop the long type drill .020-.039 inch short of the pilot hole bottom.

■ 4. Drill the Deep Hole

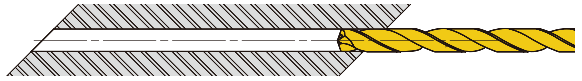


①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking Through

①When breaking through, the cutting edge can be damaged.
②Feed rate should be half the normal feed.

■ 6. Drill Retraction



①Finally clear the hole at a revolution speed of 500-1000 min^{-1}.
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 IPM.

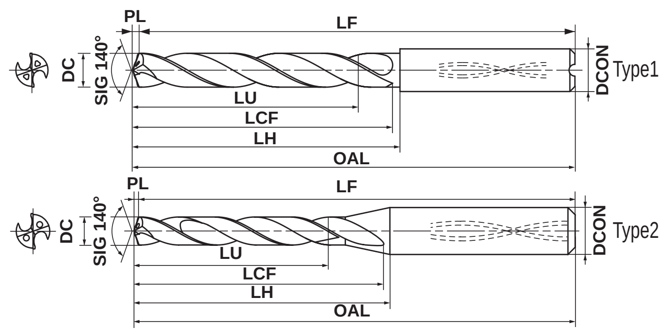
MMS

●Stainless Steel drill with unique narrow margins which reduces cutting resistance and "TRI-Cooling technology" coolant holes which provides excellent chip evacuation.
●New DP7020 grade provides excellent tool life and unique wavy cutting edge improves sharpness and cutting edge strength.

UWC DP7 140°

P | **M** | K | N | S | H

Internal Coolant



*When looking at the coating the color can vary depending on the direction of viewing. This does not have any effect on the performance of the drill.

(inch)

DC=.1181	.1181<DC≤.2362	.2362<DC≤.3937	.3937<DC≤.7087	.7087<DC≤.7874
0 −0.00055	0 −0.00071	0 −0.00087	0 −0.00106	0 −0.00130
	.1181<DCON≤.2362	.2362<DCON≤.3937	.3937<DCON≤.7087	.7087<DCON≤.7874
	0 −0.00031	0 −0.00035	0 −0.00043	0 −0.00051

(mm)

DC=3	3<DC≤6	6<DC≤10	10<DC≤18	18<DC≤20
0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	3<DCON≤6	6<DCON≤10	10<DCON≤18	18<DCON≤20
	0 −0.008	0 −0.009	0 −0.011	0 −0.013

Note 1) MMS drills are suitable for use with shrink fit holders.

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread size	L/D	Stock DP7020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.000	.1181				3	●	MMS0300X3DB	9.5	.374	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0300X5DB	15.5	.610	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.048	.1200		31		3	●	MMS0305X3D060	9.7	.382	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0305X5D060	15.8	.622	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.100	.1220				3	●	MMS0310X3DB	9.9	.390	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0310X5DB	16.1	.634	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.175	.1250	1/8			3	●	MMS0318X3D060	10.1	.398	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0318X5D060	16.4	.646	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.200	.1260				3	●	MMS0320X3DB	10.2	.402	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0320X5DB	16.6	.654	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.300	.1299			M4x.7	3	●	MMS0330X3DB	10.5	.413	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0330X5DB	17.1	.673	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.400	.1339				3	●	MMS0340X3DB	10.8	.425	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0340X5DB	17.6	.693	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.500	.1378				3	●	MMS0350X3DB	11.1	.437	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	2
					5	●	MMS0350X5DB	18.1	.713	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	2
3.572	.1407	9/64			3	●	MMS0357X3D060	11.4	.449	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0357X5D060	18.5	.728	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
3.600	.1417				3	●	MMS0360X3DB	11.5	.453	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0360X5DB	18.7	.736	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
3.700	.1457			M4.5x.75	3	●	MMS0370X3DB	11.8	.465	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0370X5DB	19.2	.756	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
3.800	.1496		25	#10-24	3	●	MMS0380X3DB	12.1	.476	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0380X5DB	19.7	.776	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
3.900	.1535				3	●	MMS0390X3DB	12.4	.488	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0390X5DB	20.2	.795	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
3.969	.1563	5/32			3	●	MMS0397X3D060	12.6	.496	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0397X5D060	20.6	.811	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
4.000	.1575				3	●	MMS0400X3DB	12.7	.500	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	2
					5	●	MMS0400X5DB	20.7	.815	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	2
4.039	.1590		21	#10-32	3	●	MMS0404X3D060	12.8	.504	24.7	.972	26.7	1.051	73.7	2.902	73	2.874	0.7	.028	6	.236	2
					5	●	MMS0404X5D060	20.9	.823	33.7	1.327	35.7	1.406	82.7	3.256	82	3.228	0.7	.028	6	.236	2
4.100	.1614				3	●	MMS0410X3DB	13.0	.512	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0410X5DB	21.2	.835	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
Note 2) The coolant hole of 5.9mm diameter or less will be round shape.

● : USA Stock

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread size	L/D	Stock DP7020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
4.200	.1654			M5x.8	3	●	MMS0420X3DB	13.4	.528	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0420X5DB	21.8	.858	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2
4.300	.1693				3	●	MMS0430X3DB	13.7	.539	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0430X5DB	22.3	.878	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2
4.366	.1719	11/64			3	●	MMS0437X3D060	13.9	.547	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0437X5D060	22.6	.890	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2
4.400	.1732		17		3	●	MMS0440X3DB	14.0	.551	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0440X5DB	22.8	.898	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2
4.500	.1772		16	#12-24	3	●	MMS0450X3DB	14.3	.563	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	2
					5	●	MMS0450X5DB	23.3	.917	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	2
4.600	.1811				3	●	MMS0460X3DB	14.6	.575	25.8	1.016	28.8	1.134	75.8	2.984	75	2.953	0.8	.031	6	.236	1
					5	●	MMS0460X5DB	23.8	.937	35.8	1.409	38.8	1.528	85.8	3.378	85	3.346	0.8	.031	6	.236	1
4.700	.1850		13		3	●	MMS0470X3DB	15.0	.591	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	●	MMS0470X5DB	24.4	.961	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.763	.1875	3/16			3	●	MMS0476X3D060	15.1	.594	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	●	MMS0476X5D060	24.7	.972	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.800	.1890				3	●	MMS0480X3DB	15.3	.602	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	●	MMS0480X5DB	24.9	.980	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.900	.1929				3	●	MMS0490X3DB	15.6	.614	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	●	MMS0490X5DB	25.4	1.000	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
5.000	.1969			M6x1.0	3	●	MMS0500X3DB	15.9	.626	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	●	MMS0500X5DB	25.9	1.020	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
5.100	.2008		7	1/4-20	3	●	MMS0510X3DB	16.2	.638	28.9	1.138	30.9	1.217	81.9	3.224	81	3.189	0.9	.035	6	.236	1
					5	●	MMS0510X5DB	26.4	1.039	39.9	1.571	42.9	1.689	89.9	3.539	89	3.504	0.9	.035	6	.236	1
5.160	.2032	13/64			3	●	MMS0516X3D060	16.4	.646	28.9	1.138	30.9	1.217	81.9	3.224	81	3.189	0.9	.035	6	.236	1
					5	●	MMS0516X5D060	26.7	1.051	39.9	1.571	42.9	1.689	89.9	3.539	89	3.504	0.9	.035	6	.236	1
5.200	.2047				3	●	MMS0520X3DB	16.5	.650	29.0	1.142	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0520X5DB	26.9	1.059	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.300	.2087		4		3	●	MMS0530X3DB	16.9	.665	29.0	1.142	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0530X5DB	27.5	1.083	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.400	.2126		3	1/4-28	3	●	MMS0540X3DB	17.2	.677	29.0	1.142	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0540X5DB	28.0	1.102	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.500	.2165				3	●	MMS0550X3DB	17.5	.689	29.0	1.142	31.0	1.220	820	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0550X5DB	28.5	1.122	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.557	.2188	7/32			3	●	MMS0556X3D060	17.7	.697	31.0	1.220	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0556X5D060	28.8	1.134	43.0	1.693	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.600	.2205		2		3	●	MMS0560X3DB	17.8	.701	31.0	1.220	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0560X5DB	29.0	1.142	43.0	1.693	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.700	.2244				3	●	MMS0570X3DB	18.1	.713	31.0	1.220	31.0	1.220	82.0	3.228	81	3.189	1.0	.039	6	.236	1
					5	●	MMS0570X5DB	29.5	1.161	43.0	1.693	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	1
5.800	.2283		1		3	●	MMS0580X3DB	18.5	.728	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	1
					5	●	MMS0580X5DB	30.1	1.185	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	1
5.900	.2323				3	●	MMS0590X3DB	18.8	.740	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	1
					5	●	MMS0590X5DB	30.6	1.205	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	1
5.954	.2344	15/64	A		3	●	MMS0595X3D060	18.9	.744	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	1
					5	●	MMS0595X5D060	30.8	1.213	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	1
6.000	.2362			M7x1.0	3	●	MMS0600X3DB	19.1	.752	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	1
					5	●	MMS0600X5DB	31.1	1.224	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	1

MMS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock DP7020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
6.100	.2402				3	●	MMS0610X3DB	19.4	.764	34.1	1.343	36.1	1.421	87.1	3.429	86	3.386	1.1	.043	8	.315	1
					5	●	MMS0610X5DB	31.6	1.244	47.1	1.854	49.1	1.933	96.1	3.783	95	3.740	1.1	.043	8	.315	1
6.200	.2441				3	●	MMS0620X3DB	19.7	.776	34.1	1.343	36.1	1.421	87.1	3.429	86	3.386	1.1	.043	8	.315	1
					5	●	MMS0620X5DB	32.1	1.264	47.1	1.854	49.1	1.933	96.1	3.783	95	3.740	1.1	.043	8	.315	1
6.300	.2480				3	●	MMS0630X3DB	20.0	.787	34.2	1.346	36.2	1.425	87.2	3.433	86	3.386	1.2	.047	8	.315	1
					5	●	MMS0630X5DB	32.6	1.283	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	1
6.350	.2500	1/4	E		3	●	MMS0635X3D080	20.2	.795	34.2	1.346	36.2	1.425	87.2	3.433	86	3.386	1.2	.047	8	.315	1
					5	●	MMS0635X5D080	32.9	1.295	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	1
6.400	.2520				3	●	MMS0640X3DB	20.4	.803	34.2	1.346	36.2	1.425	87.2	3.433	86	3.386	1.2	.047	8	.315	1
					5	●	MMS0640X5DB	33.2	1.307	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	1
6.500	.2559				3	●	MMS0650X3DB	20.7	.815	34.2	1.346	36.2	1.425	87.2	3.433	86	3.386	1.2	.047	8	.315	1
					5	●	MMS0650X5DB	33.7	1.327	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	1
6.528	.2570		F	5/16-18	3	●	MMS0653X3D080	20.8	.819	36.2	1.425	38.2	1.504	91.2	3.591	90	3.543	1.2	.047	8	.315	1
					5	●	MMS0653X5D080	33.8	1.331	50.2	1.976	52.2	2.055	99.2	3.906	98	3.858	1.2	.047	8	.315	1
6.600	.2598				3	●	MMS0660X3DB	21.0	.827	36.2	1.425	38.2	1.504	91.2	3.591	90	3.543	1.2	.047	8	.315	1
					5	●	MMS0660X5DB	34.2	1.346	50.2	1.976	52.2	2.055	99.2	3.906	98	3.858	1.2	.047	8	.315	1
6.700	.2638			M8x1.25	3	●	MMS0670X3DB	21.3	.839	36.2	1.425	38.2	1.504	91.2	3.591	90	3.543	1.2	.047	8	.315	1
					5	●	MMS0670X5DB	34.7	1.366	50.2	1.976	52.2	2.055	99.2	3.906	98	3.858	1.2	.047	8	.315	1
6.747	.2657	17/64			3	●	MMS0675X3D080	21.5	.846	36.2	1.425	38.2	1.504	91.2	3.591	90	3.543	1.2	.047	8	.315	1
					5	●	MMS0675X5D080	34.9	1.374	50.2	1.976	52.2	2.055	99.2	3.906	98	3.858	1.2	.047	8	.315	1
6.800	.2677				3	●	MMS0680X3DB	21.6	.850	36.2	1.425	38.2	1.504	91.2	3.591	90	3.543	1.2	.047	8	.315	1
					5	●	MMS0680X5DB	35.2	1.386	50.2	1.976	52.2	2.055	99.2	3.906	98	3.858	1.2	.047	8	.315	1
6.900	.2717		I	5/16-24	3	●	MMS0690X3DB	22.0	.866	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0690X5DB	35.8	1.409	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	1
7.000	.2756			M8x1.0	3	●	MMS0700X3DB	22.3	.878	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0700X5DB	36.3	1.429	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	1
7.100	.2795				3	●	MMS0710X3DB	22.6	.890	39.3	1.547	40.3	1.587	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0710X5DB	36.8	1.449	54.3	2.138	57.3	2.256	104.3	4.106	103	4.055	1.3	.051	8	.315	1
7.144	.2813	9/32	K		3	●	MMS0714X3D080	22.7	.894	39.3	1.547	40.3	1.587	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0714X5D080	37.0	1.457	54.3	2.138	57.3	2.256	104.3	4.106	103	4.055	1.3	.051	8	.315	1
7.200	.2835				3	●	MMS0720X3DB	22.9	.902	39.3	1.547	40.3	1.587	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0720X5DB	37.3	1.469	54.3	2.138	57.3	2.256	104.3	4.106	103	4.055	1.3	.051	8	.315	1
7.300	.2874				3	●	MMS0730X3DB	23.2	.913	39.3	1.547	40.3	1.587	91.3	3.594	90	3.543	1.3	.051	8	.315	1
					5	●	MMS0730X5DB	37.8	1.488	54.3	2.138	57.3	2.256	104.3	4.106	103	4.055	1.3	.051	8	.315	1
7.400	.2913				3	●	MMS0740X3DB	23.5	.925	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0740X5DB	38.3	1.508	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.500	.2953		M		3	●	MMS0750X3DB	23.9	.941	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0750X5DB	38.9	1.531	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.541	.2969	19/64			3	●	MMS0754X3D080	24.0	.945	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0754X5D080	39.1	1.539	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.600	.2992				3	●	MMS0760X3DB	24.2	.953	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0760X5DB	39.4	1.551	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.700	.3031				3	●	MMS0770X3DB	24.5	.965	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0770X5DB	39.9	1.571	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.800	.3071				3	●	MMS0780X3DB	24.8	.976	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0780X5DB	40.4	1.591	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
7.900	.3110				3	●	MMS0790X3DB	25.1	.988	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0790X5DB	40.9	1.610	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock DP7020	Order Number	LU		LCF		LH		OAL		LF		PL		DCON		Type
								mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
7.938	.3125	5/16		3/8-16	3	●	MMS0794X3D080	25.2	.992	41.4	1.630	41.4	1.630	91.4	3.598	90	3.543	1.4	.055	8	.315	1
					5	●	MMS0794X5D080	41.1	1.618	57.4	2.260	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	1
8.000	.3150				3	●	MMS0800X3DB	25.5	1.004	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	1
					5	●	MMS0800X5DB	41.5	1.634	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	1
8.100	.3189				3	●	MMS0810X3DB	25.8	1.016	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0810X5DB	42.0	1.654	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.200	.3228		P		3	●	MMS0820X3DB	26.1	1.028	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0820X5DB	42.5	1.673	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.300	.3268				3	●	MMS0830X3DB	26.4	1.039	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0830X5DB	43.0	1.693	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.335	.3282	21/64			3	●	MMS0833X3D100	26.5	1.043	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0833X5D100	43.2	1.701	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.400	.3307				3	●	MMS0840X3DB	26.7	1.051	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0840X5DB	43.5	1.713	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.433	.3320		Q	3/8-24	3	●	MMS0843X3D100	26.8	1.055	44.5	1.752	46.5	1.831	97.5	3.839	96	3.780	1.5	.059	10	.394	1
					5	●	MMS0843X5D100	43.7	1.720	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	1
8.500	.3346			M10x1.5	3	●	MMS0850X3DB	27.0	1.063	44.6	1.756	46.6	1.835	97.6	3.843	96	3.780	1.6	.063	10	.394	1
					5	●	MMS0850X5DB	44.0	1.732	61.6	2.425	63.6	2.504	114.6	4.512	113	4.449	1.6	.063	10	.394	1
8.600	.3386		R		3	●	MMS0860X3DB	27.4	1.079	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0860X5DB	44.6	1.756	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
8.700	.3425			M10x1.25	3	●	MMS0870X3DB	27.7	1.091	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0870X5DB	45.1	1.776	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
8.732	.3438	11/32			3	●	MMS0873X3D100	27.8	1.094	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0873X5D100	45.2	1.780	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
8.800	.3465				3	●	MMS0880X3DB	28.0	1.102	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0880X5DB	45.6	1.795	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
8.900	.3504				3	●	MMS0890X3DB	28.3	1.114	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0890X5DB	46.1	1.815	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
9.000	.3543				3	●	MMS0900X3DB	28.6	1.126	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	1
					5	●	MMS0900X5DB	46.6	1.835	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	1
9.100	.3583		T		3	●	MMS0910X3DB	29.0	1.142	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0910X5DB	47.2	1.858	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.129	.3594	23/64			3	●	MMS0913X3D100	29.0	1.142	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0913X5D100	47.3	1.862	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.200	.3622				3	●	MMS0920X3DB	29.3	1.154	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0920X5DB	47.7	1.878	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.300	.3661				3	●	MMS0930X3DB	29.6	1.165	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0930X5DB	48.2	1.898	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.348	.3680		U	7/16-14	3	●	MMS0935X3D100	29.7	1.169	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0935X5D100	48.4	1.906	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.400	.3701				3	●	MMS0940X3DB	29.9	1.177	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0940X5DB	48.7	1.917	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.500	.3740				3	●	MMS0950X3DB	30.2	1.189	49.7	1.957	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0950X5DB	49.2	1.937	68.7	2.705	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.525	.3750	3/8			3	●	MMS0953X3D100	30.3	1.193	51.7	2.035	51.7	2.035	102.7	4.043	101	3.976	1.7	.067	10	.394	1
					5	●	MMS0953X5D100	49.3	1.941	71.7	2.823	71.7	2.823	122.7	4.831	121	4.764	1.7	.067	10	.394	1
9.600	.3780				3	●	MMS0960X3DB	30.5	1.201	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	MMS0960X5DB	49.7	1.957	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1

MMS

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread size	L/D	Stock DP7020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
9.700	**.3819**		**Tube Sheet**		3	●	**MMS0970X3DB**	30.9	1.217	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	**MMS0970X5DB**	50.3	1.980	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1
9.800	**.3858**		**W**		3	●	**MMS0980X3DB**	31.2	1.228	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	**MMS0980X5DB**	50.8	2.000	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1
9.900	**.3898**				3	●	**MMS0990X3DB**	31.5	1.240	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	**MMS0990X5DB**	51.3	2.020	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1
9.922	**.3907**	**25/64**		**7/16-20**	3	●	**MMS0992X3D100**	31.5	1.240	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	**MMS0992X5D100**	51.4	2.024	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1
10.000	**.3937**				3	●	**MMS1000X3DB**	31.8	1.252	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	1
					5	●	**MMS1000X5DB**	51.8	2.039	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	1

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● **: USA Stock**

RECOMMENDED CUTTING CONDITIONS

Work Material		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.		Austenitic Stainless Steel (>200HB) AISI 304LN, 316LN etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1181	3.0	260 (195—330)	.0051 (.0031—.0071)	195 (150—260)	.0039 (.0020—.0059)
.1575	4.0	260 (195—330)	.0059 (.0039—.0079)	195 (150—260)	.0047 (.0031—.0071)
.1969	5.0	260 (195—330)	.0059 (.0039—.0079)	195 (150—260)	.0047 (.0031—.0071)
.2480	6.3	260 (195—330)	.0067 (.0047—.0087)	195 (150—260)	.0059 (.0039—.0079)
.3150	8.0	260 (195—330)	.0075 (.0055—.0094)	195 (150—260)	.0067 (.0047—.0087)
.3937	10.0	195 (150—230)	.0079 (.0059—.0098)	165 (130—195)	.0071 (.0051—.0091)

Work Material		Duplex Steel (≤280HB) AISI 329 etc.		Ferritic, Martensitic Stainless Steel (≤200HB) AISI 410, 430 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1181	3.0	165 (130—195)	.0039 (.0020—.0059)	260 (195—330)	.0051 (.0031—.0071)
.1575	4.0	165 (130—195)	.0047 (.0031—.0071)	260 (195—330)	.0059 (.0039—.0079)
.1969	5.0	165 (130—195)	.0047 (.0031—.0071)	260 (195—330)	.0059 (.0039—.0079)
.2480	6.3	165 (130—195)	.0059 (.0039—.0079)	260 (195—330)	.0067 (.0047—.0087)
.3150	8.0	165 (130—195)	.0067 (.0047—.0087)	260 (195—330)	.0075 (.0055—.0094)
.3937	10.0	130 (100—165)	.0071 (.0051—.0091)	195 (150—260)	.0079 (.0059—.0098)

Note 1) For stable machining, internal coolant supply with high pressure is recommended.
Note 2) Emulsion type of water coolant is recommended.
Note 3) Recommended cutting conditions are for machining under the conditions of favorable machining environment and coolant. Please lower the cutting conditions if there is a problem in the rigidity of machine and work material, and coolant property or discharge amount.
Note 4) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MMS

RECOMMENDED CUTTING CONDITIONS

Work Material		Ferritic, Martensitic Stainless Steel (>200HB) AISI 431, 420 etc.		PH Stainless Steel (<450HB) S17400, S17700 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1181	3.0	195 (150—260)	.0039 (.0020—.0059)	165 (130—195)	.0039 (.0020—.0059)
.1575	4.0	195 (150—260)	.0047 (.0031—.0071)	165 (130—195)	.0047 (.0031—.0071)
.1969	5.0	195 (150—260)	.0047 (.0031—.0071)	165 (130—195)	.0047 (.0031—.0071)
.2480	6.3	195 (150—260)	.0059 (.0039—.0079)	165 (130—195)	.0059 (.0039—.0079)
.3150	8.0	195 (150—260)	.0067 (.0047—.0087)	165 (130—195)	.0067 (.0047—.0087)
.3937	10.0	165 (130—195)	.0071 (.0051—.0091)	130 (100—165)	.0071 (.0051—.0091)

Note 1) For stable machining, internal coolant supply with high pressure is recommended.
Note 2) Emulsion type of water coolant is recommended.
Note 3) Recommended cutting conditions are for machining under the conditions of favorable machining environment and coolant. Please lower the cutting conditions if there is a problem in the rigidity of machine and work material, and coolant property or discharge amount.
Note 4) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

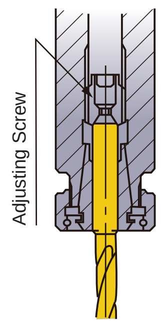
■STAINLESS STEEL CROSS REFERENCE LIST

Work Material	No	USA AISI/SAE	Japan **JIS**	Germany W-no.	Germany DIN
Ferritic, Martensitic Stainless Steel	1	416	SUS416	1.4005	X12CrS3
		410	SUS410	1.4006	X10Cr13
		430	SUS430	1.4016	X6Cr17
		434	SUS434	1.4113	X6CrMo17
		430Ti	SUS430LX	1.4510	X6CrTi17
		409	—	1.4512	X6CrTi12
	2	420	SUS420J1	1.4021	X20Cr13
		431	SUS431	1.4057	X20CrNi17-2
		420	SUS420J2	1.4028	X30Cr13
		440C	SUS440C	1.4125	X10CrMo17
PH Stainless Steel	3	630 (17-4PH)	SUS630	1.4542	X5CrNiCuNb16 4
		S15500 (15-5PH)	—	1.4545	—
		631 (17-7PH)	SUS631	1.4568	X7CrNiAl17 7
Austenitic Stainless Steel	4	304	SUS304	1.4301	X5CrNi18 10
		305	SUS305	1.4303	X5CrNi8-12
		303	SUS303	1.4305	X12CrNiS18-9
		304L	SUS304L	1.4307	X2CrNi19-11
		316	SUS316	1.4401	X5CrNiMo17 12 2
	5	304LN	SUS304LN	1.4311	X2CrNiN18 10
		316L	SUS316L	1.4404	X2CrNiMo17 12 2
		316LN	SUS316LN	1.4406	X2CrNiMoN17 12 2
		—	SUS316L	1.4435	X2CrNiMo18 14 3
		317L	SUS317L	1.4438	X2CrNiMo18 15 4
		N08926	—	1.4529	X1NiCrMoCuN25 20 7
		321	SUS321	1.4541	X6CrNiTi18-10
		347	SUS347	1.4550	X6CrNiNb18-10
		316Ti	SUS316Ti	1.4571	X6CrNiMoTi17 12 2
Duplex Steel	6	—	—	1.4362	X2CrNiN23 4
		S32750	SCS14A	1.4410	X2CrNiMoN25 7 4
		329	SUS329J1	1.4460	X3CrNiMoN27 5 2
		S31803	SUS329J3L	1.4462	X2CrNiMoN22 5 3

MMS

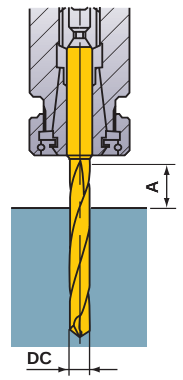
■OPERATIONAL GUIDANCE FOR THE MMS DRILL

Drill Holding



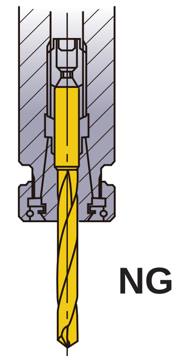
Thrust bearing type collet chuck holds the drill securely.

Drill Length



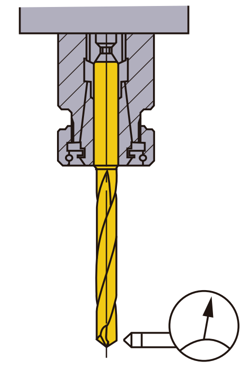
A ≥ DC x 1.5

Drill Installation



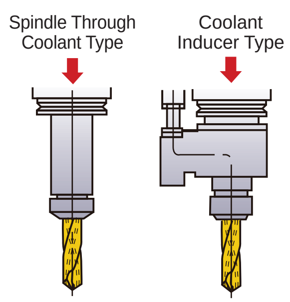
Do not clamp on the flutes.

Installation Tolerance



Runout ≤ .001"

Through Coolant Type



Coolant pressure is approx. 70 - 1015 PSI (0.5 - 7MPa).

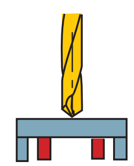
Coolant Handling

< MMS type >

1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular coolant exchange is recommended.

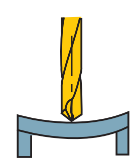
2) Small particles of swarf will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.

Thin Work Materials



Support the Work Material

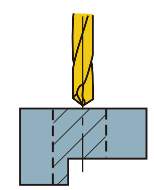
OK



If bending Occurs

NG

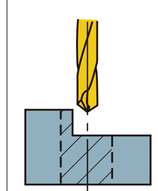
Interrupted Cutting



One Process

OK

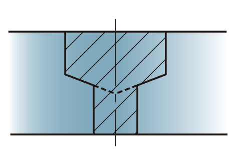
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

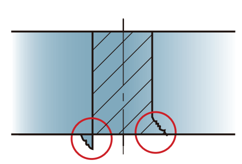
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the machining into two processes.
②Drill the larger hole first.
*Tools for chamfering and spot facing can be produced to order.

Burring and Work Material Chipping



①Lower the feed rate when breaking through.
②Add a chamfer.
③Change the point angle.

Memo

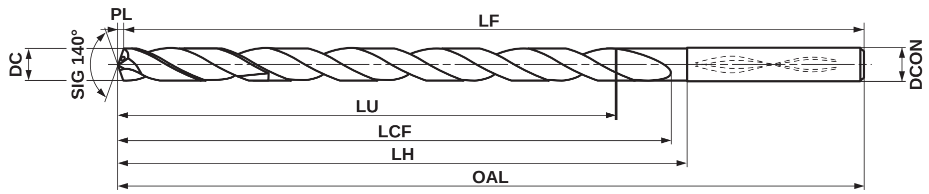
MNS

- Unique 4 hole, high flow, coolant delivery system prevents built-up-edge.
- Long drill life and highly efficient drilling of holes in aluminum.

P M K **N** S H

METRIC STANDARD

Internal Coolant



DC=3	3<DC≤6	6<DC≤10	10<DC≤14
0 / −0.014	0 / −0.018	0 / −0.022	0 / −0.027

DCON=3	3<DCON≤6	6<DCON≤10	10<DCON≤14
0 / −0.006	0 / −0.008	0 / −0.009	0 / −0.011

Note 1) MNS drills are suitable for use with shrink fit holders.
Note 2) 4.5 or smaller diameter drills are designed with 2 colant holes.

DC (mm)	L/D	Stock TF15	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCON
3.0	5	★	MNS0300LB	15.5	33.5	33.5	81.5	81	0.5	3
	10	★	MNS0300X10DB	30.5	39.5	42.5	90.5	90	0.5	3
	20	★	MNS0300X20DB	60.5	69.5	72.5	120.5	120	0.5	3
	30	★	MNS0300X30DB	90.5	99.5	102.5	150.5	150	0.5	3
3.1	5	★	MNS0310LB	16.1	39.6	39.6	87.6	87	0.6	4
	10	□	MNS0310X10DB	31.6	46.6	49.6	97.6	97	0.6	4
	20	□	MNS0310X20DB	62.6	81.6	84.6	132.6	132	0.6	4
	30	□	MNS0310X30DB	93.6	116.6	119.6	167.6	167	0.6	4
3.2	5	★	MNS0320LB	16.6	39.6	39.6	87.6	87	0.6	4
	10	★	MNS0320X10DB	32.6	46.6	49.6	97.6	97	0.6	4
	20	★	MNS0320X20DB	64.6	81.6	84.6	132.6	132	0.6	4
	30	★	MNS0320X30DB	96.6	116.6	119.6	167.6	167	0.6	4
3.3	5	★	MNS0330LB	17.1	39.6	39.6	87.6	87	0.6	4
	10	□	MNS0330X10DB	33.6	46.6	49.6	97.6	97	0.6	4
	20	□	MNS0330X20DB	66.6	81.6	84.6	132.6	132	0.6	4
	30	□	MNS0330X30DB	99.6	116.6	119.6	167.6	167	0.6	4
3.4	5	★	MNS0340LB	17.6	39.6	39.6	87.6	87	0.6	4
	10	★	MNS0340X10DB	34.6	46.6	49.6	97.6	97	0.6	4
	20	★	MNS0340X20DB	68.6	81.6	84.6	132.6	132	0.6	4
	30	★	MNS0340X30DB	102.6	116.6	119.6	167.6	167	0.6	4
3.5	5	★	MNS0350LB	18.1	39.6	39.6	87.6	87	0.6	4
	10	□	MNS0350X10DB	35.6	46.6	49.6	97.6	97	0.6	4
	20	□	MNS0350X20DB	70.6	81.6	84.6	132.6	132	0.6	4
	30	□	MNS0350X30DB	105.6	116.6	119.6	167.6	167	0.6	4
3.6	5	★	MNS0360LB	18.7	44.7	44.7	92.7	92	0.7	4
	10	★	MNS0360X10DB	36.7	52.7	55.7	103.7	103	0.7	4
	20	★	MNS0360X20DB	72.7	92.7	95.7	143.7	143	0.7	4
	30	★	MNS0360X30DB	108.7	132.7	135.7	183.7	183	0.7	4
3.7	5	★	MNS0370LB	19.2	44.7	44.7	92.7	92	0.7	4
	10	□	MNS0370X10DB	37.7	52.7	55.7	103.7	103	0.7	4
	20	□	MNS0370X20DB	74.7	92.7	95.7	143.7	143	0.7	4
	30	□	MNS0370X30DB	111.7	132.7	135.7	183.7	183	0.7	4
3.8	5	★	MNS0380LB	19.7	44.7	44.7	92.7	92	0.7	4
	10	□	MNS0380X10DB	38.7	52.7	55.7	103.7	103	0.7	4
	20	□	MNS0380X20DB	76.7	92.7	95.7	143.7	143	0.7	4
	30	□	MNS0380X30DB	114.7	132.7	135.7	183.7	183	0.7	4
3.9	5	★	MNS0390LB	20.2	44.7	44.7	92.7	92	0.7	4
	10	★	MNS0390X10DB	39.7	52.7	55.7	103.7	103	0.7	4
	20	★	MNS0390X20DB	78.7	92.7	95.7	143.7	143	0.7	4
	30	★	MNS0390X30DB	117.7	132.7	135.7	183.7	183	0.7	4
4.0	5	★	MNS0400LB	20.7	44.7	44.7	92.7	92	0.7	4
	10	★	MNS0400X10DB	40.7	52.7	55.7	103.7	103	0.7	4
	20	★	MNS0400X20DB	80.7	92.7	95.7	143.7	143	0.7	4
	30	★	MNS0400X30DB	120.7	132.7	135.7	183.7	183	0.7	4
4.1	5	★	MNS0410LB	21.2	50.7	50.7	100.7	100	0.7	5
	10	□	MNS0410X10DB	41.7	59.7	62.7	112.7	112	0.7	5
	20	□	MNS0410X20DB	82.7	104.7	107.7	157.7	157	0.7	5
	30	□	MNS0410X30DB	123.7	149.7	152.7	202.7	202	0.7	5
4.2	5	★	MNS0420LB	21.8	50.8	50.8	100.8	100	0.8	5
	10	□	MNS0420X10DB	42.8	59.8	62.8	112.8	112	0.8	5
	20	□	MNS0420X20DB	84.8	104.8	107.8	157.8	157	0.8	5
	30	□	MNS0420X30DB	126.8	149.8	152.8	202.8	202	0.8	5
4.3	5	★	MNS0430LB	22.3	50.8	50.8	100.8	100	0.8	5
	10	□	MNS0430X10DB	43.8	59.8	62.8	112.8	112	0.8	5
	20	□	MNS0430X20DB	86.8	104.8	107.8	157.8	157	0.8	5
	30	□	MNS0430X30DB	129.8	149.8	152.8	202.8	202	0.8	5

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).
★ : Stock in Japan □ : Made to Order

DC (mm)	L/D	Stock TF15	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCON
4.4	5	★	MNS0440LB	22.8	50.8	50.8	100.8	100	0.8	5
	10	□	MNS0440X10DB	44.8	59.8	62.8	112.8	112	0.8	5
	20	□	MNS0440X20DB	88.8	104.8	107.8	157.8	157	0.8	5
	30	□	MNS0440X30DB	132.8	149.8	152.8	202.8	202	0.8	5
4.5	5	★	MNS0450LB	23.3	50.8	50.8	100.8	100	0.8	5
	10	□	MNS0450X10DB	45.8	59.8	62.8	112.8	112	0.8	5
	20	□	MNS0450X20DB	90.8	104.8	107.8	157.8	157	0.8	5
	30	□	MNS0450X30DB	135.8	149.8	152.8	202.8	202	0.8	5
4.6	5	★	MNS0460LB	23.8	55.8	55.8	105.8	105	0.8	5
	10	□	MNS0460X10DB	46.8	65.8	68.8	118.8	118	0.8	5
	20	□	MNS0460X20DB	92.8	115.8	118.8	168.8	168	0.8	5
	30	□	MNS0460X30DB	138.8	165.8	168.8	218.8	218	0.8	5
4.7	5	★	MNS0470LB	24.4	55.9	55.9	105.9	105	0.9	5
	10	□	MNS0470X10DB	47.9	65.9	68.9	118.9	118	0.9	5
	20	□	MNS0470X20DB	94.9	115.9	118.9	168.9	168	0.9	5
	30	□	MNS0470X30DB	141.9	165.9	168.9	218.9	218	0.9	5
4.8	5	★	MNS0480LB	24.9	55.9	55.9	105.9	105	0.9	5
	10	□	MNS0480X10DB	48.9	65.9	68.9	118.9	118	0.9	5
	20	□	MNS0480X20DB	96.9	115.9	118.9	168.9	168	0.9	5
	30	□	MNS0480X30DB	144.9	165.9	168.9	218.9	218	0.9	5
4.9	5	★	MNS0490LB	25.4	55.9	55.9	105.9	105	0.9	5
	10	★	MNS0490X10DB	49.9	65.9	68.9	118.9	118	0.9	5
	20	★	MNS0490X20DB	98.9	115.9	118.9	168.9	168	0.9	5
	30	★	MNS0490X30DB	147.9	165.9	168.9	218.9	218	0.9	5
5.0	5	★	MNS0500LB	25.9	44.9	44.9	100.9	100	0.9	6
	10	★	MNS0500X10DB	50.9	65.9	68.9	118.9	118	0.9	5
	20	★	MNS0500X20DB	100.9	115.9	118.9	168.9	168	0.9	5
	30	★	MNS0500X30DB	150.9	165.9	168.9	218.9	218	0.9	5
5.1	5	★	MNS0510LB	26.4	44.9	44.9	100.9	100	0.9	6
	10	★	MNS0510X10DB	51.9	72.9	75.9	127.9	127	0.9	6
	20	★	MNS0510X20DB	102.9	127.9	130.9	182.9	182	0.9	6
	30	★	MNS0510X30DB	153.9	182.9	185.9	237.9	237	0.9	6
5.2	5	★	MNS0520LB	26.9	44.9	44.9	100.9	100	0.9	6
	10	□	MNS0520X10DB	52.9	72.9	75.9	127.9	127	0.9	6
	20	□	MNS0520X20DB	104.9	127.9	130.9	182.9	182	0.9	6
	30	□	MNS0520X30DB	156.9	182.9	185.9	237.9	237	0.9	6
5.3	5	★	MNS0530LB	27.5	45.0	45.0	101.0	100	1.0	6
	10	□	MNS0530X10DB	54.0	73.0	76.0	128.0	127	1.0	6
	20	□	MNS0530X20DB	107.0	128.0	131.0	183.0	182	1.0	6
	30	□	MNS0530X30DB	160.0	183.0	186.0	238.0	237	1.0	6
5.4	5	★	MNS0540LB	28.0	45.0	45.0	101.0	100	1.0	6
	10	□	MNS0540X10DB	55.0	73.0	76.0	128.0	127	1.0	6
	20	□	MNS0540X20DB	109.0	128.0	131.0	183.0	182	1.0	6
	30	□	MNS0540X30DB	163.0	183.0	186.0	238.0	237	1.0	6
5.5	5	★	MNS0550LB	28.5	45.0	45.0	101.0	100	1.0	6
	10	★	MNS0550X10DB	56.0	73.0	76.0	128.0	127	1.0	6
	20	★	MNS0550X20DB	111.0	128.0	131.0	183.0	182	1.0	6
	30	★	MNS0550X30DB	166.0	183.0	186.0	238.0	237	1.0	6
5.6	5	★	MNS0560LB	29.0	49.0	49.0	101.0	100	1.0	6
	10	□	MNS0560X10DB	57.0	79.0	82.0	134.0	133	1.0	6
	20	□	MNS0560X20DB	113.0	139.0	142.0	194.0	193	1.0	6
	30	□	MNS0560X30DB	169.0	199.0	202.0	254.0	253	1.0	6
5.7	5	★	MNS0570LB	29.5	49.0	49.0	101.0	100	1.0	6
	10	□	MNS0570X10DB	58.0	79.0	82.0	134.0	133	1.0	6
	20	□	MNS0570X20DB	115.0	139.0	142.0	194.0	193	1.0	6
	30	□	MNS0570X30DB	172.0	199.0	202.0	254.0	253	1.0	6
5.8	5	★	MNS0580LB	30.1	49.1	49.1	101.1	100	1.1	6
	10	□	MNS0580X10DB	59.1	79.1	82.1	134.1	133	1.1	6
	20	□	MNS0580X20DB	117.1	139.1	142.1	194.1	193	1.1	6
	30	□	MNS0580X30DB	175.1	199.1	202.1	254.1	253	1.1	6
5.9	5	★	MNS0590LB	30.6	49.1	49.1	101.1	100	1.1	6
	10	□	MNS0590X10DB	60.1	79.1	82.1	134.1	133	1.1	6
	20	□	MNS0590X20DB	119.1	139.1	142.1	194.1	193	1.1	6
	30	□	MNS0590X30DB	178.1	199.1	202.1	254.1	253	1.1	6
6.0	5	★	MNS0600LB	31.1	49.1	49.1	101.1	100	1.1	6
	10	★	MNS0600X10DB	61.1	79.1	82.1	134.1	133	1.1	6
	20	★	MNS0600X20DB	121.1	139.1	142.1	194.1	193	1.1	6
	30	★	MNS0600X30DB	181.1	199.1	202.1	254.1	253	1.1	6
6.1	5	★	MNS0610LB	31.6	53.1	53.1	110.1	109	1.1	7
	10	★	MNS0610X10DB	62.1	86.1	89.1	142.1	141	1.1	7
	20	★	MNS0610X20DB	123.1	151.1	154.1	207.1	206	1.1	7
	30	★	MNS0610X30DB	184.1	216.1	219.1	272.1	271	1.1	7
6.2	5	★	MNS0620LB	32.1	53.1	53.1	110.1	109	1.1	7
	10	□	MNS0620X10DB	63.1	86.1	89.1	142.1	141	1.1	7
	20	□	MNS0620X20DB	125.1	151.1	154.1	207.1	206	1.1	7
	30	□	MNS0620X30DB	187.1	216.1	219.1	272.1	271	1.1	7
6.3	5	★	MNS0630LB	32.6	53.1	53.1	110.1	109	1.1	7
	10	□	MNS0630X10DB	64.1	86.1	89.1	142.1	141	1.1	7
	20	□	MNS0630X20DB	127.1	151.1	154.1	207.1	206	1.1	7
	30	□	MNS0630X30DB	190.1	216.1	219.1	272.1	271	1.1	7
6.4	5	★	MNS0640LB	33.2	53.2	53.2	110.2	109	1.2	7
	10	□	MNS0640X10DB	65.2	86.2	89.2	142.2	141	1.2	7
	20	□	MNS0640X20DB	129.2	151.2	154.2	207.2	206	1.2	7
	30	□	MNS0640X30DB	193.2	216.2	219.2	272.2	271	1.2	7
6.5	5	★	MNS0650LB	33.7	53.2	53.2	110.2	109	1.2	7
	10	★	MNS0650X10DB	66.2	86.2	89.2	142.2	141	1.2	7
	20	★	MNS0650X20DB	131.2	151.2	154.2	207.2	206	1.2	7
	30	★	MNS0650X30DB	196.2	216.2	219.2	272.2	271	1.2	7

MNS

DC (mm)	L/D	Stock TF15	Order Number	LU	LCF	LH	OAL	LF	PL	DCON
6.6	5	★	MNS0660LB	34.2	57.2	57.2	110.2	109	1.2	7
	10	□	MNS0660X10DB	67.2	92.2	95.2	148.2	147	1.2	7
	20	□	MNS0660X20DB	133.2	162.2	165.2	218.2	217	1.2	7
	30	□	MNS0660X30DB	199.2	232.2	235.2	288.2	287	1.2	7
6.7	5	★	MNS0670LB	34.7	57.2	57.2	110.2	109	1.2	7
	10	★	MNS0670X10DB	68.2	92.2	95.2	148.2	147	1.2	7
	20	★	MNS0670X20DB	135.2	162.2	165.2	218.2	217	1.2	7
	30	★	MNS0670X30DB	202.2	232.2	235.2	288.2	287	1.2	7
6.8	5	★	MNS0680LB	35.2	57.2	57.2	110.2	109	1.2	7
	10	□	MNS0680X10DB	69.2	92.2	95.2	148.2	147	1.2	7
	20	□	MNS0680X20DB	137.2	162.2	165.2	218.2	217	1.2	7
	30	□	MNS0680X30DB	205.2	232.2	235.2	288.2	287	1.2	7
6.9	5	★	MNS0690LB	35.8	57.3	57.3	110.3	109	1.3	7
	10	□	MNS0690X10DB	70.3	92.3	95.3	148.3	147	1.3	7
	20	□	MNS0690X20DB	139.3	162.3	165.3	218.3	217	1.3	7
	30	□	MNS0690X30DB	208.3	232.3	235.3	288.3	287	1.3	7
7.0	5	★	MNS0700LB	36.3	57.3	57.3	110.3	109	1.3	7
	10	★	MNS0700X10DB	71.3	92.3	95.3	148.3	147	1.3	7
	20	★	MNS0700X20DB	141.3	162.3	165.3	218.3	217	1.3	7
	30	★	MNS0700X30DB	211.3	232.3	235.3	288.3	287	1.3	7
7.1	5	★	MNS0710LB	36.8	61.3	65.3	119.3	118	1.3	8
	10	□	MNS0710X10DB	72.3	99.3	102.3	156.3	155	1.3	8
	20	□	MNS0710X20DB	143.3	174.3	177.3	231.3	230	1.3	8
	30	□	MNS0710X30DB	214.3	249.3	252.3	306.3	305	1.3	8
7.2	5	★	MNS0720LB	37.3	61.3	65.3	119.3	118	1.3	8
	10	★	MNS0720X10DB	73.3	99.3	102.3	156.3	155	1.3	8
	20	★	MNS0720X20DB	145.3	174.3	177.3	231.3	230	1.3	8
	30	★	MNS0720X30DB	217.3	249.3	252.3	306.3	305	1.3	8
7.3	5	★	MNS0730LB	37.8	61.3	65.3	119.3	118	1.3	8
	10	□	MNS0730X10DB	74.3	99.3	102.3	156.3	155	1.3	8
	20	□	MNS0730X20DB	147.3	174.3	177.3	231.3	230	1.3	8
	30	□	MNS0730X30DB	220.3	249.3	252.3	306.3	305	1.3	8
7.4	5	★	MNS0740LB	38.3	61.3	65.3	119.3	118	1.3	8
	10	□	MNS0740X10DB	75.3	99.3	102.3	156.3	155	1.3	8
	20	□	MNS0740X20DB	149.3	174.3	177.3	231.3	230	1.3	8
	30	□	MNS0740X30DB	223.3	249.3	252.3	306.3	305	1.3	8
7.5	5	★	MNS0750LB	38.9	61.4	65.4	119.4	118	1.4	8
	10	□	MNS0750X10DB	76.4	99.4	102.4	156.4	155	1.4	8
	20	□	MNS0750X20DB	151.4	174.4	177.4	231.4	230	1.4	8
	30	□	MNS0750X30DB	226.4	249.4	252.4	306.4	305	1.4	8
7.6	5	★	MNS0760LB	39.4	65.4	65.4	119.4	118	1.4	8
	10	□	MNS0760X10DB	77.4	105.4	108.4	162.4	161	1.4	8
	20	□	MNS0760X20DB	153.4	185.4	188.4	242.4	241	1.4	8
	30	□	MNS0760X30DB	229.4	265.4	268.4	322.4	321	1.4	8
7.7	5	★	MNS0770LB	39.9	65.4	65.4	119.4	118	1.4	8
	10	□	MNS0770X10DB	78.4	105.4	108.4	162.4	161	1.4	8
	20	□	MNS0770X20DB	155.4	185.4	188.4	242.4	241	1.4	8
	30	□	MNS0770X30DB	232.4	265.4	268.4	322.4	321	1.4	8
7.8	5	★	MNS0780LB	40.4	65.4	65.4	119.4	118	1.4	8
	10	★	MNS0780X10DB	79.4	105.4	108.4	162.4	161	1.4	8
	20	★	MNS0780X20DB	157.4	185.4	188.4	242.4	241	1.4	8
	30	★	MNS0780X30DB	235.4	265.4	268.4	322.4	321	1.4	8
7.9	5	★	MNS0790LB	40.9	65.4	65.4	119.4	118	1.4	8
	10	□	MNS0790X10DB	80.4	105.4	108.4	162.4	161	1.4	8
	20	□	MNS0790X20DB	159.4	185.4	188.4	242.4	241	1.4	8
	30	□	MNS0790X30DB	238.4	265.4	268.4	322.4	321	1.4	8
8.0	5	★	MNS0800LB	41.5	65.5	65.5	119.5	118	1.5	8
	10	★	MNS0800X10DB	81.5	105.5	108.5	162.5	161	1.5	8
	20	★	MNS0800X20DB	161.5	185.5	188.5	242.5	241	1.5	8
	30	★	MNS0800X30DB	241.5	265.5	268.5	322.5	321	1.5	8
8.1	5	★	MNS0810LB	42.0	69.5	73.5	128.5	127	1.5	9
	10	□	MNS0810X10DB	82.5	112.5	115.5	170.5	169	1.5	9
	20	□	MNS0810X20DB	163.5	197.5	200.5	255.5	254	1.5	9
	30	□	MNS0810X30DB	244.5	282.5	285.5	340.5	339	1.5	9
8.2	5	★	MNS0820LB	42.5	69.5	73.5	128.5	127	1.5	9
	10	□	MNS0820X10DB	83.5	112.5	115.5	170.5	169	1.5	9
	20	□	MNS0820X20DB	165.5	197.5	200.5	255.5	254	1.5	9
	30	□	MNS0820X30DB	247.5	282.5	285.5	340.5	339	1.5	9
8.3	5	★	MNS0830LB	43.0	69.5	73.5	128.5	127	1.5	9
	10	□	MNS0830X10DB	84.5	112.5	115.5	170.5	169	1.5	9
	20	□	MNS0830X20DB	167.5	197.5	200.5	255.5	254	1.5	9
	30	□	MNS0830X30DB	250.5	282.5	285.5	340.5	339	1.5	9
8.4	5	★	MNS0840LB	43.5	69.5	73.5	128.5	127	1.5	9
	10	□	MNS0840X10DB	85.5	112.5	115.5	170.5	169	1.5	9
	20	□	MNS0840X20DB	169.5	197.5	200.5	255.5	254	1.5	9
	30	□	MNS0840X30DB	253.5	282.5	285.5	340.5	339	1.5	9
8.5	5	★	MNS0850LB	44.0	69.5	73.5	128.5	127	1.5	9
	10	□	MNS0850X10DB	86.5	112.5	115.5	170.5	169	1.5	9
	20	□	MNS0850X20DB	171.5	197.5	200.5	255.5	254	1.5	9
	30	□	MNS0850X30DB	256.5	282.5	285.5	340.5	339	1.5	9
8.6	5	★	MNS0860LB	44.6	73.6	73.6	128.6	127	1.6	9
	10	□	MNS0860X10DB	87.6	118.6	121.6	176.6	175	1.6	9
	20	□	MNS0860X20DB	173.6	208.6	211.6	266.6	265	1.6	9
	30	□	MNS0860X30DB	259.6	298.6	301.6	356.6	355	1.6	9
8.7	5	★	MNS0870LB	45.1	73.6	73.6	128.6	127	1.6	9
	10	□	MNS0870X10DB	88.6	118.6	121.6	176.6	175	1.6	9
	20	□	MNS0870X20DB	175.6	208.6	211.6	266.6	265	1.6	9
	30	□	MNS0870X30DB	262.6	298.6	301.6	356.6	355	1.6	9
8.8	5	★	MNS0880LB	45.6	73.6	73.6	128.6	127	1.6	9
	10	□	MNS0880X10DB	89.6	118.6	121.6	176.6	175	1.6	9
	20	□	MNS0880X20DB	177.6	208.6	211.6	266.6	265	1.6	9
	30	□	MNS0880X30DB	265.6	298.6	301.6	356.6	355	1.6	9
8.9	5	★	MNS0890LB	46.1	73.6	73.6	128.6	127	1.6	9
	10	□	MNS0890X10DB	90.6	118.6	121.6	176.6	175	1.6	9
	20	□	MNS0890X20DB	179.6	208.6	211.6	266.6	265	1.6	9
	30	□	MNS0890X30DB	268.6	298.6	301.6	356.6	355	1.6	9
9.0	5	★	MNS0900LB	46.6	73.6	73.6	128.6	127	1.6	9
	10	★	MNS0900X10DB	91.6	118.6	121.6	176.6	175	1.6	9
	20	★	MNS0900X20DB	181.6	208.6	211.6	266.6	265	1.6	9
	30	★	MNS0900X30DB	271.6	298.6	301.6	356.6	355	1.6	9
9.1	5	★	MNS0910LB	47.2	77.7	81.7	137.7	136	1.7	10
	10	□	MNS0910X10DB	92.7	125.7	128.7	183.7	182	1.7	10
	20	□	MNS0910X20DB	183.7	220.7	223.7	278.7	277	1.7	10
	30	□	MNS0910X30DB	274.7	315.7	318.7	373.7	372	1.7	10
9.2	5	★	MNS0920LB	47.7	77.7	81.7	137.7	136	1.7	10
	10	□	MNS0920X10DB	93.7	125.7	128.7	183.7	182	1.7	10
	20	□	MNS0920X20DB	185.7	220.7	223.7	278.7	277	1.7	10
	30	□	MNS0920X30DB	277.7	315.7	318.7	373.7	372	1.7	10
9.3	5	★	MNS0930LB	48.2	77.7	81.7	137.7	136	1.7	10
	10	□	MNS0930X10DB	94.7	125.7	128.7	183.7	182	1.7	10
	20	□	MNS0930X20DB	187.7	220.7	223.7	278.7	277	1.7	10
	30	□	MNS0930X30DB	280.7	315.7	318.7	373.7	372	1.7	10
9.4	5	★	MNS0940LB	48.7	77.7	81.7	137.7	136	1.7	10
	10	□	MNS0940X10DB	95.7	125.7	128.7	183.7	182	1.7	10
	20	□	MNS0940X20DB	189.7	220.7	223.7	278.7	277	1.7	10
	30	□	MNS0940X30DB	283.7	315.7	318.7	373.7	372	1.7	10
9.5	5	★	MNS0950LB	49.2	77.7	81.7	137.7	136	1.7	10
	10	□	MNS0950X10DB	96.7	125.7	128.7	183.7	182	1.7	10
	20	□	MNS0950X20DB	191.7	220.7	223.7	278.7	277	1.7	10
	30	□	MNS0950X30DB	286.7	315.7	318.7	373.7	372	1.7	10
9.6	5	★	MNS0960LB	49.7	81.7	81.7	137.7	136	1.7	10
	10	□	MNS0960X10DB	97.7	131.7	134.7	189.7	188	1.7	10
	20	□	MNS0960X20DB	193.7	231.7	234.7	289.7	288	1.7	10
	30	□	MNS0960X30DB	289.7	331.7	334.7	389.7	388	1.7	10
9.7	5	★	MNS0970LB	50.3	81.8	81.8	137.8	136	1.8	10
	10	□	MNS0970X10DB	98.8	131.8	134.8	189.8	188	1.8	10
	20	□	MNS0970X20DB	195.8	231.8	234.8	289.8	288	1.8	10
	30	□	MNS0970X30DB	292.8	331.8	334.8	389.8	388	1.8	10
9.8	5	★	MNS0980LB	50.8	81.8	81.8	137.8	136	1.8	10
	10	★	MNS0980X10DB	99.8	131.8	134.8	189.8	188	1.8	10
	20	★	MNS0980X20DB	197.8	231.8	234.8	289.8	288	1.8	10
	30	★	MNS0980X30DB	295.8	331.8	334.8	389.8	388	1.8	10
9.9	5	★	MNS0990LB	51.3	81.8	81.8	137.8	136	1.8	10
	10	□	MNS0990X10DB	100.8	131.8	134.8	189.8	188	1.8	10
	20	□	MNS0990X20DB	199.8	231.8	234.8	289.8	288	1.8	10
	30	□	MNS0990X30DB	298.8	331.8	334.8	389.8	388	1.8	10
10.0	5	★	MNS1000LB	51.8	81.8	81.8	137.8	136	1.8	10
	10	★	MNS1000X10DB	101.8	131.8	134.8	189.8	188	1.8	10
	20	★	MNS1000X20DB	201.8	231.8	234.8	289.8	288	1.8	10
	30	★	MNS1000X30DB	301.8	331.8	334.8	389.8	388	1.8	10

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

★ : Stock in Japan □ : Made to Order

MNS

RECOMMENDED CUTTING CONDITIONS

■ LB Type

Work Material		Aluminum Alloy (Si<5%) AISI A6061, A7075 etc.		Austenitic Stainless Steel (5%≤Si≤10%) ASTM 333.0 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1181	3.0	395 (310—460)	.0039 (.0043—.0063)	395 (310—460)	.0059 (.0063—.0083)
.1575	4.0	395 (310—460)	.0059 (.0051—.0079)	395 (310—460)	.0079 (.0079—.0106)
.1969	5.0	395 (310—460)	.0079 (.0067—.0098)	395 (310—460)	.0098 (.0098—.0130)
.2480	6.3	490 (395—560)	.0098 (.0083—.0126)	490 (395—560)	.0138 (.0126—.0165)
.3150	8.0	490 (395—560)	.0118 (.0106—.0157)	490 (395—560)	.0177 (.0157—.0209)
.3937	10.0	490 (395—560)	.0157 (.0130—.0197)	490 (395—560)	.0217 (.0197—.0264)
.4724	12.0	655 (525—755)	.0197 (.0157—.0236)	655 (525—755)	.0276 (.0236—.0315)
.5512	14.0	655 (525—755)	.0197 (.0157—.0236)	655 (525—755)	.0276 (.0236—.0315)

Work Material		Aluminum Alloy (Si>10%) ASTM 380.0, A390.0 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm		
.1181	3.0	395 (310—460)	.0059 (.0063—.0083)
.1575	4.0	395 (310—460)	.0079 (.0079—.0106)
.1969	5.0	395 (310—460)	.0098 (.0098—.0130)
.2480	6.3	490 (395—560)	.0138 (.0126—.0165)
.3150	8.0	490 (395—560)	.0177 (.0157—.0209)
.3937	10.0	490 (395—560)	.0217 (.0197—.0264)
.4724	12.0	655 (525—755)	.0276 (.0236—.0315)
.5512	14.0	655 (525—755)	.0276 (.0236—.0315)

Note 1) When using the drill with a length over L/D 10, it is necessary to use a prep hole as the pilot. (If no prep-hole is used then drill breakage can occur)
Note 2) For pilot hole drilling, Mitsubishi Materials MNS-LB, MAE-MB or MAS-MB drill is recommended.

RECOMMENDED CUTTING CONDITIONS

■ DB Type

Work Material		Aluminum Alloy (Si<5%) AISI A6061, A7075 etc.		Austenitic Stainless Steel (5%≤Si≤10%) ASTM 333.0 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.1181	3.0	295 (230—330)	.0039 (.0043—.0063)	295 (230—330)	.0059 (.0063—.0083)
.1575	4.0	295 (230—330)	.0059 (.0051—.0079)	295 (230—330)	.0079 (.0079—.0106)
.1969	5.0	295 (230—330)	.0079 (.0067—.0098)	295 (230—330)	.0098 (.0098—.0130)
.2480	6.3	395 (310—460)	.0098 (.0083—.0126)	395 (310—460)	.0138 (.0126—.0165)
.3150	8.0	395 (310—460)	.0118 (.0106—.0157)	395 (310—460)	.0177 (.0157—.0209)
.3937	10.0	395 (310—460)	.0157 (.0130—.0197)	395 (310—460)	.0217 (.0197—.0264)
.4724	12.0	525 (410—590)	.0197 (.0157—.0236)	525 (410—590)	.0276 (.0236—.0315)
.5512	14.0	525 (410—590)	.0197 (.0157—.0236)	525 (410—590)	.0276 (.0236—.0315)

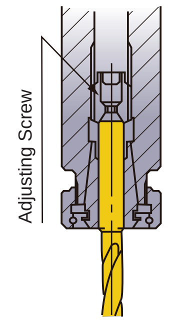
Work Material		Aluminum Alloy (Si>10%) ASTM 383.0, A390.0 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm		
.1181	3.0	295 (230—330)	.0059 (.0063—.0083)
.1575	4.0	295 (230—330)	.0079 (.0079—.0106)
.1969	5.0	295 (230—330)	.0098 (.0098—.0130)
.2480	6.3	395 (310—460)	.0138 (.0126—.0165)
.3150	8.0	395 (310—460)	.0177 (.0157—.0209)
.3937	10.0	395 (310—460)	.0217 (.0197—.0264)
.4724	12.0	525 (410—590)	.0276 (.0236—.0315)
.5512	14.0	525 (410—590)	.0276 (.0236—.0315)

Note 1) When using the drill with a length over L/D 10, it is necessary to use a prep hole as the pilot. (If no prep-hole is used then drill breakage can occur)
Note 2) For pilot hole drilling, Mitsubishi Materials MNS-LB, MAE-MB or MAS-MB drill is recommended.
Note 3) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MNS

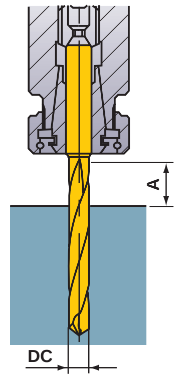
OPERATIONAL GUIDANCE FOR THE MNS...LB DRILL

Drill Holding



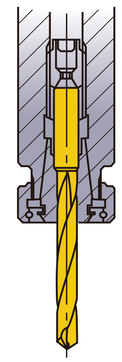
Thrust bearing type collet chuck holds the drill securely.

Drill Length



A ≥ DC x 1.5

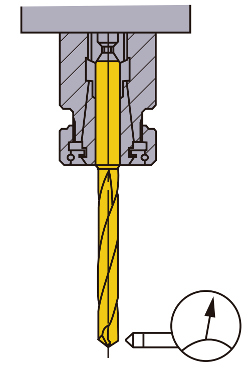
Drill Installation



NG

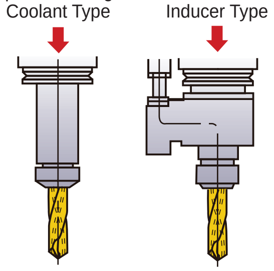
Do not clamp on the flutes.

Installation Tolerance



Runout ≤ .001″

Through Coolant Type



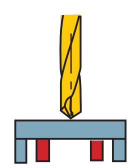
Recommended coolant pressure: 70 - 1015 PSI (0.5 - 7MPa).

Coolant Handling

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

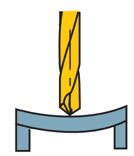
2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Work Material



Support the Work Material

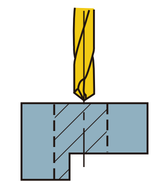
OK



If Bending Occurs

NG

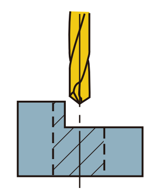
Interrupted Cutting



One Process

OK

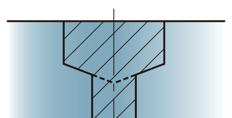
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

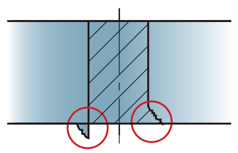
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the machining into two processes.
②Drill the larger hole first.
*Tools for chamfering and spot facing can be produced to order.

Burring and Work Material Chipping



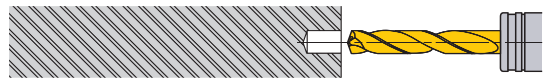
①Lower the feed rate when breaking through.
②Add a chamfer.
③Change the point angle.

MNS•••DB

OPERATIONAL GUIDANCE FOR THE MNS...DB DRILL

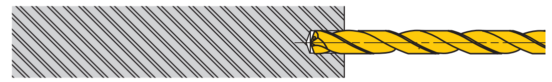
Flat Face Drilling ●Drilling a blind hole

1. Drilling a Pilot Hole



①Use a drill with the same or larger point angle than the MNS...DB type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the pilot.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the MNS...DB type.)

2. Initial Cutting with the Long Type Drill

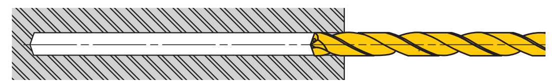


①Penetrate the pilot hole at a low revolution. (Cutting speed 65-100 SFM, feed rate .008-.012 IPR)
②Stop the long type drill .039-.118 inch short of the pilot hole bottom.

3. Drill the Deep Hole

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

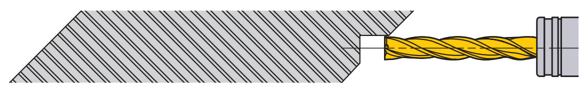
4. Drill Retraction



①After drilling, lower the cutting revolution about .039-.079 inch short of the hole end. (Cutting speed of around 65-100 SFM)
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 inch/min.
③Finally clear the hole at a cutting speed of 65-100 SFM and feed rate of .008-.012 IPR.

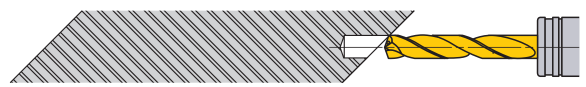
Irregular Face Drilling ●Drilling and breaking through on irregular faces or angles

1. Spot Facing



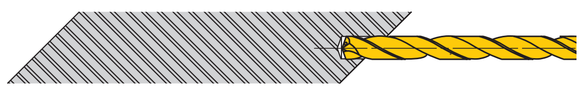
①Machine a flat on the irregular face by using an MFE (flat bottom drill) or an end mill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a Pilot Hole



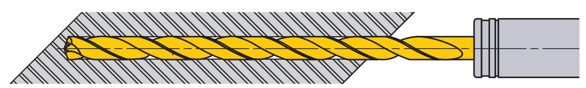
①Use a drill with the same or larger point angle than the super long type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the pilot.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type.)

3. Initial Cutting with the Long Type Drill



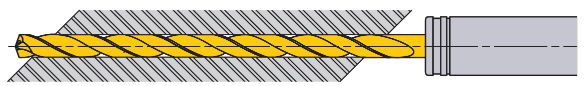
①Penetrate the pilot hole at a low revolution. (Cutting speed 65-100 SFM, feed rate .008-.012 IPR)
②Stop the long type drill .039-.118 inch short of the pilot hole bottom.

4. Drill the Deep Hole



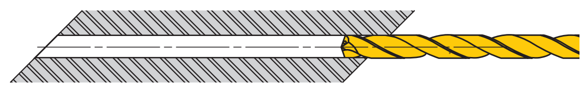
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking Through



①When breaking through, the cutting edge can be damaged.
②A feed rate of .002-.004 IPR is recommended.

6. Drill Retraction



①Finally clear the hole at a cutting speed of 65-100 SFM.
②Retract the drill to the pilot hole depth starting point at a feed rate of 120 IPM.

MAS

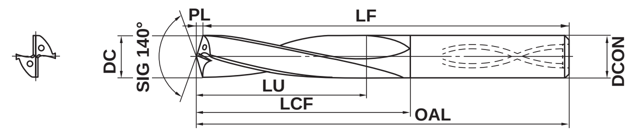
- ●Specialized in aluminum and cast iron drilling.
- ●High hole accuracy.
- ●Pre-hole drilling for rolled tap.
- ●Helical coolant hole enables high speed machining.

P M K N S H

INCH STANDARD

L/D=3

Internal Coolant



	.1250≦DC≦.2344	.2500≦DC≦.3906	.4062≦DC≦.7031	.7188≦DC≦.7812
DC	+0.00020 / 0	+0.00020 / 0	+0.00020 / 0	+0.00020 / 0
h6	.1250≦DCON≦.2344	.2500≦DCON≦.3906	.4062≦DCON≦.7031	.7188≦DCON≦.7812
	0 / −0.00031	0 / −0.00035	0 / −0.00043	0 / −0.00051

Note 1) MAS drills bigger than .2031" have a recess in the end face.
Note 2) MAS drills are suitable for use with shrink fit holders.

DC (inch)	Order Number	Stock HTi10	LU	LCF	OAL	LF	PL	DCON	Rolled Thread Tap Size
.1250	MAS01250MB	●	.398	.968	2.543	2.520	.023	.1575	
.1406	MAS01406MB	●	.447	1.128	2.703	2.677	.026	.1575	
.1495	MAS01495MB	●	.475	1.129	2.704	2.677	.027	.1575	10-24NC
.1563	MAS01563MB	●	.497	1.130	2.705	2.677	.028	.1575	
.1590	MAS01590MB	●	.506	1.249	2.824	2.795	.029	.1969	10-32NF
.1719	MAS01719MB	●	.547	1.251	2.826	2.795	.031	.1969	
.1875	MAS01875MB	●	.596	1.333	2.908	2.874	.034	.1969	
.2031	MAS02031MB	●	.646	1.454	3.029	2.992	.037	.2362	
.2165	MAS02165MB	●	.688	1.456	3.031	2.992	.039	.2362	
.2188	MAS02188MB	●	.696	1.575	3.150	3.110	.040	.2362	
.2344	MAS02344MB	●	.745	1.578	3.153	3.110	.043	.2362	
.2500	MAS02500MB	●	.795	1.700	3.353	3.307	.046	.2756	1/16-27NS
.2570	MAS02570MB	●	.817	1.701	3.354	3.307	.047	.2756	5/16-18NC
.2656	MAS02656MB	●	.845	1.702	3.355	3.307	.048	.2756	
.2720	MAS02720MB	●	.865	1.704	3.357	3.307	.050	.2756	5/16-24NF
.2812	MAS02812MB	●	.894	1.941	3.594	3.543	.051	.3150	
.2969	MAS02969MB	●	.944	1.944	3.597	3.543	.054	.3150	
.3125	MAS03125MB	●	.994	1.947	3.600	3.543	.057	.3150	3/8-16NC
.3281	MAS03281MB	●	1.043	2.029	3.761	3.701	.060	.3543	1/8-27NPT
.3320	MAS03320MB	●	1.056	2.029	3.761	3.701	.060	.3543	3/8-24NF
.3438	MAS03438MB	●	1.093	2.032	3.764	3.701	.063	.3543	
.3594	MAS03594MB	●	1.143	2.152	3.884	3.819	.065	.3937	
.3680	MAS03680MB	●	1.170	2.154	3.886	3.819	.067	.3937	7/16-14NC
.3750	MAS03750MB	●	1.193	2.155	3.887	3.819	.068	.3937	
.3906	MAS03906MB	●	1.242	2.158	3.890	3.819	.071	.3937	7/16-20NF
.4062	MAS04062MB	●	1.292	2.239	4.050	3.976	.074	.4331	
.4219	MAS04219MB	●	1.342	2.242	4.053	3.976	.077	.4331	1/2-13, 1/2-12
.4375	MAS04375MB	●	1.391	2.442	4.253	4.173	.080	.4724	1/4-18NPT
.4531	MAS04531MB	●	1.441	2.444	4.255	4.173	.082	.4724	1/2-20, 1/4-18NS
.4688	MAS04688MB	●	1.491	2.447	4.258	4.173	.085	.4724	
.4844	MAS04844MB	●	1.540	2.647	4.616	4.528	.088	.5118	9/16-12NC
.5000	MAS05000MB	●	1.590	2.650	4.619	4.528	.091	.5118	
.5118	MAS05118MB	●	1.628	2.652	4.621	4.528	.093	.5118	
.5156	MAS05156MB	●	1.640	2.850	4.818	4.724	.094	.5512	9/16-18NF
.5312	MAS05312MB	●	1.689	2.853	4.821	4.724	.097	.5512	5/8-11NC
.5469	MAS05469MB	●	1.739	2.856	4.824	4.724	.100	.5512	
.5625	MAS05625MB	●	1.789	2.937	5.220	5.118	.102	.5906	3/8-18NPT
.5781	MAS05781MB	●	1.838	2.940	5.223	5.118	.105	.5906	5/8-18NF
.5937	MAS05937MB	●	1.888	3.100	5.384	5.276	.108	.6299	3/8-18NS
.6094	MAS06094MB	●	1.938	3.103	5.387	5.276	.111	.6299	
.6250	MAS06250MB	●	1.988	3.106	5.390	5.276	.114	.6299	
.6406	MAS06406MB	●	2.037	3.267	5.550	5.433	.117	.6693	
.6563	MAS06563MB	●	2.087	3.269	5.552	5.433	.119	.6693	3/4-10NC
.6718	MAS06718MB	●	2.136	3.468	5.752	5.630	.122	.7087	
.6875	MAS06875MB	●	2.186	3.471	5.755	5.630	.125	.7087	3/4-16NF
.7031	MAS07031MB	●	2.236	3.474	5.758	5.630	.128	.7087	1/2-14NPT
.7188	MAS07188MB	●	2.286	3.674	5.958	5.827	.131	.7480	
.7344	MAS07344MB	●	2.335	3.677	5.961	5.827	.134	.7480	7/8-9, 1/2-14NS
.7500	MAS07500MB	●	2.385	3.877	6.161	6.024	.137	.7874	
.7656	MAS07656MB	●	2.435	3.879	6.163	6.024	.139	.7874	
.7812	MAS07812MB	●	2.484	3.882	6.166	6.024	.142	.7874	

Dimensions (inch)

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

● : USA Stock

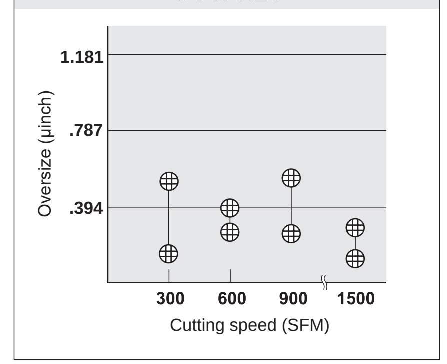
RECOMMENDED CUTTING CONDITIONS

	Work Material	Drill Dia. **ϕ.1250" – ϕ.2344"**		Drill Dia. **ϕ.2500" – ϕ.3906"**		Drill Dia. **ϕ.4062" – ϕ.7812"**	
		Cutting Speed **vc** (SFM)	Feed **fr** (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (IPR)
N	Aluminum Alloy Casting	330 (195—490)	.006 (.002—.012)	390 (260—555)	.008 (.004—.012)	490 (330—655)	.010 (.004—.016)
N	Aluminum Alloy Die Casting	390 (260—555)	.005 (.002—.010)	490 (330—590)	.006 (.002—.010)	525 (390—655)	.008 (.004—.012)
K	Gray Cast Iron	195 (130—260)	.006 (.004—.008)	260 (195—360)	.008 (.004—.012)	330 (230—425)	.012 (.008—.016)
K	Ductile Cast Iron	145 (100—195)	.004 (.002—.006)	195 (130—260)	.005 (.002—.008)	260 (195—330)	.008 (.004—.012)

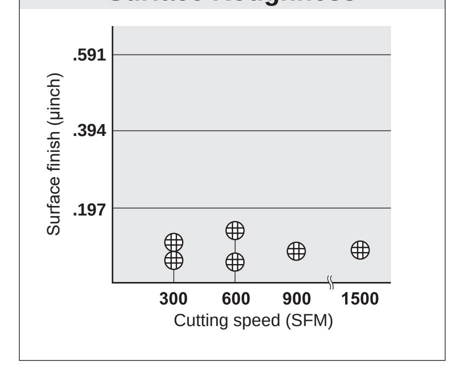
■ MACHINED HOLE ACCURACY

Tool : MAS1000MB Work Material : 330 Aluminum Feed : .008 IPR Drilled Depth : 1.18 inch (Through hole) WSO (10%)

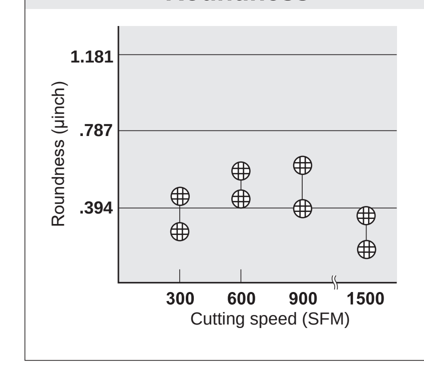
Oversize



Surface Roughness



Roundness



M
DRILLING

MAE/MAS

- Specialized in aluminum and cast iron drilling.
- High hole accuracy.
- Pre-hole drilling for rolled tap.
- Helical coolant hole enables high speed machining.

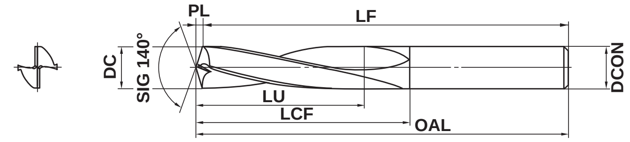
P M **K** **N** S H

DC=3	3<DC≤6	6<DC≤10	10<DC≤16
+0.005 0	+0.005 0	+0.005 0	+0.005 0

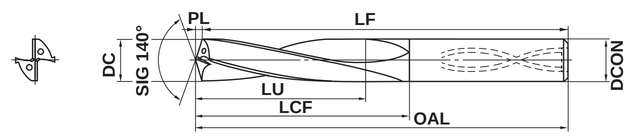
DCON=3	3<DCON≤6	6<DCON≤10	10<DCON≤16
0 −0.006	0 −0.008	0 −0.009	0 −0.011

METRIC STANDARD

MAE (External Coolant)



MAS (Internal Coolant)



Note 1) MAS type larger than ϕ5.0mm have a recess in the shank end face.
Note 2) MAE/MAS type can be used for shrink fit holders.

DC (mm)	L/D	Coolant (Int./Ext.)	Stock	Order Number	Dimensions (mm)					
			HTi10		LU	LCF	OAL	LF	PL	DCON
3.0	3	Ext.	★	MAE0300MB	9.5	21.5	61.5	61	0.5	3
	3	Int.	□	MAS0300MB	9.9	21.5	61.5	61	0.5	3
	6	Int.	★	MAS0300LB	10.2	30.5	70.5	70	0.5	3
3.1	3	Ext.	★	MAE0310MB	10.5	24.6	64.6	64	0.6	4
	3	Int.	□	MAS0310MB	10.8	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0310LB	11.1	34.6	74.6	74	0.6	4
3.2	3	Ext.	★	MAE0320MB	11.5	24.6	64.6	64	0.6	4
	3	Int.	□	MAS0320MB	11.7	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0320LB	11.8	34.6	74.6	74	0.6	4
3.3	3	Ext.	★	MAE0330MB	12.1	24.6	64.6	64	0.6	4
	3	Int.	□	MAS0330MB	12.4	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0330LB	12.7	34.6	74.6	74	0.6	4
3.4	3	Ext.	★	MAE0340MB	13.0	24.6	64.6	64	0.6	4
	3	Int.	□	MAS0340MB	13.4	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0340LB	13.7	34.6	74.6	74	0.6	4
3.5	3	Ext.	★	MAE0350MB	14.0	24.6	64.6	64	0.6	4
	3	Int.	□	MAS0350MB	14.3	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0350LB	14.6	34.6	74.6	74	0.6	4
3.6	3	Ext.	★	MAE0360MB	15.0	28.7	68.7	68	0.7	4
	3	Int.	□	MAS0360MB	15.3	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0360LB	15.6	40.7	80.7	80	0.7	4
3.65	3	Ext.	★	*MAE0365MB	15.9	28.7	68.7	68	0.7	4
	3	Int.	□	*MAS0365MB	16.2	28.7	68.7	68	0.7	4
	6	Int.	★	*MAS0365LB	16.5	40.7	80.7	80	0.7	4
3.7	3	Ext.	★	MAE0370MB	16.9	28.7	68.7	68	0.7	4
	3	Int.	□	MAS0370MB	17.2	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0370LB	17.5	40.7	80.7	80	0.7	4
3.8	3	Ext.	★	MAE0380MB	17.8	28.7	68.7	68	0.7	4
	3	Int.	□	MAS0380MB	18.1	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0380LB	18.5	40.7	80.7	80	0.7	4
3.9	3	Ext.	★	MAE0390MB	18.8	28.7	68.7	68	0.7	4
	3	Int.	□	MAS0390MB	19.1	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0390LB	19.4	40.7	80.7	80	0.7	4
4.0	3	Ext.	★	MAE0400MB	19.7	28.7	68.7	68	0.7	4
	3	Int.	□	MAS0400MB	20.0	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0400LB	20.4	40.7	80.7	80	0.7	4
4.1	3	Ext.	★	MAE0410MB	20.7	31.7	71.7	71	0.7	5
	3	Int.	□	MAS0410MB	21.0	31.7	71.7	71	0.7	5
	6	Int.	★	MAS0410LB	21.3	44.7	84.7	84	0.7	5
4.2	3	Ext.	★	MAE0420MB	21.6	31.8	71.8	71	0.8	5
	3	Int.	□	MAS0420MB	22.0	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0420LB	22.3	44.8	84.8	84	0.8	5
4.3	3	Ext.	★	MAE0430MB	22.6	31.8	71.8	71	0.8	5
	3	Int.	□	MAS0430MB	22.9	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0430LB	23.2	44.8	84.8	84	0.8	5
4.4	3	Ext.	★	MAE0440MB	23.4	31.8	71.8	71	0.8	5
	3	Int.	□	MAS0440MB	23.5	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0440LB	23.9	44.8	84.8	84	0.8	5
4.5	3	Ext.	★	MAE0450MB	24.2	31.8	71.8	71	0.8	5
	3	Int.	□	MAS0450MB	24.5	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0450LB	24.8	44.8	84.8	84	0.8	5
4.6	3	Ext.	★	*MAE0460MB	25.1	33.8	73.8	73	0.8	5
	3	Int.	□	*MAS0460MB	25.5	33.8	73.8	73	0.8	5
	6	Int.	★	*MAS0460LB	25.8	48.8	88.8	88	0.8	5
4.7	3	Ext.	★	MAE0470MB	26.1	33.9	73.9	73	0.9	5
	3	Int.	□	MAS0470MB	26.4	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0470LB	26.7	48.9	88.9	88	0.9	5
4.8	3	Ext.	★	MAE0480MB	27.0	33.9	73.9	73	0.9	5
	3	Int.	□	MAS0480MB	27.4	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0480LB	27.7	48.9	88.9	88	0.9	5

*: Standard hole size for rolled thread tap.
Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

DC (mm)	L/D	Coolant (Int./Ext.)	Stock	Order Number	Dimensions (mm)					
			HTi10		LU	LCF	OAL	LF	PL	DCON
4.9	3	Ext.	★	MAE0490MB	28.0	33.9	73.9	73	0.9	5
	3	Int.	□	MAS0490MB	28.3	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0490LB	28.6	48.9	88.9	88	0.9	5
5.0	3	Ext.	★	MAE0500MB	29.0	33.9	73.9	73	0.9	5
	3	Int.	★	MAS0500MB	29.3	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0500LB	29.3	48.9	88.9	88	0.9	5
5.1	3	Ext.	★	MAE0510MB	29.6	36.9	76.9	76	0.9	6
	3	Int.	□	MAS0510MB	29.9	36.9	76.9	76	0.9	6
	6	Int.	★	MAS0510LB	30.2	52.9	92.9	92	0.9	6
5.2	3	Ext.	★	MAE0520MB	30.5	36.9	76.9	76	0.9	6
	3	Int.	□	MAS0520MB	30.9	36.9	76.9	76	0.9	6
	6	Int.	★	MAS0520LB	31.2	52.9	92.9	92	0.9	6
5.3	3	Ext.	★	MAE0530MB	31.5	37.0	77.0	76	1.0	6
	3	Int.	□	MAS0530MB	31.8	37.0	77.0	76	1.0	6
	6	Int.	★	MAS0530LB	32.1	53.0	93.0	92	1.0	6
5.4	3	Ext.	★	MAE0540MB	32.5	37.0	77.0	76	1.0	6
	3	Int.	□	MAS0540MB	32.8	37.0	77.0	76	1.0	6
	6	Int.	★	MAS0540LB	33.1	53.0	93.0	92	1.0	6
5.5	3	Ext.	★	*MAE0550MB	33.4	37.0	77.0	76	1.0	6
	3	Int.	★	*MAS0550MB	33.7	37.0	77.0	76	1.0	6
	6	Int.	★	*MAS0550LB	34.0	53.0	93.0	92	1.0	6
5.6	3	Ext.	★	MAE0560MB	34.4	40.0	80.0	79	1.0	6
	3	Int.	□	MAS0560MB	34.7	40.0	80.0	79	1.0	6
	6	Int.	★	MAS0560LB	35.0	58.0	98.0	97	1.0	6
5.7	3	Ext.	★	MAE0570MB	35.2	40.0	80.0	79	1.0	6
	3	Int.	□	MAS0570MB	35.3	40.0	80.0	79	1.0	6
	6	Int.	★	MAS0570LB	35.6	58.0	98.0	97	1.0	6
5.8	3	Ext.	★	MAE0580MB	36.0	40.1	80.1	79	1.1	6
	3	Int.	□	MAS0580MB	36.3	40.1	80.1	79	1.1	6
	6	Int.	★	MAS0580LB	36.6	58.1	98.1	97	1.1	6
5.9	3	Ext.	★	MAE0590MB	36.9	40.1	80.1	79	1.1	6
	3	Int.	□	MAS0590MB	37.2	40.1	80.1	79	1.1	6
	6	Int.	★	MAS0590LB	37.5	58.1	98.1	97	1.1	6
6.0	3	Ext.	★	MAE0600MB	37.9	40.1	80.1	79	1.1	6
	3	Int.	□	MAS0600MB	38.2	40.1	80.1	79	1.1	6
	6	Int.	★	MAS0600LB	38.5	58.1	98.1	97	1.1	6
6.1	3	Ext.	★	MAE0610MB	38.8	43.1	85.1	84	1.1	7
	3	Int.	□	MAS0610MB	39.1	43.1	85.1	84	1.1	7
	6	Int.	★	MAS0610LB	39.5	63.1	105.1	104	1.1	7
6.2	3	Ext.	★	MAE0620MB	39.8	43.1	85.1	84	1.1	7
	3	Int.	□	MAS0620MB	40.1	43.1	85.1	84	1.1	7
	6	Int.	★	MAS0620LB	40.4	63.1	105.1	104	1.1	7
6.3	3	Ext.	★	MAE0630MB	40.7	43.1	85.1	84	1.1	7
	3	Int.	□	MAS0630MB	41.0	43.1	85.1	84	1.1	7
	6	Int.	★	MAS0630LB	41.3	63.1	105.1	104	1.1	7
6.4	3	Ext.	★	MAE0640MB	41.4	43.2	85.2	84	1.2	7
	3	Int.	□	MAS0640MB	41.7	43.2	85.2	84	1.2	7
	6	Int.	★	MAS0640LB	42.0	63.2	105.2	104	1.2	7
6.5	3	Ext.	★	MAE0650MB	42.3	43.2	85.2	84	1.2	7
	3	Int.	★	MAS0650MB	42.6	43.2	85.2	84	1.2	7
	6	Int.	★	MAS0650LB	43.0	63.2	105.2	104	1.2	7
6.6	3	Ext.	★	MAE0660MB	43.3	43.2	85.2	84	1.2	7
	3	Int.	□	MAS0660MB	43.6	43.2	85.2	84	1.2	7
	6	Int.	★	MAS0660LB	43.9	66.2	108.2	107	1.2	7
6.7	3	Ext.	★	MAE0670MB	44.2	43.2	85.2	84	1.2	7
	3	Int.	□	MAS0670MB	44.5	43.2	85.2	84	1.2	7
	6	Int.	★	MAS0670LB	44.9	66.2	108.2	107	1.2	7
6.8	3	Ext.	★	MAE0680MB	45.2	43.2	85.2	84	1.2	7
	3	Int.	★	MAS0680MB	45.5	43.2	85.2	84	1.2	7
	6	Int.	★	MAS0680LB	45.8	66.2	108.2	107	1.2	7
6.9	3	Ext.	★	MAE0690MB	46.1	43.3	85.3	84	1.3	7
	3	Int.	□	MAS0690MB	46.5	43.3	85.3	84	1.3	7
	6	Int.	★	MAS0690LB	46.8	66.3	108.3	107	1.3	7
7.0	3	Ext.	★	MAE0700MB	47.1	43.3	85.3	84	1.3	7
	3	Int.	★	MAS0700MB	47.4	43.3	85.3	84	1.3	7
	6	Int.	★	MAS0700LB	47.6	66.3	108.3	107	1.3	7
7.1	3	Ext.	★	MAE0710MB	47.7	49.3	91.3	90	1.3	8
	3	Int.	□	MAS0710MB	48.0	49.3	91.3	90	1.3	8
	6	Int.	★	MAS0710LB	48.4	69.3	111.3	110	1.3	8
7.2	3	Ext.	★	MAE0720MB	48.7	49.3	91.3	90	1.3	8
	3	Int.	□	MAS0720MB	49.0	49.3	91.3	90	1.3	8
	6	Int.	★	MAS0720LB	49.3	69.3	111.3	110	1.3	8
7.3	3	Ext.	★	MAE0730MB	49.6	49.3	91.3	90	1.3	8
	3	Int.	□	MAS0730MB	50.0	49.3	91.3	90	1.3	8
	6	Int.	★	MAS0730LB	50.3	69.3	111.3	110	1.3	8
7.35	3	Ext.	★	*MAE0735MB	50.6	49.3	91.3	90	1.3	8
	3	Int.	★	*MAS0735MB	50.9	49.3	91.3	90	1.3	8
	6	Int.	★	*MAS0735LB	18.5	69.3	111.3	110	1.3	8
7.4	3	Ext.	★	MAE0740MB	9.5	49.3	91.3	90	1.3	8
	3	Int.	□	MAS0740MB	19.2	49.3	91.3	90	1.3	8
	6	Int.	★	MAS0740LB	9.9	69.3	111.3	110	1.3	8
7.5	3	Ext.	★	MAE0750MB	19.8	49.4	91.4	90	1.4	8
	3	Int.	□	MAS0750MB	10.2	49.4	91.4	90	1.4	8
	6	Int.	★	MAS0750LB	20.4	69.4	111.4	110	1.4	8
7.6	3	Ext.	★	MAE0760MB	10.5	49.4	91.4	90	1.4	8
	3	Int.	□	MAS0760MB	21.0	49.4	91.4	90	1.4	8
	6	Int.	★	MAS0760LB	10.8	73.4	115.4	114	1.4	8
7.7	3	Ext.	★	MAE0770MB	21.6	49.4	91.4	90	1.4	8
	3	Int.	□	MAS0770MB	11.1	49.4	91.4	90	1.4	8
	6	Int.	★	MAS0770LB	22.3	73.4	115.4	114	1.4	8

★ : Stocked in Japan □ : Made to Order

MAE/MAS

DC (mm)	L/D	Coolant (Int./Ext.)	Stock	Order Number	Dimensions (mm)					
			HTi10		LU	LCF	OAL	LF	PL	DCON
7.8	3	Ext.	★	MAE0780MB	11.5	49.4	91.4	90	1.4	8
	3	Int.	□	MAS0780MB	22.6	49.4	91.4	90	1.4	8
	6	Int.	★	MAS0780LB	11.7	73.4	115.4	114	1.4	8
7.9	3	Ext.	★	MAE0790MB	22.9	49.4	91.4	90	1.4	8
	3	Int.	□	MAS0790MB	11.8	49.4	91.4	90	1.4	8
	6	Int.	★	MAS0790LB	23.5	73.4	115.4	114	1.4	8
8.0	3	Ext.	★	MAE0800MB	12.1	49.5	91.5	90	1.5	8
	3	Int.	★	MAS0800MB	24.1	49.5	91.5	90	1.5	8
	6	Int.	★	MAS0800LB	12.4	73.5	115.5	114	1.5	8
8.1	3	Ext.	★	MAE0810MB	24.7	51.5	95.5	94	1.5	9
	3	Int.	□	MAS0810MB	12.7	51.5	95.5	94	1.5	9
	6	Int.	★	MAS0810LB	25.3	76.5	120.5	119	1.5	9
8.2	3	Ext.	★	MAE0820MB	13.0	51.5	95.5	94	1.5	9
	3	Int.	□	MAS0820MB	26.0	51.5	95.5	94	1.5	9
	6	Int.	★	MAS0820LB	13.4	76.5	120.5	119	1.5	9
8.3	3	Ext.	★	MAE0830MB	26.6	51.5	95.5	94	1.5	9
	3	Int.	□	MAS0830MB	13.7	51.5	95.5	94	1.5	9
	6	Int.	★	MAS0830LB	27.2	76.5	120.5	119	1.5	9
8.4	3	Ext.	★	MAE0840MB	14.0	51.5	95.5	94	1.5	9
	3	Int.	□	MAS0840MB	27.8	51.5	95.5	94	1.5	9
	6	Int.	★	MAS0840LB	14.3	76.5	120.5	119	1.5	9
8.5	3	Ext.	★	MAE0850MB	28.4	51.5	95.5	94	1.5	9
	3	Int.	★	MAS0850MB	14.6	51.5	95.5	94	1.5	9
	6	Int.	★	MAS0850LB	29.1	76.5	120.5	119	1.5	9
8.6	3	Ext.	★	MAE0860MB	15.0	51.6	95.6	94	1.6	9
	3	Int.	□	MAS0860MB	29.7	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0860LB	15.3	78.6	122.6	121	1.6	9
8.7	3	Ext.	★	MAE0870MB	30.3	51.6	95.6	94	1.6	9
	3	Int.	□	MAS0870MB	15.6	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0870LB	30.9	78.6	122.6	121	1.6	9
8.8	3	Ext.	★	MAE0880MB	15.9	51.6	95.6	94	1.6	9
	3	Int.	□	MAS0880MB	31.5	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0880LB	16.2	78.6	122.6	121	1.6	9
8.9	3	Ext.	★	MAE0890MB	32.1	51.6	95.6	94	1.6	9
	3	Int.	□	MAS0890MB	16.5	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0890LB	32.8	78.6	122.6	121	1.6	9
9.0	3	Ext.	★	MAE0900MB	16.9	51.6	95.6	94	1.6	9
	3	Int.	★	MAS0900MB	33.4	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0900LB	17.2	78.6	122.6	121	1.6	9
9.1	3	Ext.	★	MAE0910MB	34.0	54.7	98.7	97	1.7	10
	3	Int.	□	MAS0910MB	17.5	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0910LB	34.6	82.7	126.7	125	1.7	10
9.2	3	Ext.	★	MAE0920MB	17.8	54.7	98.7	97	1.7	10
	3	Int.	□	MAS0920MB	35.2	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0920LB	18.1	82.7	126.7	125	1.7	10
9.21	3	Ext.	★	*MAE0921MB	35.9	54.7	98.7	97	1.7	10
	3	Int.	★	*MAS0921MB	18.5	54.7	98.7	97	1.7	10
	6	Int.	★	*MAS0921LB	36.5	82.7	126.7	125	1.7	10
9.3	3	Ext.	★	MAE0930MB	18.8	54.7	98.7	97	1.7	10
	3	Int.	□	MAS0930MB	37.1	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0930LB	19.1	82.7	126.7	125	1.7	10
9.4	3	Ext.	★	MAE0940MB	37.7	54.7	98.7	97	1.7	10
	3	Int.	□	MAS0940MB	19.4	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0940LB	38.3	82.7	126.7	125	1.7	10
9.5	3	Ext.	★	MAE0950MB	19.7	54.7	98.7	97	1.7	10
	3	Int.	★	MAS0950MB	38.9	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0950LB	20.0	82.7	126.7	125	1.7	10
9.6	3	Ext.	★	MAE0960MB	39.6	54.7	98.7	97	1.7	10
	3	Int.	□	MAS0960MB	20.4	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0960LB	40.2	82.7	126.7	125	1.7	10
9.7	3	Ext.	★	MAE0970MB	20.7	54.8	98.8	97	1.8	10
	3	Int.	□	MAS0970MB	40.8	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0970LB	21.0	82.8	126.8	125	1.8	10
9.8	3	Ext.	★	MAE0980MB	41.4	54.8	98.8	97	1.8	10
	3	Int.	□	MAS0980MB	21.3	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0980LB	42.0	82.8	126.8	125	1.8	10
9.9	3	Ext.	★	MAE0990MB	21.6	54.8	98.8	97	1.8	10
	3	Int.	□	MAS0990MB	42.7	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0990LB	22.0	82.8	126.8	125	1.8	10
10.0	3	Ext.	★	MAE1000MB	43.3	54.8	98.8	97	1.8	10
	3	Int.	★	MAS1000MB	22.3	54.8	98.8	97	1.8	10
	6	Int.	★	MAS1000LB	43.9	82.8	126.8	125	1.8	10

* : Standard hole size for rolled thread tap.
Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

★ : Stocked in Japan □ : Made to Order

RECOMMENDED CUTTING CONDITIONS

Tool		Work Material	Drill Diameter ø3.0—ø6.0 mm ø.118″—ø.236″		Drill Diameter ø6.0—ø10.0 mm ø.240″—ø.394″		Drill Diameter ø10.0—ø16.0 mm ø.398″—ø.630″	
			Cutting Speed vc (SFM)	Feed fr (IPR)	Cutting Speed vc (SFM)	Feed fr (IPR)	Cutting Speed vc (SFM)	Feed fr (IPR)
MAE	N	Cast Aluminum Alloy	295 (130—460)	.006 (.002—.012)	330 (165—490)	.008 (.002—.012)	395 (195—560)	.010 (.004—.016)
		Die Cast Aluminum Alloy	330 (195—490)	.005 (.002—.010)	360 (230—525)	.006 (.002—.010)	425 (260—590)	.008 (.004—.012)
	K	Gray Cast Iron	130 (65—195)	.006 (.004—.008)	195 (130—260)	.008 (.004—.012)	260 (195—330)	.012 (.008—.016)
		Ductile Cast Iron	100 (65—130)	.004 (.002—.006)	130 (65—195)	.005 (.002—.008)	195 (130—260)	.008 (.004—.012)
MAS	N	Cast Aluminum Alloy	300 (195—490)	.006 (.002—.012)	390 (260—555)	.008 (.004—.012)	490 (330—655)	.010 (.004—.016)
		Die Cast Aluminum Alloy	390 (260—555)	.005 (.002—.010)	490 (330—590)	.006 (.002—.010)	525 (390—655)	.008 (.004—.012)
	K	Gray Cast Iron	195 (130—260)	.006 (.004—.008)	260 (195—360)	.008 (.004—.012)	330 (230—425)	.012 (.008—.016)
		Ductile Cast Iron	145 (100—195)	.004 (.002—.006)	195 (130—260)	.005 (.002—.008)	260 (195—330)	.008 (.004—.012)

HOLE AND DRILL DIAMETERS FOR THREAD

Thread Size	Thread Tapping			Roll Thread Tapping		
	Super Burnish Drill Diameter (DCmm)	Hole Diameter Tolerance (ømm)		Super Burnish Drill Diameter (DCmm)	Hole Diameter Tolerance (ømm)	
		Max.	Min.		Max.	Min.
M4x0.7	**3.3**	3.242	3.422	**3.65**	3.65	3.70
M5x0.8	**4.2**	4.134	4.334	**4.60**	4.59	4.66
M6x1.0	**5.0**	4.917	5.153	**5.50**	5.48	5.57
M8x1.25	**6.8**	6.647	6.912	**7.35**	7.34	7.41
M10x1.5	**8.5**	8.376	8.676	**9.21**	9.18	9.28
M12x1.75	**10.3**	10.106	10.441	**11.08**	11.05	11.15
M14x2	**12.0**	11.835	12.210	**12.96**	12.92	13.04
M16x2	**14.0**	13.835	14.210	**14.96**	14.92	15.04

MSE

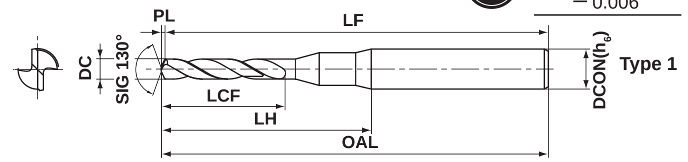
●Wide flute prevents chip packing.
●Stable, small diameter machining.

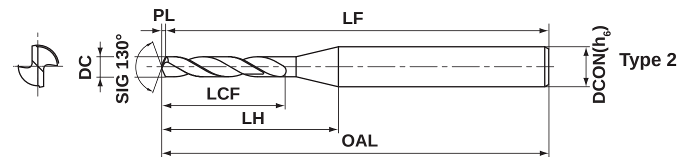
P | M | K | N | S | H

0.10≤DC≤0.99
0 −0.009
DCON=3
0 −0.006

METRIC STANDARD

External Coolant





Note 1) MSE type can be used for shrink fit holders.

DC (mm)	Stock VP20MF	Stock VP15TF	Order Number	LCF	LH	OAL	LF	PL	DCON	Type
0.10	★		MSE0010SB	1.22	9.72	38.02	38	0.02	3	1
0.11	★		MSE0011SB	1.23	9.73	38.03	38	0.03	3	1
0.12	★		MSE0012SB	1.43	9.73	38.03	38	0.03	3	1
0.13	★		MSE0013SB	1.43	9.73	38.03	38	0.03	3	1
0.14	★		MSE0014SB	2.03	9.73	38.03	38	0.03	3	1
0.15	★		MSE0015SB	2.03	9.73	38.03	38	0.03	3	1
0.16	★		MSE0016SB	2.04	9.74	38.04	38	0.04	3	1
0.17	★		MSE0017SB	2.04	9.74	38.04	38	0.04	3	1
0.18	★		MSE0018SB	2.04	9.74	38.04	38	0.04	3	1
0.19	★		MSE0019SB	2.04	9.74	38.04	38	0.04	3	1
0.20	★		MSE0020SB	2.55	9.75	38.05	38	0.05	3	1
0.21	★		MSE0021SB	2.55	9.75	38.05	38	0.05	3	1
0.22	★		MSE0022SB	2.55	9.75	38.05	38	0.05	3	1
0.23	★		MSE0023SB	2.55	9.75	38.05	38	0.05	3	1
0.24	★		MSE0024SB	3.06	9.76	38.06	38	0.06	3	1
0.25	★		MSE0025SB	3.06	9.76	38.06	38	0.06	3	1
0.26	★		MSE0026SB	3.06	9.76	38.06	38	0.06	3	1
0.27	★		MSE0027SB	3.06	9.76	38.06	38	0.06	3	1
0.28	★		MSE0028SB	3.07	9.77	38.07	38	0.07	3	1
0.29	★		MSE0029SB	3.07	9.77	38.07	38	0.07	3	1
0.30		★	MSE0030SB	5.07	10.27	38.07	38	0.07	3	2
0.31		★	MSE0031SB	5.07	10.27	38.07	38	0.07	3	2
0.32		★	MSE0032SB	5.07	10.27	38.07	38	0.07	3	2
0.33		★	MSE0033SB	5.08	10.28	38.08	38	0.08	3	2
0.34		★	MSE0034SB	6.08	11.28	38.08	38	0.08	3	2
0.35		★	MSE0035SB	6.08	11.18	38.08	38	0.08	3	2
0.36		★	MSE0036SB	6.08	11.18	38.08	38	0.08	3	2
0.37		★	MSE0037SB	6.09	11.19	38.09	38	0.09	3	2
0.38		★	MSE0038SB	6.09	11.19	38.09	38	0.09	3	2
0.39		★	MSE0039SB	6.09	11.19	38.09	38	0.09	3	2
0.40		★	MSE0040SB	7.09	12.19	38.09	38	0.09	3	2
0.41		★	MSE0041SB	7.10	12.10	38.10	38	0.10	3	2

DC (mm)	Stock VP20MF	Stock VP15TF	Order Number	LCF	LH	OAL	LF	PL	DCON	Type
0.42		★	MSE0042SB	7.10	12.10	38.10	38	0.10	3	2
0.43		★	MSE0043SB	7.10	12.10	38.10	38	0.10	3	2
0.44		★	MSE0044SB	7.10	12.10	38.10	38	0.10	3	2
0.45		★	MSE0045SB	7.10	12.10	38.10	38	0.10	3	2
0.46		★	MSE0046SB	7.11	12.01	38.11	38	0.11	3	2
0.47		★	MSE0047SB	7.11	12.01	38.11	38	0.11	3	2
0.48		★	MSE0048SB	7.11	12.01	38.11	38	0.11	3	2
0.49		★	MSE0049SB	7.11	12.01	38.11	38	0.11	3	2
0.50		★	MSE0050SB	7.12	12.02	38.12	38	0.12	3	2
0.51		★	MSE0051SB	7.12	11.92	38.12	38	0.12	3	2
0.52		★	MSE0052SB	7.12	11.92	38.12	38	0.12	3	2
0.53		★	MSE0053SB	7.12	11.92	38.12	38	0.12	3	2
0.54		★	MSE0054SB	7.13	11.93	38.13	38	0.13	3	2
0.55		★	MSE0055SB	7.13	11.93	38.13	38	0.13	3	2
0.56		★	MSE0056SB	7.13	11.93	38.13	38	0.13	3	2
0.57		★	MSE0057SB	7.13	11.83	38.13	38	0.13	3	2
0.58		★	MSE0058SB	7.14	11.84	38.14	38	0.14	3	2
0.59		★	MSE0059SB	7.14	11.84	38.14	38	0.14	3	2
0.60		★	MSE0060SB	7.14	11.84	38.14	38	0.14	3	2
0.61		★	MSE0061SB	7.14	11.84	38.14	38	0.14	3	2
0.62		★	MSE0062SB	7.14	11.74	38.14	38	0.14	3	2
0.63		★	MSE0063SB	7.15	11.75	38.15	38	0.15	3	2
0.64		★	MSE0064SB	7.15	11.75	38.15	38	0.15	3	2
0.65		★	MSE0065SB	7.15	11.75	38.15	38	0.15	3	2
0.66		★	MSE0066SB	7.15	11.75	38.15	38	0.15	3	2
0.67		★	MSE0067SB	7.16	11.66	38.16	38	0.16	3	2
0.68		★	MSE0068SB	7.16	11.66	38.16	38	0.16	3	2
0.69		★	MSE0069SB	7.16	11.66	38.16	38	0.16	3	2
0.70		★	MSE0070SB	8.16	12.66	38.16	38	0.16	3	2
0.71		★	MSE0071SB	8.17	12.67	38.17	38	0.17	3	2
0.72		★	MSE0072SB	8.17	12.67	38.17	38	0.17	3	2
0.73		★	MSE0073SB	8.17	12.57	38.17	38	0.17	3	2

Note 1) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

★ : Stocked in Japan

DC (mm)	Stock VP20MF	Stock VP15TF	Order Number	LCF	LH	OAL	LF	PL	DCON	Type
0.74		★	MSE0074SB	8.17	12.57	38.17	38	0.17	3	2
0.75		★	MSE0075SB	8.17	12.57	38.17	38	0.17	3	2
0.76		★	MSE0076SB	8.18	12.58	38.18	38	0.18	3	2
0.77		★	MSE0077SB	8.18	12.58	38.18	38	0.18	3	2
0.78		★	MSE0078SB	8.18	12.48	38.18	38	0.18	3	2
0.79		★	MSE0079SB	8.18	12.48	38.18	38	0.18	3	2
0.80		★	MSE0080SB	10.19	14.49	38.19	38	0.19	3	2
0.81		★	MSE0081SB	10.19	14.49	38.19	38	0.19	3	2
0.82		★	MSE0082SB	10.19	14.49	38.19	38	0.19	3	2
0.83		★	MSE0083SB	10.19	14.49	38.19	38	0.19	3	2
0.84		★	MSE0084SB	10.20	14.40	38.20	38	0.20	3	2
0.85		★	MSE0085SB	10.20	14.40	38.20	38	0.20	3	2
0.86		★	MSE0086SB	10.20	14.40	38.20	38	0.20	3	2

DC (mm)	Stock VP20MF	Stock VP15TF	Order Number	LCF	LH	OAL	LF	PL	DCON	Type
0.87		★	MSE0087SB	10.20	14.40	38.20	38	0.20	3	2
0.88		★	MSE0088SB	10.21	14.41	38.21	38	0.21	3	2
0.89		★	MSE0089SB	10.21	14.31	38.21	38	0.21	3	2
0.90		★	MSE0090SB	10.21	14.31	38.21	38	0.21	3	2
0.91		★	MSE0091SB	10.21	14.31	38.21	38	0.21	3	2
0.92		★	MSE0092SB	10.21	14.31	38.21	38	0.21	3	2
0.93		★	MSE0093SB	10.22	14.32	38.22	38	0.22	3	2
0.94		★	MSE0094SB	10.22	14.22	38.22	38	0.22	3	2
0.95		★	MSE0095SB	10.22	14.22	38.22	38	0.22	3	2
0.96		★	MSE0096SB	10.22	14.22	38.22	38	0.22	3	2
0.97		★	MSE0097SB	10.23	14.23	38.23	38	0.23	3	2
0.98		★	MSE0098SB	10.23	14.23	38.23	38	0.23	3	2
0.99		★	MSE0099SB	10.23	14.23	38.23	38	0.23	3	2

RECOMMENDED CUTTING CONDITIONS

Work Material		Mild Steel (≤180HB) AISI 1010 etc.			Carbon Steel, Alloy Steel (180−280HB) AISI 1045, 4140 etc.		
Drill Dia. **DC**		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)
inch	mm						
.00394	0.10	20 (15–25)	.0001 (.00004−.0001)	.0008	20 (15–25)	.0001 (.00004−.0001)	.0008
.00472	0.12	25 (15–35)	.0001 (.00004−.0001)	.0008	25 (15–35)	.0001 (.00004−.0001)	.0008
.00630	0.16	35 (20–45)	.0001 (.00004−.0001)	.0008	35 (20–45)	.0001 (.00004−.0001)	.0008
.00787	0.20	40 (25–50)	.0001 (.0001−.0002)	.0016	40 (25–50)	.0001 (.0001−.0002)	.0016
.00984	0.25	50 (35–65)	.0001 (.0001−.0002)	.0016	50 (35–65)	.0001 (.0001−.0002)	.0016
.01260	0.32	65 (45–85)	.0002 (.0001−.0002)	.0020	65 (45–85)	.0002 (.0001−.0002)	.0020
.01575	0.40	80 (50–105)	.0002 (.0001−.0002)	.0020	80 (50–105)	.0002 (.0001−.0002)	.0020
.01969	0.50	105 (65–115)	.0002 (.0002−.0003)	.0039	105 (65–115)	.0002 (.0002−.0003)	.0039
.02480	0.63	130 (80–150)	.0003 (.0002−.0004)	.0039	130 (80–150)	.0003 (.0002−.0004)	.0039
.03150	0.80	165 (115–195)	.0008 (.0006−.0010)	.0118	165 (115–195)	.0006 (.0005−.0007)	.0118
.03937	0.99	205 (130–230)	.0016 (.0012−.0020)	.0118	205 (130–230)	.0008 (.0006−.0010)	.0118

Note 1) You must use the MSP starter drill when using the MSE drill. (Order number : MSP0300SB)
Note 2) Change cutting conditions depending on your machine and work material rigidity.
Note 3) When machining holes over DCx5, reduce the step stated above.
Note 4) The use of water-soluble fluid (diluted by 20 times) is recommended for drilling under the cutting conditions above. Lower the revolutions if you use oil fluid or mist.
Note 5) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MSE

RECOMMENDED CUTTING CONDITIONS

Work Material		Carbon Steel, Alloy Steel (280−350HB) AISI 4340 etc.			Pre-hardened Steel AISI P21, P20 etc.		
Drill Dia. **DC**		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)
inch	mm						
.00394	0.10	20 (15–25)	.0001 (.00004−.0001)	.0008	20 (15–25)	.0001 (.00004−.0001)	.0008
.00472	0.12	25 (15–35)	.0001 (.00004−.0001)	.0008	25 (15–35)	.0001 (.00004−.0001)	.0008
.00630	0.16	35 (20–45)	.0001 (.00004−.0001)	.0008	35 (20–45)	.0001 (.00004−.0001)	.0008
.00787	0.20	40 (25–50)	.0001 (.00008−.0002)	.0016	40 (25–50)	.0001 (.00008−.0002)	.0016
.00984	0.25	50 (35–65)	.0001 (.00008−.0002)	.0016	50 (35–65)	.0001 (.00008−.0002)	.0016
.01260	0.32	65 (45–85)	.0002 (.00012−.0002)	.0020	65 (45–85)	.0002 (.00012−.0002)	.0020
.01575	0.40	80 (50–105)	.0002 (.00012−.0002)	.0020	80 (50–105)	.0002 (.00012−.0002)	.0020
.01969	0.50	105 (65–115)	.0002 (.00020−.0003)	.0039	105 (65–115)	.0002 (.00020−.0003)	.0039
.02480	0.63	130 (80–150)	.0003 (.00024−.0004)	.0039	130 (80–150)	.0003 (.00024−.0004)	.0039
.03150	0.80	165 (115–195)	.0006 (.00047−.0007)	.0118	165 (115–195)	.0006 (.00047−.0007)	.0118
.03937	0.99	205 (130–230)	.0008 (.00059−.0010)	.0118	205 (130–230)	.0008 (.00059−.0010)	.0118

Work Material		Austenitic Stainless Steel (≦200HB) AISI 304, 316 etc.			Gray Cast Iron (≦350MPa) No45B etc.		
Drill Dia. **DC**		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)
inch	mm						
.00394	0.10	20 (15–25)	.0001 (.00004−.0001)	.0008	20 (15–25)	.0001 (.00004−.0001)	.0008
.00472	0.12	25 (15–35)	.0001 (.00004−.0001)	.0008	25 (15–35)	.0001 (.00004−.0001)	.0008
.00630	0.16	35 (20–45)	.0001 (.00004−.0001)	.0008	35 (20–45)	.0001 (.00004−.0001)	.0008
.00787	0.20	35 (20–45)	.0001 (.00008−.0002)	.0016	40 (25–50)	.0001 (.00008−.0002)	.0016
.00984	0.25	45 (25–60)	.0001 (.00008−.0002)	.0016	50 (35–65)	.0001 (.00008−.0002)	.0016
.01260	0.32	50 (35–65)	.0002 (.00012−.0002)	.0020	65 (45–85)	.0002 (.00012−.0002)	.0020
.01575	0.40	50 (35–60)	.0002 (.00012−.0002)	.0020	80 (50–105)	.0002 (.00012−.0002)	.0020
.01969	0.50	50 (35–65)	.0002 (.00020−.0003)	.0039	105 (65–115)	.0002 (.00020−.0003)	.0039
.02480	0.63	50 (35–65)	.0003 (.00024−.0004)	.0039	130 (80–150)	.0003 (.00024−.0004)	.0039
.03150	0.80	50 (35–65)	.0006 (.00047−.0007)	.0079	165 (115–195)	.0008 (.00059−.0010)	.0118
.03937	0.99	50 (35–65)	.0008 (.00059−.0010)	.0079	205 (130–230)	.0016 (.00118−.0020)	.0118

Work Material		Aluminum Alloy (Si<5%) ASTM A6061, A7075 etc.			Heat Resistant Alloy Inconel718 etc.		
Drill Dia. **DC**		Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)	Cutting Speed **vc** (Min.−Max.) (SFM)	Feed **fr** (Min.−Max.) (IPR)	Peck (inch)
inch	mm						
.00394	0.10	20 (15–25)	.0001 (.00004−.0001)	.0020	5 (5–15)	.00004 (.00002−.00004)	.0008
.00472	0.12	25 (15–35)	.0001 (.00008−.0002)	.0020	10 (5–15)	.00004 (.00002−.00004)	.0008
.00630	0.16	35 (20–45)	.0002 (.00012−.0002)	.0020	15 (10–20)	.00004 (.00002−.00004)	.0008
.00787	0.20	40 (25–50)	.0002 (.00020−.0003)	.0039	15 (10–20)	.00008 (.00004−.00008)	.0016
.00984	0.25	50 (35–65)	.0003 (.00024−.0004)	.0039	15 (10–20)	.00008 (.00004−.00008)	.0016
.01260	0.32	65 (45–85)	.0004 (.00031−.0005)	.0118	15 (10–20)	.00008 (.00004−.00008)	.0020
.01575	0.40	80 (50–105)	.0008 (.00059−.0010)	.0118	15 (15–20)	.00008 (.00004−.00008)	.0020
.01969	0.50	105 (65–115)	.0012 (.00098−.0014)	.0197	15 (15–35)	.00012 (.00004−.00012)	.0039
.02480	0.63	130 (80–150)	.0016 (.00138−.0018)	.0197	20 (15–35)	.00016 (.00008−.00016)	.0039
.03150	0.80	165 (115–195)	.0020 (.00177−.0022)	.0315	20 (15–35)	.00024 (.00016−.00024)	.0079
.03937	0.99	205 (130–230)	.0024 (.00217−.0026)	.0315	20 (15–35)	.00039 (.00031−.00039)	.0079

Note 1) You must use the MSP starter drill when using the MSE drill. (Order number : MSP0300SB)
Note 2) Change cutting conditions depending on your machine and work material rigidity.
Note 3) When machining holes over DCx5, reduce the step stated above.
Note 4) The use of water-soluble fluid (diluted by 20 times) is recommended for drilling under the cutting conditions above. Lower the revolutions if you use oil fluid or mist.
Note 5) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

■REFERENCE TABLE OF PRE-HOLE DIMENSIONS

Unit : mm

Description	Cutting Dia.	Pre-hole Diameter	Pre-hole Depth
MSE0010SB	0.10	0.060−0.080	0.030−0.040
MSE0011SB	0.11	0.066−0.088	0.033−0.044
MSE0012SB	0.12	0.072−0.096	0.036−0.048
MSE0013SB	0.13	0.078−0.104	0.039−0.052
MSE0014SB	0.14	0.084−0.112	0.042−0.056
MSE0015SB	0.15	0.090−0.120	0.045−0.060
MSE0016SB	0.16	0.096−0.128	0.048−0.064
MSE0017SB	0.17	0.102−0.136	0.051−0.068
MSE0018SB	0.18	0.108−0.144	0.054−0.072
MSE0019SB	0.19	0.114−0.152	0.057−0.076
MSE0020SB	0.20	0.120−0.160	0.060−0.080
MSE0021SB	0.21	0.126−0.168	0.063−0.084
MSE0022SB	0.22	0.132−0.176	0.066−0.088
MSE0023SB	0.23	0.138−0.184	0.069−0.092
MSE0024SB	0.24	0.144−0.192	0.072−0.096
MSE0025SB	0.25	0.150−0.200	0.075−0.100
MSE0026SB	0.26	0.156−0.208	0.078−0.104
MSE0027SB	0.27	0.162−0.216	0.081−0.108
MSE0028SB	0.28	0.168−0.224	0.084−0.112
MSE0029SB	0.29	0.174−0.232	0.087−0.116
MSE0030SB	0.30	0.180−0.240	0.090−0.120
MSE0031SB	0.31	0.186−0.248	0.093−0.124
MSE0032SB	0.32	0.192−0.256	0.096−0.128
MSE0033SB	0.33	0.198−0.264	0.099−0.132
MSE0034SB	0.34	0.204−0.272	0.102−0.136
MSE0035SB	0.35	0.210−0.280	0.105−0.140
MSE0036SB	0.36	0.216−0.288	0.108−0.144
MSE0037SB	0.37	0.222−0.296	0.111−0.148
MSE0038SB	0.38	0.228−0.304	0.114−0.152
MSE0039SB	0.39	0.234−0.312	0.117−0.156
MSE0040SB	0.40	0.240−0.320	0.120−0.160
MSE0041SB	0.41	0.246−0.328	0.123−0.164
MSE0042SB	0.42	0.252−0.336	0.126−0.168
MSE0043SB	0.43	0.258−0.344	0.129−0.172
MSE0044SB	0.44	0.264−0.352	0.132−0.176
MSE0045SB	0.45	0.270−0.360	0.135−0.180
MSE0046SB	0.46	0.276−0.368	0.138−0.184
MSE0047SB	0.47	0.282−0.376	0.141−0.188
MSE0048SB	0.48	0.288−0.384	0.144−0.192
MSE0049SB	0.49	0.294−0.392	0.147−0.196
MSE0050SB	0.50	0.300−0.400	0.150−0.200
MSE0051SB	0.51	0.306−0.408	0.153−0.204
MSE0052SB	0.52	0.312−0.416	0.156−0.208
MSE0053SB	0.53	0.318−0.424	0.159−0.212
MSE0054SB	0.54	0.324−0.432	0.162−0.216

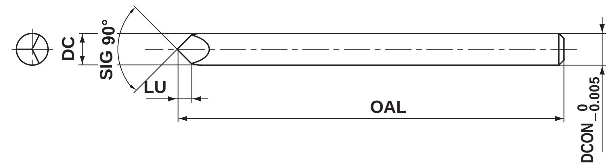
Description	Cutting Dia.	Pre-hole Diameter	Pre-hole Depth
MSE0055SB	0.55	0.330−0.440	0.165−0.220
MSE0056SB	0.56	0.336−0.448	0.168−0.224
MSE0057SB	0.57	0.342−0.456	0.171−0.228
MSE0058SB	0.58	0.348−0.464	0.174−0.232
MSE0059SB	0.59	0.354−0.472	0.177−0.236
MSE0060SB	0.60	0.360−0.480	0.180−0.240
MSE0061SB	0.61	0.366−0.488	0.183−0.244
MSE0062SB	0.62	0.372−0.496	0.186−0.248
MSE0063SB	0.63	0.378−0.504	0.189−0.252
MSE0064SB	0.64	0.384−0.512	0.192−0.256
MSE0065SB	0.65	0.390−0.520	0.195−0.260
MSE0066SB	0.66	0.396−0.528	0.198−0.264
MSE0067SB	0.67	0.402−0.536	0.201−0.268
MSE0068SB	0.68	0.408−0.544	0.204−0.272
MSE0069SB	0.69	0.414−0.552	0.207−0.276
MSE0070SB	0.70	0.420−0.560	0.210−0.280
MSE0071SB	0.71	0.426−0.568	0.213−0.284
MSE0072SB	0.72	0.432−0.576	0.216−0.288
MSE0073SB	0.73	0.438−0.584	0.219−0.292
MSE0074SB	0.74	0.444−0.592	0.222−0.296
MSE0075SB	0.75	0.450−0.600	0.225−0.300
MSE0076SB	0.76	0.456−0.608	0.228−0.304
MSE0077SB	0.77	0.462−0.616	0.231−0.308
MSE0078SB	0.78	0.468−0.624	0.234−0.312
MSE0079SB	0.79	0.474−0.632	0.237−0.316
MSE0080SB	0.80	0.480−0.640	0.240−0.320
MSE0081SB	0.81	0.486−0.648	0.243−0.324
MSE0082SB	0.82	0.492−0.656	0.246−0.328
MSE0083SB	0.83	0.498−0.664	0.249−0.332
MSE0084SB	0.84	0.504−0.672	0.252−0.336
MSE0085SB	0.85	0.510−0.680	0.255−0.340
MSE0086SB	0.86	0.516−0.688	0.258−0.344
MSE0087SB	0.87	0.522−0.696	0.261−0.348
MSE0088SB	0.88	0.528−0.704	0.264−0.352
MSE0089SB	0.89	0.534−0.712	0.267−0.356
MSE0090SB	0.90	0.540−0.720	0.270−0.360
MSE0091SB	0.91	0.546−0.728	0.273−0.364
MSE0092SB	0.92	0.552−0.736	0.276−0.368
MSE0093SB	0.93	0.558−0.744	0.279−0.372
MSE0094SB	0.94	0.564−0.752	0.282−0.376
MSE0095SB	0.95	0.570−0.760	0.285−0.380
MSE0096SB	0.96	0.576−0.768	0.288−0.384
MSE0097SB	0.97	0.582−0.776	0.291−0.388
MSE0098SB	0.98	0.588−0.784	0.294−0.392
MSE0099SB	0.99	0.594−0.792	0.297−0.396

MSP
STARTER Drill

●For use with MSE Type drill only.

P M K N S H

METRIC STANDARD
External Coolant



Note 1) MSP type can be used for shrink fit holders.

Order Number	Grade	Stock	Dimensions (mm)				Range of Diameter (mm)
			DC	OAL	DCON	LU	
MSP0300SB	**VP15TF**	●	3.0	38	3.0	1.5	**0.1—3.0**

RECOMMENDED CUTTING CONDITIONS

DC (mm)	Cutting Speed **vc** (SFM)	Revolution **n** (min^{-1})	Feed **fr** (Min.—Max.) (IPR)
0.1—3.0	10—310	10000	.00002 (.00001—.00004)

M

DRILLING

● : USA Stock

Memo

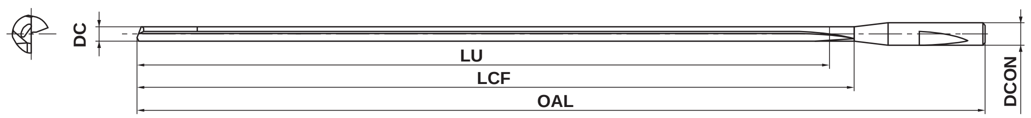
MICRO-MGS

●Small diameter deep hole drilling.
●High hole accuracy is possible.
●Can be used with machining and turning center.

P M K N S H

METRIC STANDARD

Internal Coolant



DC≤3
0 −0.005

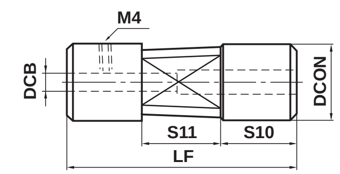
Note 1) MGS type can be used for shrink fit holders.

DC (mm)	L/D	Stock HTi10	Order Number	LU	LCF	OAL	DCON
0.7	50	★	MGS0070L040B	35.0	40	80	3
	80	★	MGS0070L060B	56.0	60	100	3
0.8	45	★	MGS0080L040B	36.0	40	80	3
	70	★	MGS0080L060B	56.0	60	100	3
0.9	40	★	MGS0090L040B	36.0	40	80	3
	60	★	MGS0090L060B	54.0	60	100	3
1.0	35	★	MGS0100L040B	35.0	40	80	3
	55	★	MGS0100L060B	55.0	60	100	3
	75	★	MGS0100L080B	75.0	80	120	3
1.1	30	★	MGS0110L040B	33.0	40	80	3
	50	★	MGS0110L060B	55.0	60	100	3
	65	★	MGS0110L080B	71.5	80	120	3
1.2	30	★	MGS0120L040B	36.0	40	80	3
	45	★	MGS0120L060B	54.0	60	100	3
	60	★	MGS0120L080B	72.0	80	120	3
1.3	40	★	MGS0130L060B	52.0	60	100	3
	55	★	MGS0130L080B	71.5	80	120	3
	70	★	MGS0130L100B	91.0	100	140	3
1.4	35	★	MGS0140L060B	49.0	60	100	3
	50	★	MGS0140L080B	70.0	80	120	3
	65	★	MGS0140L100B	91.0	100	140	3
1.5	35	★	MGS0150L060B	52.5	60	100	3
	50	★	MGS0150L080B	75.0	80	120	3
	60	★	MGS0150L100B	90.0	100	140	3
1.6	30	★	MGS0160L060B	48.0	60	100	3
	45	★	MGS0160L080B	72.0	80	120	3
	55	★	MGS0160L100B	88.0	100	140	3
1.7	30	★	MGS0170L060B	51.0	60	100	3
	40	★	MGS0170L080B	68.0	80	120	3
	55	★	MGS0170L100B	93.5	100	140	3
1.8	30	★	MGS0180L060B	54.0	60	100	3
	40	★	MGS0180L080B	72.0	80	120	3
	50	★	MGS0180L100B	90.0	100	140	3
1.9	25	★	MGS0190L060B	47.5	60	100	3
	35	★	MGS0190L080B	66.5	80	120	3
	45	★	MGS0190L100B	85.5	100	140	3
2.0	25	★	MGS0200L060B	50.0	60	100	3
	35	★	MGS0200L080B	70.0	80	120	3
	45	★	MGS0200L100B	90.0	100	140	3
2.1	35	★	MGS0210L080B	73.5	80	120	3
	40	★	MGS0210L100B	84.0	100	140	3
2.2	30	★	MGS0220L080B	66.0	80	120	3
	40	★	MGS0220L100B	88.0	100	140	3
2.3	30	★	MGS0230L080B	69.0	80	120	3
	40	★	MGS0230L100B	92.0	100	140	3
2.4	30	★	MGS0240L080B	72.0	80	120	3
	35	★	MGS0240L100B	84.0	100	140	3
2.5	25	★	MGS0250L080B	62.5	80	120	3
	35	★	MGS0250L100B	87.5	100	140	3
2.6	25	★	MGS0260L080B	65.0	80	120	3
	35	★	MGS0260L100B	91.0	100	140	3
2.7	25	★	MGS0270L080B	67.5	80	120	3
	30	★	MGS0270L100B	81.0	100	140	3
2.8	25	★	MGS0280L080B	70.0	80	120	3
	30	★	MGS0280L100B	84.0	100	140	3
2.9	20	★	MGS0290L080B	58.0	80	120	3
	30	★	MGS0290L100B	87.0	100	140	3
3.0	20	★	MGS0300L080B	60.0	80	120	3
	30	★	MGS0300L100B	90.0	100	140	3

Note 1) Contact Mitsubishi Materials regarding coated products (**VP**, **GP** and **UP** coated carbide).

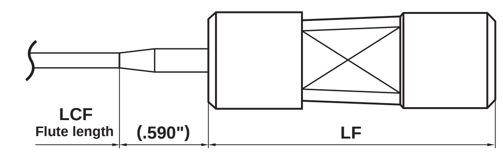
★ : Stocked in Japan

DRIVER



Order Number	Stock	DCON	DCB	LF	S10	S11	Clamp Screw	Wrench
		Dimensions (inch)						
MGD38	★	.500	.118	1.500	.496	.500	HSS04004	HKY20F
MGD70	★	.500	.118	2.756	.984	.787	HSS04004	HKY20F

When connected with a driver.



RECOMMENDED CUTTING CONDITIONS

Work Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180−280HB) AISI 1045, 4140 etc.	
Drill Dia. DC inch	mm	Cutting Speed vc (Min.−Max.) (SFM)	Feed fr (Min.−Max.) (IPR)	Cutting Speed vc (Min.−Max.) (SFM)	Feed fr (Min.−Max.) (IPR)
.0315	0.8	165 (130−195)	.0004 (.0002−.0006)	130 (100−165)	.0004 (.0002−.0006)
.0394	1.0	165 (130−195)	.0004 (.0003−.0008)	130 (100−165)	.0004 (.0003−.0008)
.0472	1.2	195 (150−245)	.0006 (.0003−.0009)	165 (130−195)	.0006 (.0003−.0009)
.0630	1.6	195 (150−245)	.0008 (.0004−.0013)	165 (130−195)	.0008 (.0004−.0013)
.0787	2.0	195 (150−245)	.0010 (.0005−.0016)	165 (130−195)	.0010 (.0005−.0016)
.0984	2.5	230 (180−280)	.0012 (.0007−.0020)	195 (150−245)	.0012 (.0007−.0020)
.1181	3.0	230 (180−280)	.0016 (.0008−.0024)	195 (150−245)	.0016 (.0008−.0024)

Work Material		Carbon Steel, Alloy Steel (280−350HB) AISI 4340 etc.		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.	
Drill Dia. DC inch	mm	Cutting Speed vc (Min.−Max.) (SFM)	Feed fr (Min.−Max.) (IPR)	Cutting Speed vc (Min.−Max.) (SFM)	Feed fr (Min.−Max.) (IPR)
.0315	0.8	100 (65−130)	.0002 (.0002−.0002)	100 (65−130)	.0004 (.0002−.0006)
.0394	1.0	100 (65−130)	.0002 (.0002−.0003)	100 (65−130)	.0004 (.0003−.0008)
.0472	1.2	130 (100−165)	.0002 (.0002−.0003)	100 (65−130)	.0006 (.0003−.0009)
.0630	1.6	130 (100−165)	.0004 (.0003−.0004)	130 (100−165)	.0008 (.0004−.0013)
.0787	2.0	130 (100−165)	.0004 (.0004−.0005)	130 (100−165)	.0010 (.0005−.0016)
.0984	2.5	165 (130−195)	.0006 (.0005−.0007)	130 (100−165)	.0012 (.0007−.0020)
.1181	3.0	165 (130−195)	.0006 (.0006−.0008)	130 (100−165)	.0016 (.0008−.0024)

Note 1) A pilot hole or guide bushing is required.
Note 2) Coolant filter must be less than 5 microns. Fine filtration is necessary to prevent blockage of the coolant holes.
Note 3) For safety and success, high pressure coolant is required. **(Minimum coolant pressure = 1,000PSI)**
Note 4) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

MICRO-MGS

RECOMMENDED CUTTING CONDITIONS

Work Material		Gray Cast Iron (≤350MPa) No45B etc.		Ductile Cast Iron (≤450MPa) 60-40-8 etc.	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0315	0.8	165 (130—195)	.0004 (.0003—.0006)	130 (100—165)	.0002 (.0002—.0003)
.0394	1.0	165 (130—195)	.0006 (.0004—.0008)	130 (100—165)	.0002 (.0003—.0004)
.0472	1.2	195 (150—245)	.0006 (.0005—.0009)	165 (130—195)	.0004 (.0003—.0005)
.0630	1.6	195 (150—245)	.0008 (.0006—.0013)	165 (130—195)	.0004 (.0004—.0006)
.0787	2.0	195 (150—245)	.0012 (.0008—.0016)	165 (130—195)	.0006 (.0005—.0008)
.0984	2.5	230 (180—280)	.0014 (.0010—.0020)	195 (150—245)	.0008 (.0007—.0010)
.1181	3.0	230 (180—280)	.0018 (.0012—.0024)	195 (150—245)	.0010 (.0008—.0012)

Work Material		Aluminum Alloy (Si<5%) ASTM A6061, 7075 etc.		Copper, Copper alloy	
Drill Dia. **DC**		Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (Min.—Max.) (SFM)	Feed **fr** (Min.—Max.) (IPR)
inch	mm				
.0315	0.8	165 (130—195)	.0004 (.0003—.0006)	130 (100—165)	.0004 (.0003—.0006)
.0394	1.0	195 (150—245)	.0006 (.0004—.0008)	165 (130—195)	.0006 (.0004—.0008)
.0472	1.2	230 (180—280)	.0006 (.0005—.0009)	195 (150—245)	.0006 (.0005—.0009)
.0630	1.6	260 (195—330)	.0008 (.0006—.0013)	230 (180—280)	.0008 (.0006—.0013)
.0787	2.0	295 (230—360)	.0012 (.0008—.0016)	260 (195—330)	.0012 (.0008—.0016)
.0984	2.5	330 (260—395)	.0014 (.0010—.0020)	295 (230—360)	.0014 (.0010—.0020)
.1181	3.0	330 (260—395)	.0018 (.0012—.0024)	330 (260—395)	.0018 (.0012—.0024)

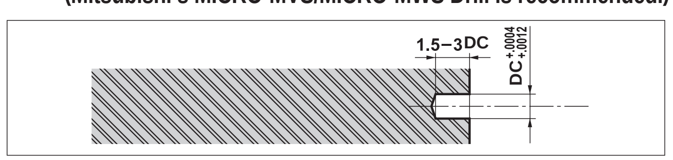
Note 1) A pilot hole or guide bushing is required.
Note 2) Coolant filter must be less than **5 microns**. Fine filtration is necessary to prevent blockage of the coolant holes.
Note 3) For safety and success, high pressure coolant is required. **(Minimum coolant pressure = 1,000PSI)**
Note 4) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

■ Special Application Notes :

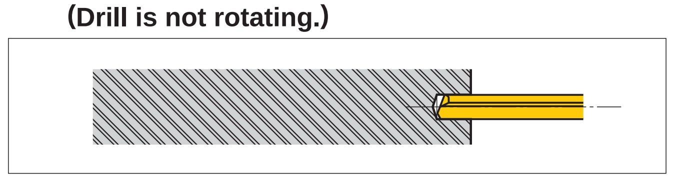
- For safety and success, high pressure coolant is required. **(Minimum coolant pressure = 1000PSI)**
- Coolant filter must be less than **5 microns**. Fine filtration is necessary to prevent blockage of the coolant holes.
- A pilot hole or guide bushing is required.

HOW TO USE

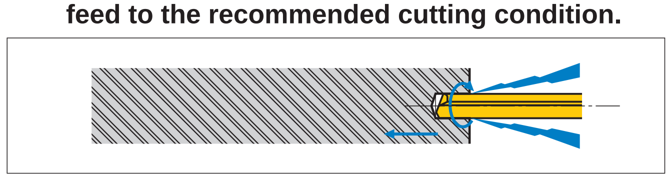
■ 1. Pilot hole drilling.
(Mitsubishi's MICRO-MVS/MICRO-MWS Drill is recommended.)



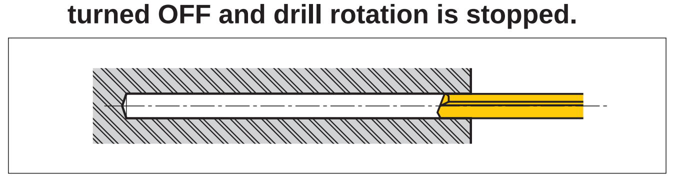
■ 2. Drill is inserted into the pilot hole with the MGS drill rotation stopped or rotating CCW at 300 min⁻¹ or less. (Drill is not rotating.)



■ 3. Coolant is turned ON, raise cutting speed and feed to the recommended cutting condition.



■ 4. Return to "Pos 2" after drilling end, coolant turned OFF and drill rotation is stopped.



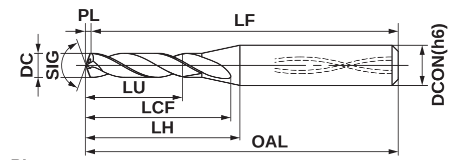
Memo

DSA

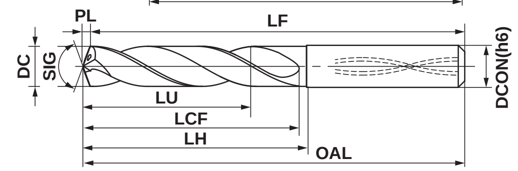
only DSAS

P M K N **S** H

DSAS

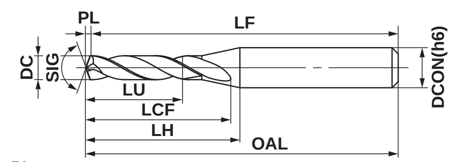


Type1

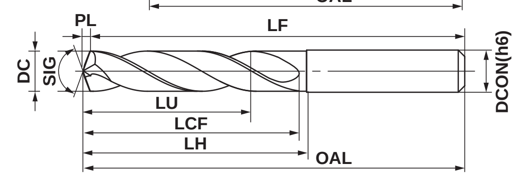


Type2

DSAE



Type3



Type4

* When looking at coating the color can vary depending on the direction of viewing.This does not have any effect on the performance of the drill.

(inch)

Type	Tolerance	DC=.1181	.1181<DC≤.2362	.2362<DC≤.3937	.3937<DC≤.4724
Type1,2,3,4	DC	0 / −.00071	0 / −.00071	0 / −.00087	0 / −.00106
	DCON	0 / −.00031	0 / −.00031	0 / −.00035	0 / −.00043

(mm)

Type	Tolerance	DC=3	3<DC≤6	6<DC≤10	10<DC≤12
Type1,2,3,4	DC	0 / −0.018	0 / −0.018	0 / −0.022	0 / −0.027
	DCON	0 / −0.008	0 / −0.008	0 / −0.009	0 / −0.011

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP9020	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.000	.1181				3	Ext.	DSAE0300X03S060	★	9.5	.374	21.5	.846	23.5	.925	70.5	2.776	70	2.756	0.5	.020	6	.236	3
					3	Int.	DSAS0300X03S060	●	9.5	.374	21.5	.846	23.5	.925	70.5	2.776	70	2.756	0.5	.020	6	.236	1
					5	Int.	DSAS0300X05S060	●	15.5	.610	28.5	1.122	31.5	1.240	78.5	3.091	78	3.071	0.5	.020	6	.236	1
3.100	.1220				3	Int.	DSAS0310X03S060	●	9.9	.390	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0310X05S060	●	16.1	.634	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.175	.1250	1/8			3	Int.	DSAS0318X03S060	●	10.1	.398	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0318X05S060	●	16.5	.650	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.200	.1260				3	Int.	DSAS0320X03S060	●	10.2	.402	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0320X05S060	●	16.6	.654	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.260	.1283				3	Int.	DSAS0326X03S060	●	10.4	.409	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0326X05S060	★	16.9	.665	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.300	.1299			M4x.7	3	Int.	DSAS0330X03S060	●	10.5	.413	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0330X05S060	●	17.1	.673	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.400	.1339				3	Ext.	DSAE0340X03S060	★	10.8	.425	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	3
					3	Int.	DSAS0340X03S060	●	10.8	.425	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0340X05S060	●	17.6	.693	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1
3.500	.1378				3	Int.	DSAS0350X03S060	●	11.1	.437	21.6	.850	23.6	.929	70.6	2.780	70	2.756	0.6	.024	6	.236	1
					5	Int.	DSAS0350X05S060	●	18.1	.713	28.6	1.126	31.6	1.244	78.6	3.094	78	3.071	0.6	.024	6	.236	1

Note 1) The coolant hole of ø.1875" (ø4.763mm) or less will be round shape.

● = NEW

● : USA Stock ★ : Stocked in Japan

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP9020	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
3.572	.1407	9/64			3	Int.	DSAS0357X03S060	●	11.4	.449	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0357X05S060	●	18.6	.732	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
3.600	.1417				3	Int.	DSAS0360X03S060	●	11.5	.453	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0360X05S060	★	18.7	.736	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
3.700	.1457			M4.5x.75	3	Int.	DSAS0370X03S060	●	11.8	.465	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0370X05S060	●	19.2	.756	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
3.800	.1496		25	#10-24	3	Int.	DSAS0380X03S060	●	12.1	.476	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0380X05S060	●	19.7	.776	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
3.900	.1535				3	Int.	DSAS0390X03S060	●	12.4	.488	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0390X05S060	●	20.2	.795	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
3.969	.1563	5/32			3	Int.	DSAS0397X03S060	●	12.6	.496	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0397X05S060	●	20.5	.807	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
4.000	.1575				3	Ext.	DSAE0400X03S060	★	12.7	.500	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	3
					3	Int.	DSAS0400X03S060	●	12.7	.500	22.7	.894	23.7	.933	70.7	2.783	70	2.756	0.7	.028	6	.236	1
					5	Int.	DSAS0400X05S060	●	20.7	.815	30.7	1.209	31.7	1.248	78.7	3.098	78	3.071	0.7	.028	6	.236	1
4.100	.1614				3	Int.	DSAS0410X03S060	●	13.0	.512	24.7	.972	26.7	1.051	73.7	2.902	73	2.874	0.7	.028	6	.236	1
					5	Int.	DSAS0410X05S060	●	21.2	.835	33.7	1.327	35.7	1.406	82.7	3.256	82	3.228	0.7	.028	6	.236	1
4.200	.1654			M5x.8	3	Int.	DSAS0420X03S060	●	13.4	.528	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	1
					5	Int.	DSAS0420X05S060	●	21.8	.858	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	1
4.300	.1693				3	Ext.	DSAE0430X03S060	★	13.7	.539	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	3
					3	Int.	DSAS0430X03S060	●	13.7	.539	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	1
					5	Int.	DSAS0430X05S060	●	22.3	.878	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	1
4.366	.1719	11/64			3	Int.	DSAS0437X03S060	●	13.9	.547	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	1
					5	Int.	DSAS0437X05S060	●	22.6	.890	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	1
4.400	.1732		17		3	Int.	DSAS0440X03S060	●	14.0	.551	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	1
					5	Int.	DSAS0440X05S060	●	22.8	.898	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	1
4.500	.1772		16	#12-24	3	Ext.	DSAE0450X03S060	★	14.3	.563	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	3
					3	Int.	DSAS0450X03S060	●	14.3	.563	24.8	.976	26.8	1.055	73.8	2.906	73	2.874	0.8	.031	6	.236	1
					5	Int.	DSAS0450X05S060	●	23.3	.917	33.8	1.331	35.8	1.409	82.8	3.260	82	3.228	0.8	.031	6	.236	1
4.600	.1811				3	Int.	DSAS0460X03S060	●	14.6	.575	25.8	1.016	28.8	1.134	75.8	2.984	75	2.953	0.8	.031	6	.236	1
					5	Int.	DSAS0460X05S060	●	23.8	.937	35.8	1.409	38.8	1.528	85.8	3.378	85	3.346	0.8	.031	6	.236	1
4.700	.1850		13		3	Int.	DSAS0470X03S060	●	15.0	.591	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	Int.	DSAS0470X05S060	●	24.4	.961	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.763	.1875	3/16			3	Int.	DSAS0476X03S060	●	15.2	.598	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	Int.	DSAS0476X05S060	●	24.7	.972	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.800	.1890		12		3	Int.	DSAS0480X03S060	●	15.3	.602	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	Int.	DSAS0480X05S060	●	24.9	.980	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.865	.1915				3	Int.	DSAS0486X03S060	●	15.5	.610	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	Int.	DSAS0486X05S060	★	25.2	.992	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
4.900	.1929				3	Int.	DSAS0490X03S060	●	15.6	.614	25.9	1.020	28.9	1.138	75.9	2.988	75	2.953	0.9	.035	6	.236	1
					5	Int.	DSAS0490X05S060	★	25.4	1.000	35.9	1.413	38.9	1.531	85.9	3.382	85	3.346	0.9	.035	6	.236	1
5.000	.1969			M6x1.0	3	Ext.	DSAE0500X03S060	★	15.9	.626	28.9	1.138	29.9	1.177	81.9	3.224	81	3.189	0.9	.035	6	.236	4
					3	Int.	DSAS0500X03S060	●	15.9	.626	28.9	1.138	29.9	1.177	81.9	3.224	81	3.189	0.9	.035	6	.236	2
					5	Int.	DSAS0500X05S060	●	25.9	1.020	39.9	1.571	42.9	1.689	89.9	3.539	89	3.504	0.9	.035	6	.236	2
5.100	.2008		7	1/4-20	3	Ext.	DSAE0510X03S060	★	16.2	.638	28.9	1.138	29.9	1.177	81.9	3.224	81	3.189	0.9	.035	6	.236	4
					3	Int.	DSAS0510X03S060	●	16.2	.638	28.9	1.138	29.9	1.177	81.9	3.224	81	3.189	0.9	.035	6	.236	2
					5	Int.	DSAS0510X05S060	●	26.4	1.039	39.9	1.571	42.9	1.689	89.9	3.539	89	3.504	0.9	.035	6	.236	2
5.160	.2032	13/64			3	Int.	DSAS0516X03S060	●	16.5	.650	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	2
					5	Int.	DSAS0516X05S060	●	26.8	1.055	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	2
5.200	.2047				3	Int.	DSAS0520X03S060	●	16.6	.654	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	2
					5	Int.	DSAS0520X05S060	●	27.0	1.063	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	2
5.300	.2087		4		3	Int.	DSAS0530X03S060	●	16.9	.665	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	2
					5	Int.	DSAS0530X05S060	●	27.5	1.083	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	2

Note 1) The coolant hole of ø.1875" (ø4.763mm) or less will be round shape.

● = NEW

DSA

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP9020	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
5.400	.2126		3	1/4-28	3	Ext.	DSAE0540X03S060	★	17.2	.677	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	4
					3	Int.	DSAS0540X03S060	●	17.2	.677	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	2
					5	Int.	DSAS0540X05S060	●	28.0	1.102	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	2
5.500	.2165				3	Ext.	DSAE0550X03S060	★	17.5	.689	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	4
					3	Int.	DSAS0550X03S060	●	17.5	.689	29.0	1.142	30.0	1.181	82.0	3.228	81	3.189	1.0	.039	6	.236	2
					5	Int.	DSAS0550X05S060	●	28.5	1.122	40.0	1.575	43.0	1.693	90.0	3.543	89	3.504	1.0	.039	6	.236	2
5.557	.2188	7/32			3	Int.	DSAS0556X03S060	●	17.8	.701	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0556X05S060	●	28.9	1.138	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
5.600	.2205		2		3	Ext.	DSAE0560X03S060	★	17.9	.705	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	4
					3	Int.	DSAS0560X03S060	●	17.9	.705	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0560X05S060	●	29.1	1.146	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
5.700	.2244				3	Int.	DSAS0570X03S060	●	18.2	.717	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0570X05S060	●	29.6	1.165	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
5.800	.2283		1		3	Int.	DSAS0580X03S060	●	18.5	.728	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0580X05S060	●	30.1	1.185	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
5.900	.2323				3	Ext.	DSAE0590X03S060	★	18.8	.740	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	4
					3	Int.	DSAS0590X03S060	●	18.8	.740	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0590X05S060	●	30.6	1.205	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
5.954	.2344	15/64	A		3	Int.	DSAS0595X03S060	●	19.0	.748	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0595X05S060	●	30.9	1.217	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
6.000	.2362			M7x1.0	3	Ext.	DSAE0600X03S060	★	19.1	.752	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	4
					3	Int.	DSAS0600X03S060	●	19.1	.752	31.1	1.224	31.1	1.224	82.1	3.232	81	3.189	1.1	.043	6	.236	2
					5	Int.	DSAS0600X05S060	●	31.1	1.224	43.1	1.697	43.1	1.697	90.1	3.547	89	3.504	1.1	.043	6	.236	2
6.100	.2402				3	Ext.	DSAE0610X03S080	★	19.5	.768	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	4
					3	Int.	DSAS0610X03S080	●	19.5	.768	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0610X05S080	●	31.7	1.248	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.200	.2441				3	Ext.	DSAE0620X03S080	★	19.8	.780	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	4
					3	Int.	DSAS0620X03S080	●	19.8	.780	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0620X05S080	●	32.2	1.268	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.300	.2480				3	Int.	DSAS0630X03S080	●	20.1	.791	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0630X05S080	★	32.7	1.287	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.350	.2500	1/4	E		3	Int.	DSAS0635X03S080	●	20.3	.799	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0635X05S080	●	33.0	1.299	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.400	.2520				3	Ext.	DSAE0640X03S080	★	20.4	.803	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	4
					3	Int.	DSAS0640X03S080	●	20.4	.803	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0640X05S080	●	33.2	1.307	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.500	.2559				3	Int.	DSAS0650X03S080	●	20.7	.815	34.2	1.346	37.2	1.465	87.2	3.433	86	3.386	1.2	.047	8	.315	2
					5	Int.	DSAS0650X05S080	●	33.7	1.327	47.2	1.858	49.2	1.937	96.2	3.787	95	3.740	1.2	.047	8	.315	2
6.600	.2598				3	Int.	DSAS0660X03S080	●	21.1	.831	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0660X05S080	●	34.3	1.350	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
6.700	.2638			M8x1.25	3	Int.	DSAS0670X03S080	●	21.4	.843	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0670X05S080	★	34.8	1.370	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
6.747	.2657	17/64			3	Int.	DSAS0675X03S080	●	21.5	.846	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0675X05S080	●	35.0	1.378	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
6.800	.2677				3	Ext.	DSAE0680X03S080	★	21.7	.854	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	4
					3	Int.	DSAS0680X03S080	●	21.7	.854	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0680X05S080	●	35.3	1.390	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
6.900	.2717		I	5/16-24	3	Ext.	DSAE0690X03S080	★	22.0	.866	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	4
					3	Int.	DSAS0690X03S080	●	22.0	.866	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0690X05S080	●	35.8	1.409	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
6.950	.2736				3	Int.	DSAS0695X03S080	●	22.2	.874	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0695X05S080	★	36.1	1.421	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2

● : USA Stock ★ : Stocked in Japan

● = NEW

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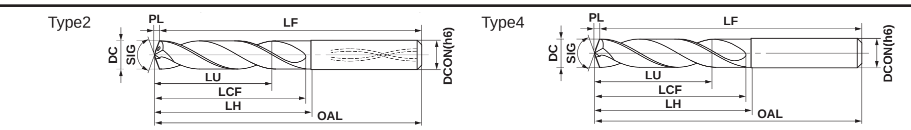
DRILLING



DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP9020	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
7.000	.2756			M8x1.0	3	Ext.	DSAE0700X03S080	★	22.3	.878	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	4
					3	Int.	DSAS0700X03S080	●	22.3	.878	36.3	1.429	38.3	1.508	91.3	3.594	90	3.543	1.3	.051	8	.315	2
					5	Int.	DSAS0700X05S080	●	36.3	1.429	50.3	1.980	52.3	2.059	99.3	3.909	98	3.858	1.3	.051	8	.315	2
7.100	.2795				3	Ext.	DSAE0710X03S080	★	22.7	.894	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	4
					3	Int.	DSAS0710X03S080	●	22.7	.894	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0710X05S080	●	36.9	1.453	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.144	.2813	9/32	K		3	Int.	DSAS0714X03S080	●	22.8	.898	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0714X05S080	●	37.1	1.461	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.200	.2835				3	Int.	DSAS0720X03S080	●	23.0	.906	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0720X05S080	●	37.4	1.472	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.300	.2874				3	Int.	DSAS0730X03S080	●	23.3	.917	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0730X05S080	★	37.9	1.492	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.400	.2913				3	Int.	DSAS0740X03S080	●	23.6	.929	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0740X05S080	●	38.4	1.512	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.500	.2953		M		3	Int.	DSAS0750X03S080	●	23.9	.941	39.4	1.551	40.4	1.591	91.4	3.598	90	3.543	1.4	.055	8	.315	2
					5	Int.	DSAS0750X05S080	●	38.9	1.531	54.4	2.142	57.4	2.260	104.4	4.110	103	4.055	1.4	.055	8	.315	2
7.541	.2969	19/64			3	Int.	DSAS0754X03S080	●	24.1	.949	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0754X05S080	●	39.2	1.543	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
7.600	.2992				3	Int.	DSAS0760X03S080	●	24.3	.957	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0760X05S080	★	39.5	1.555	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
7.700	.3031				3	Int.	DSAS0770X03S080	●	24.6	.969	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0770X05S080	●	40.0	1.575	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
7.800	.3071				3	Ext.	DSAE0780X03S080	★	24.9	.980	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	4
					3	Int.	DSAS0780X03S080	●	24.9	.980	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0780X05S080	●	40.5	1.594	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
7.900	.3110				3	Int.	DSAS0790X03S080	●	25.2	.992	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0790X05S080	●	41.0	1.614	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
7.938	.3125	5/16		3/8-16	3	Int.	DSAS0794X03S080	●	25.3	.996	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0794X05S080	●	41.2	1.622	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
8.000	.3150				3	Ext.	DSAE0800X03S080	★	25.5	1.004	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	4
					3	Int.	DSAS0800X03S080	●	25.5	1.004	41.5	1.634	41.5	1.634	91.5	3.602	90	3.543	1.5	.059	8	.315	2
					5	Int.	DSAS0800X05S080	●	41.5	1.634	57.5	2.264	57.5	2.264	104.5	4.114	103	4.055	1.5	.059	8	.315	2
8.100	.3189				3	Ext.	DSAE0810X03S100	★	25.8	1.016	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	4
					3	Int.	DSAS0810X03S100	●	25.8	1.016	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0810X05S100	★	42.0	1.654	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.200	.3228		P		3	Ext.	DSAE0820X03S100	★	26.1	1.028	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	4
					3	Int.	DSAS0820X03S100	●	26.1	1.028	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0820X05S100	★	42.5	1.673	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.300	.3268				3	Int.	DSAS0830X03S100	●	26.4	1.039	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0830X05S100	●	43.0	1.693	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.335	.3282	21/64			3	Int.	DSAS0833X03S100	●	26.5	1.043	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0833X05S100	●	43.2	1.701	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.400	.3307				3	Ext.	DSAE0840X03S100	★	26.7	1.051	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	4
					3	Int.	DSAS0840X03S100	●	26.7	1.051	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0840X05S100	★	43.5	1.713	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.500	.3346			M10x1.5	3	Ext.	DSAE0850X03S100	★	27.0	1.063	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	4
					3	Int.	DSAS0850X03S100	●	27.0	1.063	44.5	1.752	47.5	1.870	97.5	3.839	96	3.780	1.5	.059	10	.394	2
					5	Int.	DSAS0850X05S100	●	44.0	1.732	61.5	2.421	63.5	2.500	114.5	4.508	113	4.449	1.5	.059	10	.394	2
8.600	.3386		R		3	Int.	DSAS0860X03S100	●	27.4	1.079	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0860X05S100	●	44.6	1.756	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2
8.700	.3425			M10x1.25	3	Int.	DSAS0870X03S100	●	27.7	1.091	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0870X05S100	●	45.1	1.776	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2

● = NEW

M

DRILLING

DSA

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP9020	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
8.732	.3438	11/32			3	Int.	DSAS0873X03S100	●	27.8	1.094	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0873X05S100	●	45.3	1.783	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2
8.800	.3465				3	Int.	DSAS0880X03S100	●	28.0	1.102	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0880X05S100	●	45.6	1.795	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2
8.900	.3504				3	Int.	DSAS0890X03S100	●	28.3	1.114	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0890X05S100	●	46.1	1.815	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2
9.000	.3543				3	Ext.	DSAE0900X03S100	★	28.6	1.126	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	4
					3	Int.	DSAS0900X03S100	●	28.6	1.126	46.6	1.835	48.6	1.913	102.6	4.039	101	3.976	1.6	.063	10	.394	2
					5	Int.	DSAS0900X05S100	●	46.6	1.835	64.6	2.543	66.6	2.622	117.6	4.630	116	4.567	1.6	.063	10	.394	2
9.100	.3583		T		3	Int.	DSAS0910X03S100	●	29.1	1.146	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0910X05S100	★	47.3	1.862	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.200	.3622				3	Int.	DSAS0920X03S100	●	29.4	1.157	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0920X05S100	★	47.8	1.882	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.300	.3661				3	Int.	DSAS0930X03S100	●	29.7	1.169	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0930X05S100	★	48.3	1.902	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.400	.3701				3	Int.	DSAS0940X03S100	●	30.0	1.181	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0940X05S100	★	48.8	1.921	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.500	.3740				3	Int.	DSAS0950X03S100	●	30.3	1.193	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0950X05S100	●	49.3	1.941	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.525	.3750	3/8			3	Int.	DSAS0953X03S100	●	30.4	1.197	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0953X05S100	●	49.4	1.945	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.600	.3780				3	Int.	DSAS0960X03S100	●	30.6	1.205	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0960X05S100	★	49.8	1.961	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.700	.3819		Tube Sheet		3	Int.	DSAS0970X03S100	●	30.9	1.217	49.8	1.961	50.8	2.000	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0970X05S100	★	50.3	1.980	68.8	2.709	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.800	.3858		W		3	Int.	DSAS0980X03S100	●	31.2	1.228	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0980X05S100	●	50.8	2.000	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.900	.3898				3	Int.	DSAS0990X03S100	●	31.5	1.240	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0990X05S100	★	51.3	2.020	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
9.922	.3907	25/64		7/16-20	3	Int.	DSAS0992X03S100	●	31.6	1.244	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS0992X05S100	●	51.4	2.024	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2
10.000	.3937				3	Ext.	DSAE1000X03S100	★	31.8	1.252	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	4
					3	Int.	DSAS1000X03S100	●	31.8	1.252	51.8	2.039	51.8	2.039	102.8	4.047	101	3.976	1.8	.071	10	.394	2
					5	Int.	DSAS1000X05S100	●	51.8	2.039	71.8	2.827	71.8	2.827	122.8	4.835	121	4.764	1.8	.071	10	.394	2

● = NEW

M

DRILLING

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material			Heat Resistant Alloys Inconel718 etc.		Titanium Alloys Ti-6Al-4V etc.	
DC inch	DC mm	L/D	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.1181	3.000	≤ 5	30	.002 (.002—.004)	130	.003 (.002—.005)
.1575	4.000	≤ 5	30	.002 (.002—.004)	130	.004 (.003—.006)
.1969	5.000	≤ 5	40	.003 (.002—.005)	130	.005 (.003—.008)
.2362	6.000	≤ 5	50	.004 (.003—.006)	130	.006 (.004—.008)
.3150	8.000	≤ 5	50	.004 (.003—.006)	140	.007 (.006—.010)
.3937	10.000	≤ 5	60	.004 (.003—.006)	140	.009 (.007—.011)
.4724	12.000	≤ 5	65	.005 (.003—.006)	150	.009 (.008—.012)

Note 1) Spindle through & high pressure coolant system is recommended to make stable holes.
Note 2) Emulsion type of water-soluble coolant is recommended.
Note 3) In non water-insoluble coolant, reduce the cutting speed by 10%-20%.
Note 4) When drilling length of DCx1 or more with the use of external coolant system, step drilling is recommended in every DCx0.5 to encourage chips to break.

M

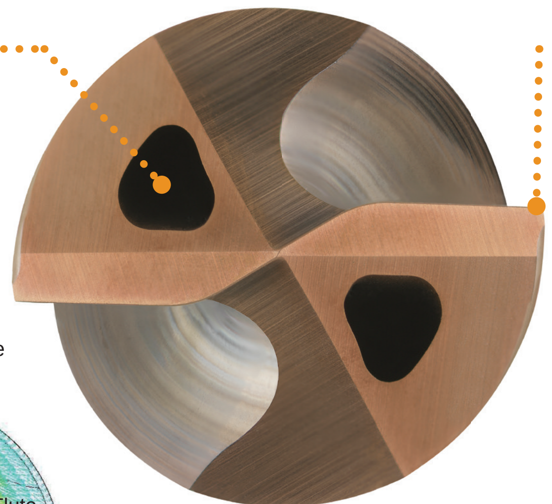
DRILLING

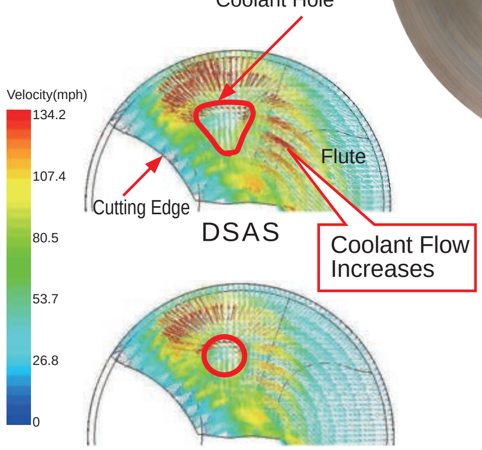
Solid Carbide Drill for Machining Heat Resistant Alloys

DSA Series

TRI-Cooling Technology

The unique hole geometry increases the coolant flow rate, resulting in high lubricity and cooling effect. (available in sizes over : ø.1969 inch or ø 5 mm)

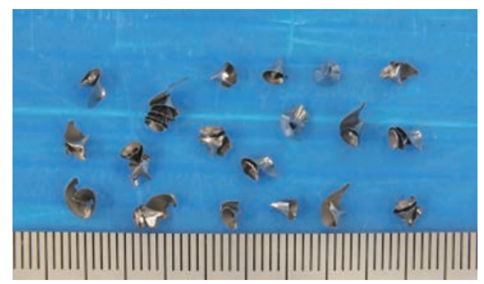




Comparison of Coolant Flow Rate
(Spindle Speed 4700 min^{-1})

Straight Cutting Edge with Single-Pass Honing

The tough straight cutting edge with single-pass honing enables stable chip formation as well as preventing the cutting edge from chipping.



DSAS

Conventional

New Grade for Machining of Heat Resistant Alloys DP9020

New hard grade provides both high wear and fracture resistance, leading to longer tool life.

Special Margin

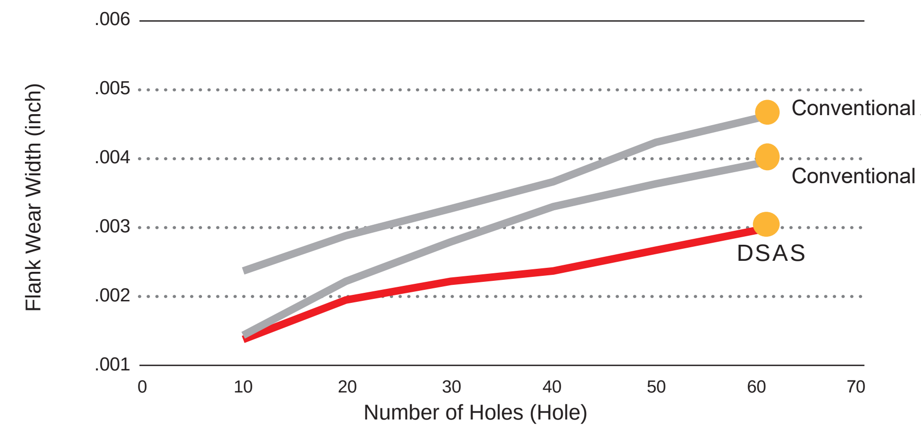
The specially designed thin margin minimizes contact area with hole surface and workpiece materials in combination with tri-cooling technology to reduce cutting heat and prevent the generation of work-hardening making it especially suited for the machining of heat resistant alloys.

M

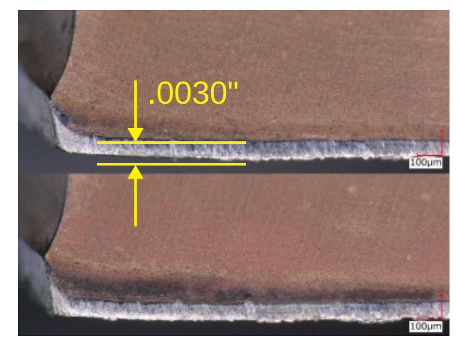
DRILLING

Cutting Performance

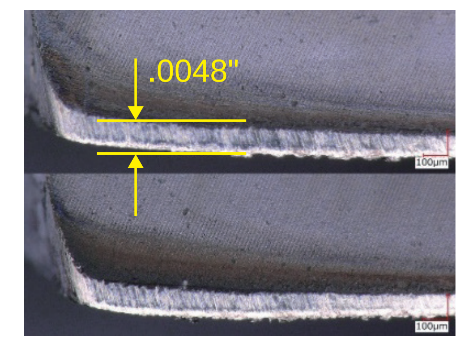
Comparison of Flank Wear Width by Inconel 718



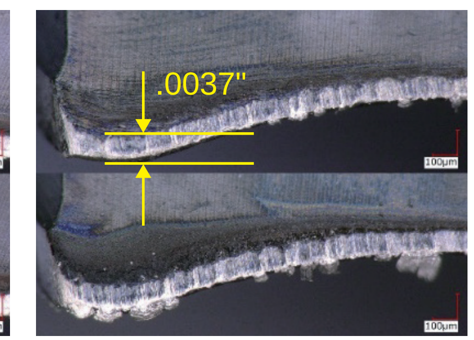
<Cutting Conditions>
Workpiece Material : Inconel 718
Tool : DSAS0700X03S080
Drill Dia. : DC= .2756 inch
Hole Depth : .470 inch (l= DCx 1.7)
Cutting Speed : vc= 50 SFM
Feed per Rev. : fr= .0039 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC



DSAS

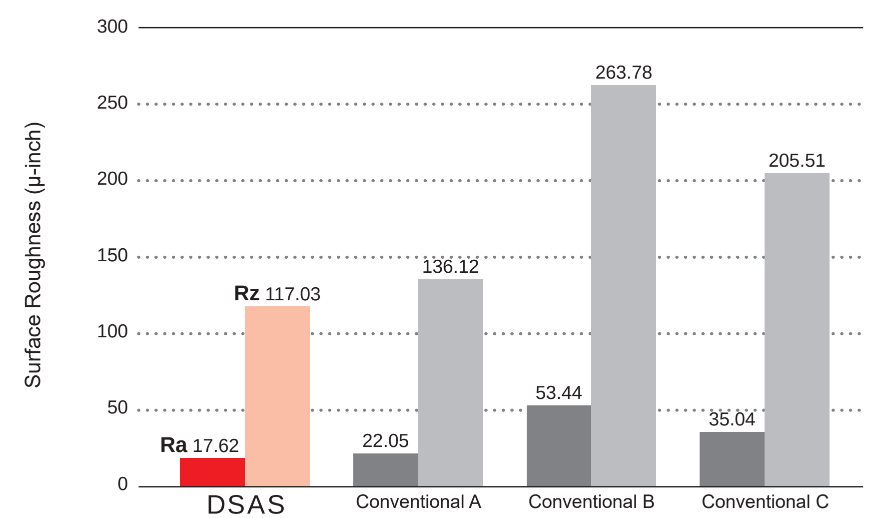


Conventional A



Conventional B

Comparison of Wall Surface Roughness by Inconel 718



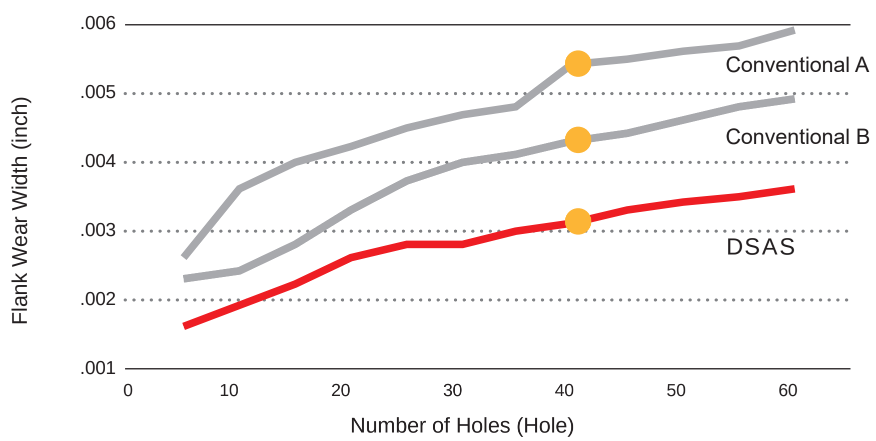
<Cutting Conditions>
Workpiece Material : Inconel 718
Tool : DSAS0700X03S080
Drill Dia. : DC= .2756 inch
Hole Depth : .390 inch (l= DCx 1.4)
Cutting Speed : vc= 50 SFM
Feed per Rev. : fr= .0039 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC

M

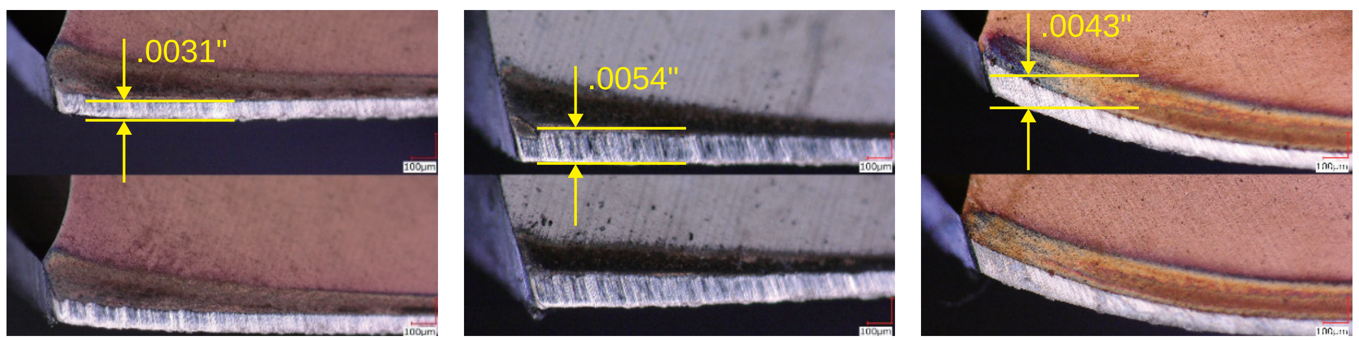
DRILLING

Cutting Performance

Comparison of Flank Wear Width by RENE 41

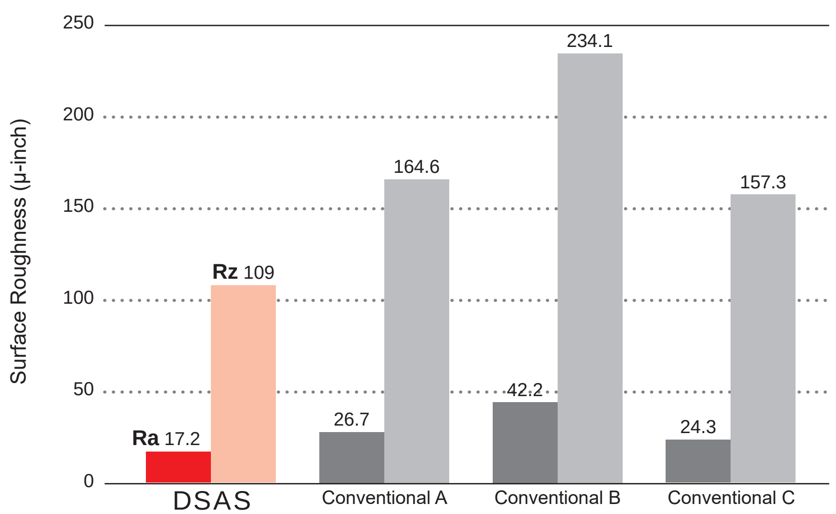


<Cutting Conditions>
Workpiece Material : RENE 41
Tool : DSAS0690X03S080
Drill Dia. : DC= .2717 inch
Hole Depth : .390 inch (l= DCx 1.4)
Cutting Speed : vc= 50 SFM
Feed per Rev. : fr= .0039 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC



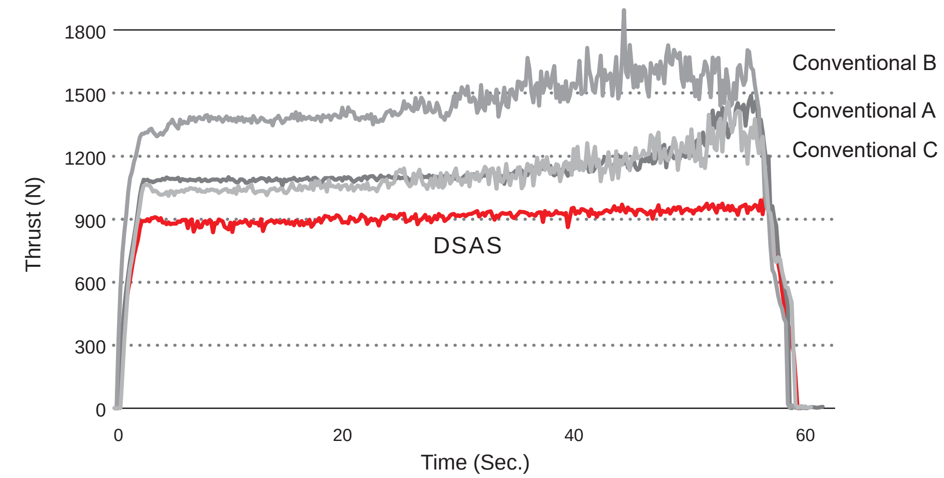
DSAS　Conventional A　Conventional B

Comparison of Wall Surface Roughness by RENE 41



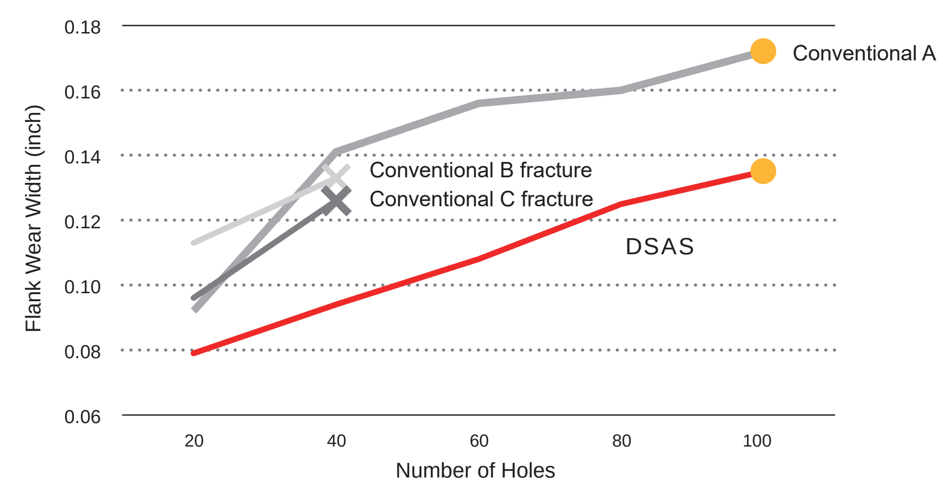
<Cutting Conditions>
Workpiece Material : RENE 41
Tool : DSAS0690X03S080
Drill Dia. : DC= .2717"
Hole Depth : .390 inch (l= DCx 1.4)
Cutting Speed : vc= 50 SFM
Feed per Rev. : fr= .0039 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC

Comparison of Cutting Resistance by Inconel 718 : L/D = 5



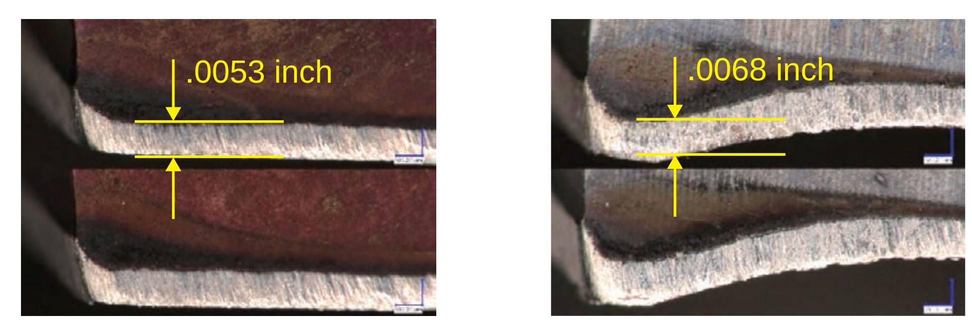
<Cutting Conditions>
Workpiece Material : Inconel 718
Tool : DSAS0600X05S060
Drill Dia. : DC= .2756 inch
Hole Depth : 1.181 inch (l= DCx 5)
Cutting Speed : vc= 30 SFM
Feed per Rev. : fr= .0024 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC

Comparison of Flank Wear Width by Inconel 718 : L/D = 5



<Cutting Conditions>
Workpiece Material : Inconel 718
Tool : DSAS0600X05S060
Drill Dia. : DC= .2756 inch
Hole Depth : 1.181 inch (l= DCx 5)
Cutting Speed : vc= 65 SFM
Feed per Rev. : fr= .0039 IPR
Cutting Mode : Internal Coolant (Water-soluble Coolants)
Machine : Vertical MC

After 100 Hole



DSAS　Conventional A

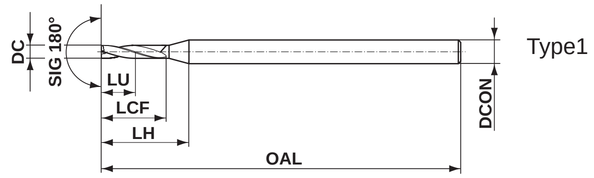
MFE NEW for Small Diameter
SOLID CARBIDE FLAT BOTTOM DRILLS

- Sharp cutting edges with long tool life
- Combination of different radius sizes provides strong cutting edge and excellent chip control

UWC DP1A DP102A 180° XR

P M K N S H

External Coolant



(inch)

.0295≤DC≤.1161			
0 / − .00055			
DCON=.118	.118<DCON≤.157		
0 / − .00024	0 / − .00031		

(inch)

DC					L/D	Stock	Order Number	LU		LCF		LH		OAL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size		DP102A		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
0.750	**.0295**				2	●	**MFE0075X02S030**	1.5	.059	3.0	.118	7.7	.303	45	1.772	3	.118	1
0.800	**.0315**				2	●	**MFE0080X02S030**	1.6	.063	3.2	.126	7.8	.307	45	1.772	3	.118	1
0.850	**.0335**				2	●	**MFE0085X02S030**	1.7	.067	3.4	.134	7.9	.311	45	1.772	3	.118	1
0.900	**.0354**				2	●	**MFE0090X02S030**	1.8	.071	3.6	.142	8.0	.315	45	1.772	3	.118	1
0.950	**.0374**				2	●	**MFE0095X02S030**	1.9	.075	3.8	.150	8.1	.319	45	1.772	3	.118	1
1.000	**.0394**				2	●	**MFE0100X02S030**	2.0	.079	4.0	.157	8.2	.323	45	1.772	3	.118	1
1.050	**.0413**				2	●	**MFE0105X02S030**	2.1	.083	4.2	.165	8.3	.327	45	1.772	3	.118	1
1.100	**.0433**				2	●	**MFE0110X02S030**	2.2	.087	4.4	.173	8.4	.331	45	1.772	3	.118	1
1.150	**.0453**				2	●	**MFE0115X02S030**	2.3	.091	4.6	.181	8.6	.339	45	1.772	3	.118	1
1.200	**.0472**				2	●	**MFE0120X02S030**	2.4	.094	4.8	.189	8.7	.343	45	1.772	3	.118	1
1.250	**.0492**				2	●	**MFE0125X02S030**	2.5	.098	5.0	.197	8.8	.346	45	1.772	3	.118	1
1.300	**.0512**				2	●	**MFE0130X02S030**	2.6	.102	5.2	.205	8.9	.350	45	1.772	3	.118	1
1.350	**.0531**				2	●	**MFE0135X02S030**	2.7	.106	5.4	.213	9.0	.354	45	1.772	3	.118	1
1.400	**.0551**				2	●	**MFE0140X02S030**	2.8	.110	5.6	.220	9.1	.358	45	1.772	3	.118	1
1.450	**.0571**				2	●	**MFE0145X02S030**	2.9	.114	5.8	.228	9.2	.362	45	1.772	3	.118	1
1.500	**.0591**			**#1-64**	2	●	**MFE0150X02S030**	3.0	.118	6.0	.236	9.3	.366	45	1.772	3	.118	1
1.550	**.0610**				2	●	**MFE0155X02S030**	3.1	.122	6.2	.244	9.4	.370	45	1.772	3	.118	1
1.600	**.0630**				2	●	**MFE0160X02S030**	3.2	.126	6.4	.252	9.5	.374	45	1.772	3	.118	1
1.650	**.0650**				2	●	**MFE0165X02S030**	3.3	.130	6.6	.260	9.6	.378	45	1.772	3	.118	1
1.700	**.0669**				2	●	**MFE0170X02S030**	3.4	.134	6.8	.268	9.7	.382	45	1.772	3	.118	1
1.750	**.0689**				2	●	**MFE0175X02S030**	3.5	.138	7.0	.276	9.8	.386	45	1.772	3	.118	1
1.800	**.0709**				2	●	**MFE0180X02S030**	3.6	.142	7.2	.283	9.9	.390	45	1.772	3	.118	1
1.850	**.0728**				2	●	**MFE0185X02S030**	3.7	.146	7.4	.291	10.0	.394	45	1.772	3	.118	1
1.900	**.0748**				2	●	**MFE0190X02S030**	3.8	.150	7.6	.299	10.2	.402	45	1.772	3	.118	1
1.950	**.0768**				2	●	**MFE0195X02S030**	3.9	.154	7.8	.307	10.3	.406	45	1.772	3	.118	1
2.000	**.0787**			**#3-48**	2	●	**MFE0200X02S040**	4.0	.157	8.0	.315	12.2	.480	50	1.969	4	.157	1
2.050	**.0807**				2	●	**MFE0205X02S040**	4.1	.161	8.2	.323	12.3	.484	50	1.969	4	.157	1
2.100	**.0827**				2	●	**MFE0210X02S040**	4.2	.165	8.4	.331	12.4	.488	50	1.969	4	.157	1
2.150	**.0846**				2	●	**MFE0215X02S040**	4.3	.169	8.6	.339	12.6	.496	50	1.969	4	.157	1
2.200	**.0866**				2	●	**MFE0220X02S040**	4.4	.173	8.8	.346	12.7	.500	50	1.969	4	.157	1
2.250	**.0886**				2	●	**MFE0225X02S040**	4.5	.177	9.0	.354	12.8	.504	50	1.969	4	.157	1
2.300	**.0906**				2	●	**MFE0230X02S040**	4.6	.181	9.2	.362	12.9	.508	50	1.969	4	.157	1
2.350	**.0925**				2	●	**MFE0235X02S040**	4.7	.185	9.4	.370	13.0	.512	50	1.969	4	.157	1
2.400	**.0945**				2	●	**MFE0240X02S040**	4.8	.189	9.6	.378	13.1	.516	50	1.969	4	.157	1

● : USA Stock

(inch)

DC					L/D	Stock	Order Number	LU		LCF		LH		OAL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size		DP102A		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
2.450	**.0965**				2	●	**MFE0245X02S040**	4.9	.193	9.8	.386	13.2	.520	50	1.969	4	.157	1
2.500	**.0984**				2	●	**MFE0250X02S040**	5.0	.197	10.0	.394	13.3	.524	50	1.969	4	.157	1
2.550	**.1004**				2	●	**MFE0255X02S040**	5.1	.201	10.2	.402	13.4	.528	50	1.969	4	.157	1
2.600	**.1024**				2	●	**MFE0260X02S040**	5.2	.205	10.4	.409	13.5	.531	50	1.969	4	.157	1
2.650	**.1043**				2	●	**MFE0265X02S040**	5.3	.209	10.6	.417	13.6	.535	50	1.969	4	.157	1
2.700	**.1063**		**36**	**#6-32**	2	●	**MFE0270X02S040**	5.4	.213	10.8	.425	13.7	.539	50	1.969	4	.157	1
2.750	**.1083**				2	●	**MFE0275X02S040**	5.5	.217	11.0	.433	13.8	.543	50	1.969	4	.157	1
2.800	**.1102**		**35**		2	●	**MFE0280X02S040**	5.6	.220	11.2	.441	13.9	.547	50	1.969	4	.157	1
2.850	**.1122**				2	●	**MFE0285X02S040**	5.7	.224	11.4	.449	14.0	.551	50	1.969	4	.157	1
2.900	**.1142**				2	●	**MFE0290X02S040**	5.8	.228	11.6	.457	14.2	.559	50	1.969	4	.157	1
2.950	**.1161**		**32**		2	●	**MFE0295X02S040**	5.9	.232	11.8	.465	14.3	.563	50	1.969	4	.157	1

MFE

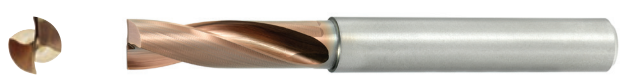
SOLID CARBIDE FLAT BOTTOM DRILLS

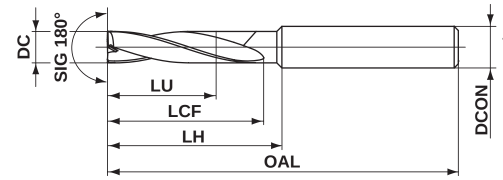
- Sharp cutting edges with long tool life
- Combination of different radius sizes provides strong cutting edge and excellent chip control

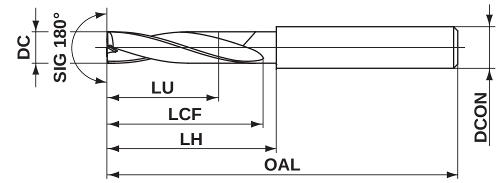
UWC DP1 180°

P M K N S H

External Coolant







(inch)

	.118≤DC≤.236	.236 < DC≤.394	.394 < DC≤.709	.709 < DC≤.787
DC	0 / −.00047	0 / −.00059	0 / −.00071	0 / −.00083
	DCON=.236	.315, .394	.472, .551, .630, .709	.787
h6	0 / −.00031	0 / −.00035	0 / −.00043	0 / −.00051

(inch)

DC					L/D	Stock	Order Number	LU		LCF		LH		OAL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size		DP1020		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
3.000	.1181				2	●	MFE0300X02S060	6.0	.236	12	.472	19.6	.772	55	2.165	6	.236	1
3.048	.1200		31		2	●	MFE0305X02S060	6.1	.240	14	.551	21.5	.846	55	2.165	6	.236	1
3.100	.1220				2	●	MFE0310X02S060	6.2	.244	14	.551	21.4	.843	55	2.165	6	.236	1
3.175	.1250	1/8			2	●	MFE0318X02S060	6.4	.252	14	.551	21.3	.839	55	2.165	6	.236	1
3.200	.1260				2	●	MFE0320X02S060	6.4	.252	14	.551	21.2	.835	55	2.165	6	.236	1
3.300	.1299			M4x.7	2	●	MFE0330X02S060	6.6	.260	14	.551	21.0	.827	55	2.165	6	.236	1
3.400	.1339				2	●	MFE0340X02S060	6.8	.268	14	.551	20.9	.823	55	2.165	6	.236	1
3.500	.1378				2	●	MFE0350X02S060	7.0	.276	14	.551	20.7	.815	55	2.165	6	.236	1
3.572	.1407	9/64			2	●	MFE0357X02S060	7.1	.280	16	.630	22.5	.886	55	2.165	6	.236	1
3.600	.1417				2	●	MFE0360X02S060	7.2	.283	16	.630	22.5	.886	55	2.165	6	.236	1
3.700	.1457			M4.5x.75	2	●	MFE0370X02S060	7.4	.291	16	.630	22.3	.878	55	2.165	6	.236	1
3.800	.1496		25	#10-24	2	●	MFE0380X02S060	7.6	.299	16	.630	22.1	.870	55	2.165	6	.236	1
3.900	.1535				2	●	MFE0390X02S060	7.8	.307	16	.630	21.9	.862	55	2.165	6	.236	1
3.969	.1563	5/32			2	●	MFE0397X02S060	7.9	.311	16	.630	21.8	.858	55	2.165	6	.236	1
4.000	.1575				2	●	MFE0400X02S060	8.0	.315	16	.630	21.7	.854	55	2.165	6	.236	1
4.039	.1590		21	#10-32	2	●	MFE0404X02S060	8.1	.319	18	.709	23.7	.933	62	2.441	6	.236	1
4.100	.1614				2	●	MFE0410X02S060	8.2	.323	18	.709	23.5	.925	62	2.441	6	.236	1
4.200	.1654			M5x.8	2	●	MFE0420X02S060	8.4	.331	18	.709	23.4	.921	62	2.441	6	.236	1
4.300	.1693				2	●	MFE0430X02S060	8.6	.339	18	.709	23.2	.913	62	2.441	6	.236	1
4.366	.1719	11/64			2	●	MFE0437X02S060	8.7	.343	18	.709	23.0	.906	62	2.441	6	.236	1
4.400	.1732		17		2	●	MFE0440X02S060	8.8	.346	18	.709	23.0	.906	62	2.441	6	.236	1
4.500	.1772		16	#12-24	2	●	MFE0450X02S060	9.0	.354	18	.709	22.8	.898	62	2.441	6	.236	1
4.600	.1811				2	●	MFE0460X02S060	9.2	.362	20	.787	23.7	.933	62	2.441	6	.236	1
4.700	.1850		13		2	●	MFE0470X02S060	9.4	.370	20	.787	23.7	.933	62	2.441	6	.236	1
4.763	.1875	3/16			2	●	MFE0476X02S060	9.5	.374	20	.787	23.6	.929	62	2.441	6	.236	1
4.800	.1890		12		2	●	MFE0480X02S060	9.6	.378	20	.787	23.6	.929	62	2.441	6	.236	1
4.900	.1929				2	●	MFE0490X02S060	9.8	.386	20	.787	23.6	.929	62	2.441	6	.236	1
5.000	.1969			M6x1.0	2	●	MFE0500X02S060	10.0	.394	20	.787	23.5	.925	62	2.441	6	.236	1
5.100	.2008		7	1/4-20	2	●	MFE0510X02S060	10.2	.402	22	.866	25.5	1.004	62	2.441	6	.236	1
5.160	.2032	13/64			2	●	MFE0516X02S060	10.3	.406	22	.866	25.4	1.000	62	2.441	6	.236	1
5.200	.2047				2	●	MFE0520X02S060	10.4	.409	22	.866	25.4	1.000	62	2.441	6	.236	1
5.300	.2087				2	●	MFE0530X02S060	10.6	.417	22	.866	25.4	1.000	62	2.441	6	.236	1
5.400	.2126		3	1/4-28	2	●	MFE0540X02S060	10.8	.425	22	.866	25.3	.996	62	2.441	6	.236	1
5.500	.2165				2	●	MFE0550X02S060	11.0	.433	22	.866	25.3	.996	62	2.441	6	.236	1
5.557	.2188	7/32			2	●	MFE0556X02S060	11.1	.437	24	.945	27.2	1.071	62	2.441	6	.236	1
5.600	.2205		2		2	●	MFE0560X02S060	11.2	.441	24	.945	27.2	1.071	62	2.441	6	.236	1
5.700	.2244				2	●	MFE0570X02S060	11.4	.449	24	.945	27.2	1.071	62	2.441	6	.236	1
5.800	.2283		1		2	●	MFE0580X02S060	11.6	.457	24	.945	27.1	1.067	62	2.441	6	.236	1
5.900	.2323				2	●	MFE0590X02S060	11.8	.465	24	.945	27.1	1.067	62	2.441	6	.236	1
5.954	.2344	15/64	A		2	●	MFE0595X02S060	11.9	.469	24	.945	27.0	1.063	62	2.441	6	.236	1
6.000	.2362			M7x1.0	2	●	MFE0600X02S060	12.0	.472	24	.945	27.0	1.063	62	2.441	6	.236	1
NEW 6.100	.2402				2	★	MFE0610X02S070	12.2	.480	26	1.024	29.5	1.161	74	2.913	7	.276	1
6.100	.2402				2	●	MFE0610X02S080	12.2	.480	26	1.024	30.0	1.181	74	2.913	8	.315	1
NEW 6.200	.2441				2	★	MFE0620X02S070	12.4	.488	26	1.024	29.4	1.157	74	2.913	7	.276	1
6.200	.2441				2	●	MFE0620X02S080	12.4	.488	26	1.024	29.9	1.177	74	2.913	8	.315	1
NEW 6.300	.2480				2	★	MFE0630X02S070	12.6	.496	26	1.024	29.4	1.157	74	2.913	7	.276	1
6.300	.2480				2	●	MFE0630X02S080	12.6	.496	26	1.024	29.9	1.177	74	2.913	8	.315	1
6.350	.2500	1/4	E		2	●	MFE0635X02S080	12.7	.500	26	1.024	29.8	1.173	74	2.913	8	.315	1
NEW 6.400	.2520				2	★	MFE0640X02S070	12.8	.504	26	1.024	29.3	1.154	74	2.913	7	.276	1
6.400	.2520				2	●	MFE0640X02S080	12.8	.504	26	1.024	29.8	1.173	74	2.913	8	.315	1
NEW 6.500	.2559				2	★	MFE0650X02S070	13.0	.512	26	1.024	29.3	1.154	74	2.913	7	.276	1
6.500	.2559				2	●	MFE0650X02S080	13.0	.512	26	1.024	29.8	1.173	74	2.913	8	.315	1
6.528	.2570		F	5/16-18	2	●	MFE0653X02S080	13.1	.516	28	1.102	31.7	1.248	74	2.913	8	.315	1
NEW 6.600	.2598				2	★	MFE0660X02S070	13.2	.520	28	1.102	31.2	1.228	74	2.913	7	.276	1
6.600	.2598				2	●	MFE0660X02S080	13.2	.520	28	1.102	31.7	1.248	74	2.913	8	.315	1
NEW 6.700	.2638			M8x1.25	2	★	MFE0670X02S070	13.4	.528	28	1.102	31.2	1.228	74	2.913	7	.276	1
6.700	.2638			M8x1.25	2	●	MFE0670X02S080	13.4	.528	28	1.102	31.7	1.248	74	2.913	8	.315	1
6.747	.2657	17/64			2	●	MFE0675X02S080	13.5	.531	28	1.102	31.6	1.244	74	2.913	8	.315	1
NEW 6.800	.2677				2	★	MFE0680X02S070	13.6	.535	28	1.102	31.1	1.224	74	2.913	7	.276	1
6.800	.2677				2	●	MFE0680X02S080	13.6	.535	28	1.102	31.6	1.244	74	2.913	8	.315	1
NEW 6.900	.2717		I	5/16-24	2	★	MFE0690X02S070	13.8	.543	28	1.102	31.1	1.224	74	2.913	7	.276	1
6.900	.2717		I	5/16-24	2	●	MFE0690X02S080	13.8	.543	28	1.102	31.6	1.244	74	2.913	8	.315	1
NEW 7.000	.2756			M8x1.0	2	★	MFE0700X02S070	14.0	.551	28	1.102	31.0	1.220	74	2.913	7	.276	1
7.000	.2756			M8x1.0	2	●	MFE0700X02S080	14.0	.551	28	1.102	31.5	1.240	74	2.913	8	.315	1
7.100	.2795				2	●	MFE0710X02S080	14.2	.559	30	1.181	33.5	1.319	74	2.913	8	.315	1
7.144	.2813	9/32	K		2	●	MFE0714X02S080	14.3	.563	30	1.181	33.4	1.315	74	2.913	8	.315	1
7.200	.2835				2	●	MFE0720X02S080	14.4	.567	30	1.181	33.4	1.315	74	2.913	8	.315	1
7.300	.2874				2	●	MFE0730X02S080	14.6	.575	30	1.181	33.4	1.315	74	2.913	8	.315	1
7.400	.2913				2	●	MFE0740X02S080	14.8	.583	30	1.181	33.3	1.311	74	2.913	8	.315	1
7.500	.2953		M		2	●	MFE0750X02S080	15.0	.591	30	1.181	33.3	1.311	74	2.913	8	.315	1
7.541	.2969	19/64			2	●	MFE0754X02S080	15.1	.594	32	1.260	35.2	1.386	74	2.913	8	.315	1
7.600	.2992				2	●	MFE0760X02S080	15.2	.598	32	1.260	35.2	1.386	74	2.913	8	.315	1
7.700	.3031				2	●	MFE0770X02S080	15.4	.606	32	1.260	35.2	1.386	74	2.913	8	.315	1
7.800	.3071				2	●	MFE0780X02S080	15.6	.614	32	1.260	35.1	1.382	74	2.913	8	.315	1
7.900	.3110				2	●	MFE0790X02S080	15.8	.622	32	1.260	35.1	1.382	74	2.913	8	.315	1
7.938	.3125	5/16		3/8-16	2	●	MFE0794X02S080	15.9	.626	32	1.260	35.0	1.378	74	2.913	8	.315	1

● : USA Stock ★ : Stocked in Japan

MFE

(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	DCON mm	DCON inch	Type
8.000	**.3150**				2	●	**MFE0800X02S080**	16.0	.630	32	1.260	35.0	1.378	74	2.913	8	.315	1
8.100	**.3189**				2	●	**MFE0810X02S100**	16.2	.638	34	1.339	38.0	1.496	84	3.307	10	.394	1
8.200	**.3228**		**P**		2	●	**MFE0820X02S100**	16.4	.646	34	1.339	37.9	1.492	84	3.307	10	.394	1
8.300	**.3268**				2	●	**MFE0830X02S100**	16.6	.654	34	1.339	37.9	1.492	84	3.307	10	.394	1
8.335	**.3282**	**21/64**			2	●	**MFE0833X02S100**	16.7	.657	34	1.339	37.8	1.488	84	3.307	10	.394	1
8.400	**.3307**				2	●	**MFE0840X02S100**	16.8	.661	34	1.339	37.8	1.488	84	3.307	10	.394	1
8.433	**.3320**		**Q**	3/8-24	2	●	**MFE0843X02S100**	16.9	.665	34	1.343	37.8	1.488	84	3.307	10	.394	1
8.500	**.3346**			M10x1.5	2	●	**MFE0850X02S100**	17.0	.669	34	1.339	37.8	1.488	84	3.307	10	.394	1
8.600	**.3386**		**R**		2	●	**MFE0860X02S100**	17.2	.677	36	1.417	39.7	1.563	84	3.307	10	.394	1
8.700	**.3425**			M10x1.25	2	●	**MFE0870X02S100**	17.4	.685	36	1.417	39.7	1.563	84	3.307	10	.394	1
8.732	**.3438**	**11/32**			2	●	**MFE0873X02S100**	17.5	.689	36	1.417	39.6	1.559	84	3.307	10	.394	1
8.800	**.3465**				2	●	**MFE0880X02S100**	17.6	.693	36	1.417	39.6	1.559	84	3.307	10	.394	1
8.900	**.3504**				2	●	**MFE0890X02S100**	17.8	.701	36	1.417	39.6	1.559	84	3.307	10	.394	1
9.000	**.3543**				2	●	**MFE0900X02S100**	18.0	.709	36	1.417	39.5	1.555	84	3.307	10	.394	1
9.100	**.3583**		**T**		2	●	**MFE0910X02S100**	18.2	.717	38	1.496	41.5	1.634	84	3.307	10	.394	1
9.129	**.3594**	**23/64**			2	●	**MFE0913X02S100**	18.3	.720	38	1.496	41.4	1.630	84	3.307	10	.394	1
9.200	**.3622**				2	●	**MFE0920X02S100**	18.4	.724	38	1.496	41.4	1.630	84	3.307	10	.394	1
9.300	**.3661**				2	●	**MFE0930X02S100**	18.6	.732	38	1.496	41.4	1.630	84	3.307	10	.394	1
9.348	**.3680**		**U**	7/16-14	2	●	**MFE0935X02S100**	18.7	.736	38	1.496	41.3	1.626	84	3.307	10	.394	1
9.400	**.3701**				2	●	**MFE0940X02S100**	18.8	.740	38	1.496	41.3	1.626	84	3.307	10	.394	1
9.500	**.3740**				2	●	**MFE0950X02S100**	19.0	.748	38	1.496	41.3	1.626	84	3.307	10	.394	1
9.525	**.3750**	**3/8**			2	●	**MFE0953X02S100**	19.1	.752	40	1.575	43.2	1.701	84	3.307	10	.394	1
9.600	**.3780**				2	●	**MFE0960X02S100**	19.2	.756	40	1.575	43.2	1.701	84	3.307	10	.394	1
9.700	**.3819**		Tube Sheet		2	●	**MFE0970X02S100**	19.4	.764	40	1.575	43.2	1.701	84	3.307	10	.394	1
9.800	**.3858**		**W**		2	●	**MFE0980X02S100**	19.6	.772	40	1.575	43.1	1.697	84	3.307	10	.394	1
9.900	**.3898**				2	●	**MFE0990X02S100**	19.8	.780	40	1.575	43.1	1.697	84	3.307	10	.394	1
9.922	**.3907**	**25/64**		7/16-20	2	●	**MFE0992X02S100**	19.8	.780	40	1.575	43.0	1.693	84	3.307	10	.394	1
10.000	**.3937**				2	●	**MFE1000X02S100**	20.0	.787	40	1.575	43.0	1.693	84	3.307	10	.394	1

● : USA Stock

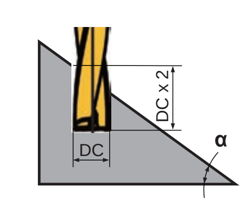
RECOMMENDED CUTTING CONDITIONS

(inch)

Work Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180—280HB) AISI 1045, 4140 etc.		Carbon Steel, Alloy Steel (280—350HB) AISI 4340 etc.	
DC inch	DC mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.0295	0.75	180	.0012 (.0004—.0020)	150	.0012 (.0004—.0020)	130	.0012 (.0004—.0020)
.0394	1.0	180	.0012 (.0004—.0020)	150	.0012 (.0004—.0020)	130	.0012 (.0004—.0020)
.0591	1.5	190	.0014 (.0006—.0022)	155	.0014 (.0006—.0022)	130	.0014 (.0006—.0020)
.0787	2.0	195	.0016 (.0008—.0024)	165	.0016 (.0008—.0024)	140	.0016 (.0008—.0024)
.0984	2.5	205	.0020 (.0012—.0028)	170	.0020 (.0012—.0028)	150	.0020 (.0012—.0028)
.1181	3.0	245	.0024 (.0016—.0031)	245	.0024 (.0016—.0031)	210	.0024 (.0016—.0031)
.1575	4.0	245	.0031 (.0024—.0039)	245	.0031 (.0024—.0039)	210	.0031 (.0024—.0039)
.1969	5.0	245	.0039 (.0031—.0051)	245	.0039 (.0031—.0051)	210	.0039 (.0031—.0051)
.2362	6.0	245	.0051 (.0039—.0059)	245	.0051 (.0039—.0059)	210	.0051 (.0039—.0059)
.3150	8.0	245	.0059 (.0051—.0067)	245	.0059 (.0051—.0067)	210	.0059 (.0051—.0067)
.3937	10.0	245	.0067 (.0059—.0079)	245	.0067 (.0059—.0079)	210	.0067 (.0059—.0079)

Work Material		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.		Gray Cast Iron (≤350MPa) AISI No45B etc.		Ductile Cast Iron (≤450MPa) AISI 60-40-18 etc.	
DC inch	DC mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.0295	0.75	80	.0003 (.0001—.0004)	180	.0012 (.0004—.0020)	130	.0004 (.0002—.0006)
.0394	1.0	80	.0003 (.0001—.0004)	180	.0012 (.0004—.0020)	130	.0004 (.0002—.0006)
.0591	1.5	80	.0004 (.0002—.0006)	190	.0014 (.0006—.0022)	155	.0008 (.0004—.0012)
.0787	2.0	100	.0006 (.0004—.0008)	195	.0016 (.0008—.0024)	180	.0012 (.0006—.0018)
.0984	2.5	100	.0006 (.0004—.0008)	205	.0020 (.0012—.0028)	190	.0018 (.0010—.0026)
.1181	3.0	100	.0008 (.0004—.0012)	245	.0024 (.0016—.0031)	210	.0020 (.0016—.0024)
.1575	4.0	100	.0012 (.0008—.0016)	245	.0031 (.0024—.0039)	230	.0024 (.0020—.0031)
.1969	5.0	100	.0016 (.0012—.0020)	245	.0039 (.0031—.0047)	230	.0031 (.0024—.0039)
.2362	6.0	100	.0020 (.0016—.0024)	245	.0047 (.0039—.0055)	230	.0039 (.0031—.0047)
.3150	8.0	100	.0024 (.0020—.0031)	245	.0055 (.0047—.0063)	230	.0047 (.0039—.0059)
.3937	10.0	100	.0031 (.0024—.0039)	245	.0063 (.0055—.0071)	230	.0059 (.0047—.0071)

Work Material		Aluminum Alloy (Si<5%) AISI 6061, 7075 etc.	
DC inch	DC mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.0295	0.75	330	.0008 (.0004—.0012)
.0394	1.0	330	.0008 (.0004—.0012)
.0591	1.5	330	.0008 (.0004—.0012)
.0787	2.0	360	.0020 (.0012—.0028)
.0984	2.5	360	.0024 (.0016—.0035)
.1181	3.0	360	.0024 (.0016—.0035)
.1575	4.0	360	.0031 (.0024—.0039)
.1969	5.0	360	.0039 (.0031—.0051)
.2362	6.0	360	.0051 (.0039—.0063)
.3150	8.0	360	.0063 (.0051—.0079)
.3937	10.0	360	.0079 (.0063—.0094)



Note 1) The recommended hole depth is DCx2. This should be the depth from the uppermost surface of the work material when machining on an angled surface. (Refer to diagram)
Note 2) The above cutting table assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, adjust the feed rate to 70% or lower as a guideline.
When the inclination angle α is greater than 30°, adjust the feed rate to 50% or lower as a guideline.
Note 3) This product is a tool intended for hole drilling. It cannot be used for cross-feed machining or helical machining.

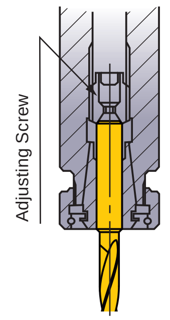
M DRILLING

M DRILLING

MFE

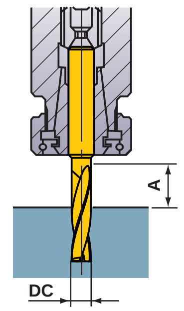
OPERATIONAL GUIDANCE

Drill Holding



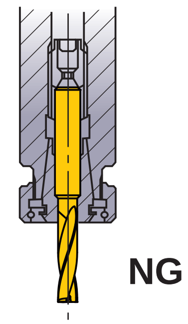
Thrust bearing type collet chuck holds the drill securely.

Drill Length



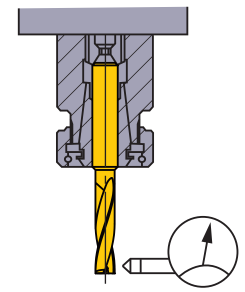
A > DC x 1.5

Drill Installation



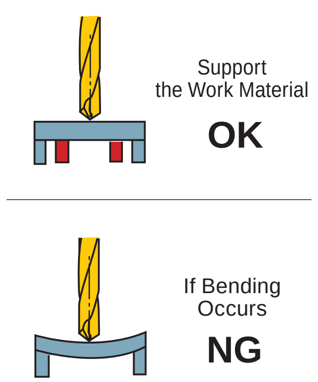
Do not clamp on the flutes.

Installation Tolerance

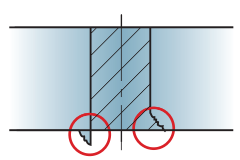


Run-out ≤ .0012 inch

Thin Work Material

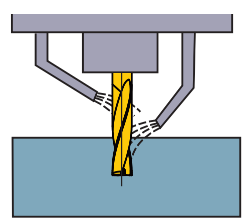


Burring and Work Material Chipping



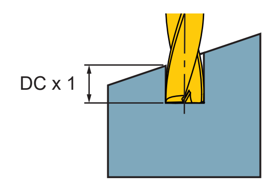
①Lower the feed rate by 50% at the end of through cutting.
②Add a chamfer.

Coolant Method (MFE)



Two coolant positions, at the end and at the center are ideal.

Inclined Face Drilling

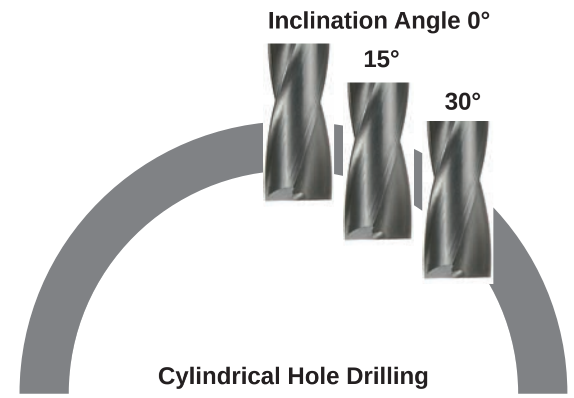


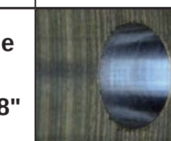
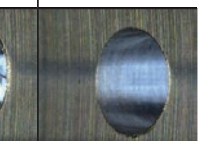
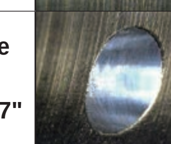
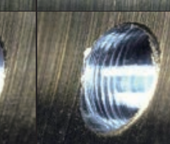
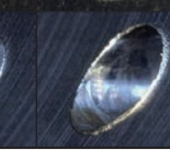
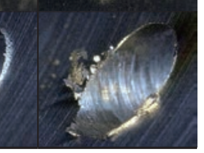
① When machining a deep hole into an inclined surface, use MFE drill (L/D=2) as a drill for a guide hole.
② Set the drill depth at approx. DC x 1 to obtain anaccurate guide hole.

Cutting Performance

Comparison of Exit Burrs Generated in AISI 304

The unique cutting edge shape suppresses the formation of exit burrs.

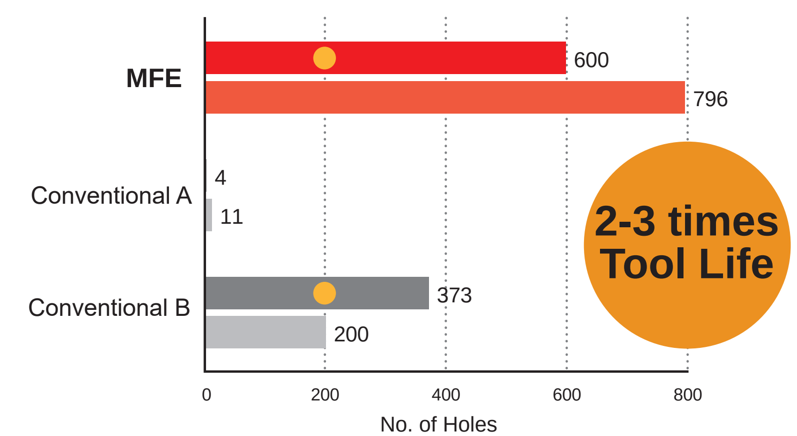


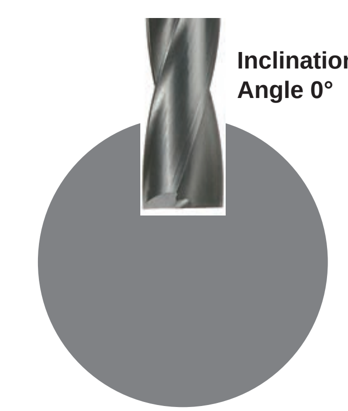
	MFE	Conventional A	Conventional B
Inclination Angle 0° Hole Depth=.158"			
Inclination Angle 15° Hole Depth≒.197"			
Inclination Angle 30° Hole Depth≒.276"			

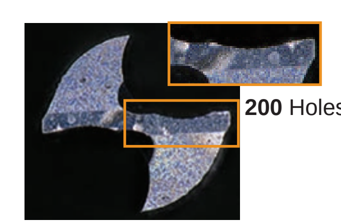
<Cutting Conditions>
Drill : MFE0200X02S040
Work Material : AISI 304
Cutting Speed : **vc**=100 SFM
Feed per Rev. : **fr**=.0004 IPR
Cutting Mode : Wet Cutting
External Coolant (Water-soluble)
Machine : Vertical MC (BT40)

Comparison of Tool Life when Used on AISI 304

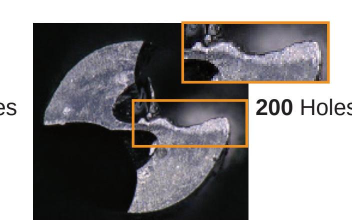
Excellent fracture resistance is achieved even when hole drilling cylindrical surfaces using small automatic lathes.







MFE



Conventional B

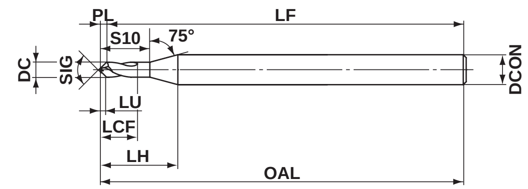
<Cutting Conditions>
Drill : MFE0080X02S030
Work Material : AISI 304
Cutting Speed : **vc**=50 SFM
Feed per Rev. : **fr**=.0004 IPR
Cutting Mode : Wet Cutting
External Coolant (Water-insoluble)
Machine : Small Automatic Lathes

DLE

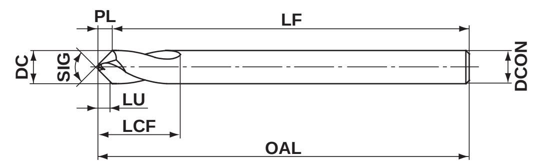
Leading Drill Series

P | M | K | N | S | H

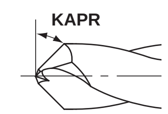
External Coolant



Type1



Type2



(mm)

h7	DCON=3	3＜DCON≦6	6＜DCON≦10	10＜DCON≦16
	0 / −0.010	0 / −0.012	0 / −0.015	0 / −0.018

(inch)

h7	DCON=.1181	.1181＜DCON≦.2362	.2362＜DCON≦.3937	.3937＜DCON≦.6299
	0 / −.0004	0 / −.0005	0 / −.0006	0 / −.0007

	DC		SIG	Stock		Order Number	LU		LCF		LH		S10		OAL		LF		PL		KAPR	DCON		Fig.
	(mm)	(inch)		DP1020	DP102A		(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)		(mm)	(inch)	
	3.0	.1181	60°	●		**DLE0300S030P060**	2.0	.079	9	.354	–	–	–	–	45	1.772	42.9	1.689	2.1	.083	60°	3	.118	2
	4.0	.1575	60°	●		**DLE0400S040P060**	2.7	.106	12	.472	–	–	–	–	50	1.969	47.2	1.858	2.8	.110	60°	4	.157	2
	5.0	.1969	60°	●		**DLE0500S050P060**	3.4	.134	14	.551	–	–	–	–	60	2.362	56.5	2.224	3.5	.138	60°	5	.197	2
	6.0	.2362	60°	●		**DLE0600S060P060**	4.0	.157	15	.591	–	–	–	–	66	2.598	61.8	2.433	4.2	.165	60°	6	.236	2
	7.0	.2756	60°	●		**DLE0700S070P060**	4.7	.185	18	.709	–	–	–	–	74	2.913	69.1	2.720	4.9	.193	60°	7	.276	2
	8.0	.3150	60°	●		**DLE0800S080P060**	5.4	.213	20	.787	–	–	–	–	74	2.913	68.4	2.693	5.6	.220	60°	8	.315	2
	10.0	.3937	60°	●		**DLE1000S100P060**	6.8	.268	24	.945	–	–	–	–	84	3.307	77	3.031	7.0	.276	60°	10	.394	2
	12.0	.4724	60°	●		**DLE1200S120P060**	8.1	.319	28	1.102		–	–	–	95	3.740	86.6	3.409	8.4	.331	60°	12	.472	2
NEW	1.0	.0394	90°		●	**DLE0100S030P090**	0.35	.014	2	.079	6.7	.264	3.0	.118	45	1.772	44.6	1.756	0.4	.016	45°	3	.118	1
NEW	1.5	.0591	90°		●	**DLE0150S030P090**	0.55	.022	3	.118	7.3	.287	4.5	.177	45	1.772	44.4	1.748	0.6	.024	45°	3	.118	1
NEW	2.0	.0787	90°		●	**DLE0200S030P090**	0.80	.031	4	.157	7.9	.311	6.1	.240	45	1.772	44.1	1.736	0.9	.035	45°	3	.118	1
NEW	2.5	.0984	90°		●	**DLE0250S030P090**	1.00	.039	5	.197	7.9	.311	7.1	.280	45	1.772	43.9	1.728	1.1	.043	45°	3	.118	1
	3.0	.1181	90°	●		**DLE0300S030P090**	1.2	.047	9	.354	–	–	–	–	45	1.772	43.7	1.720	1.3	.051	45°	3	.118	2
	4.0	.1575	90°	●		**DLE0400S040P090**	1.6	.063	12	.472	–	–	–	–	50	1.969	48.3	1.902	1.7	.067	45°	4	.157	2
	5.0	.1969	90°	●		**DLE0500S050P090**	2.0	.079	14	.551	–	–	–	–	60	2.362	57.9	2.280	2.1	.083	45°	5	.197	2
	6.0	.2362	90°	●		**DLE0600S060P090**	2.4	.094	15	.591	–	–	–	–	66	2.598	63.4	2.496	2.6	.102	45°	6	.236	2
	7.0	.2756	90°	●		**DLE0700S070P090**	2.8	.110	18	.709	–	–	–	–	74	2.913	71.0	2.795	3.0	.118	45°	7	.276	2
	8.0	.3150	90°	●		**DLE0800S080P090**	3.2	.126	20	.787	–	–	–	–	74	2.913	70.6	2.780	3.4	.134	45°	8	.315	2
	10.0	.3937	90°	●		**DLE1000S100P090**	4.1	.161	24	.945	–	–	–	–	84	3.307	79.7	3.138	4.3	.169	45°	10	.394	2
	12.0	.4724	90°	●		**DLE1200S120P090**	4.9	.193	28	1.102	–	–	–	–	95	3.740	89.9	3.539	5.1	.201	45°	12	.472	2
	16.0	.6299	90°	●		**DLE1600S160P090**	6.6	.260	35	1.378	–	–	–	–	113	4.449	106.2	4.181	6.8	.268	45°	16	.630	2

Note 1) In the region of roughly **DC**/4, which is the region of the two-step point angles, the central area will not have a 60°, 90° bottom hole angle. Chamfering will also not be possible in this region.

Note 2) The centering diameter should be less than the drill diameter (processing diameter) **DC** and the usable length **LU** should be referred to as a guideline.

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter
SIG = Point Angle

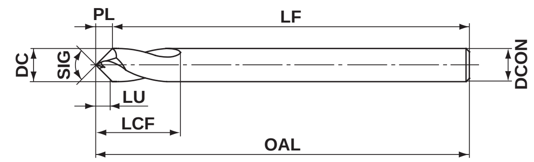
● : USA Stock

M
DRILLING

DLE
Leading Drill Series

P | M | K | N | S | H

External Coolant

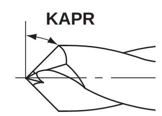


(mm)

h7	DCON=3	3＜DCON≦6	6＜DCON≦10	10＜DCON≦16
	0 −0.010	0 −0.012	0 −0.015	0 −0.018

(inch)

h7	DCON=.1181	.1181＜DCON≦.2362	.2362＜DCON≦.3937	.3937＜DCON≦.6299
	0 −.0004	0 −.0005	0 −.0006	0 −.0007



DC		SIG	DP1020	Order Number	LU		LCF		OAL		LF		PL		KAPR	DCON	
(mm)	(inch)				(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)		(mm)	(inch)
3.0	.1181	120°	●	DLE0300S030P120	0.8	.031	9	.354	45	1.772	44.1	1.736	0.9	.035	30°	3	.118
4.0	.1575	120°	●	DLE0400S040P120	1.1	.043	12	.472	50	1.969	48.8	1.921	1.2	.047	30°	4	.157
5.0	.1969	120°	●	DLE0500S050P120	1.3	.051	14	.551	60	2.362	58.6	2.307	1.4	.055	30°	5	.197
6.0	.2362	120°	●	DLE0600S060P120	1.6	.063	15	.591	66	2.598	64.3	2.531	1.7	.067	30°	6	.236
7.0	.2756	120°	●	DLE0700S070P120	1.9	.075	18	.709	74	2.913	72.0	2.835	2.0	.079	30°	7	.276
8.0	.3150	120°	●	DLE0800S080P120	2.2	.087	20	.787	74	2.913	71.7	2.823	2.3	.091	30°	8	.315
10.0	.3937	120°	●	DLE1000S100P120	2.8	.110	24	.945	84	3.307	81.1	3.193	2.9	.114	30°	10	.394
12.0	.4724	120°	●	DLE1200S120P120	3.3	.130	28	1.102	95	3.740	91.5	3.602	3.5	.138	30°	12	.472
3.0	.1181	145°	●	DLE0300S030P145	0.4	.016	9	.354	45	1.772	44.5	1.752	0.5	.020	17.5°	3	.118
4.0	.1575	145°	●	DLE0400S040P145	0.5	.020	12	.472	50	1.969	49.4	1.945	0.6	.024	17.5°	4	.157
5.0	.1969	145°	●	DLE0500S050P145	0.7	.028	14	.551	60	2.362	59.2	2.331	0.8	.031	17.5°	5	.197
6.0	.2362	145°	●	DLE0600S060P145	0.8	.031	15	.591	66	2.598	65.1	2.563	0.9	.035	17.5°	6	.236
7.0	.2756	145°	●	DLE0700S070P145	1.0	.039	18	.709	74	2.913	72.9	2.870	1.1	.043	17.5°	7	.276
8.0	.3150	145°	●	DLE0800S080P145	1.1	.043	20	.787	74	2.913	72.7	2.862	1.3	.051	17.5°	8	.315
NEW 10.0	.3937	145°	●	DLE1000S100P145	1.4	.055	24	.945	84	3.307	82.4	3.244	1.6	.063	17.5°	10	.394
NEW 12.0	.4724	145°	●	DLE1200S120P145	1.7	.067	28	1.102	95	3.740	93.1	3.665	1.9	.075	17.5°	12	.472

Note 1) The centering diameter should be less than the drill diameter (processing diameter) **DC** and the usable length **LU** should be referred to as a guideline.

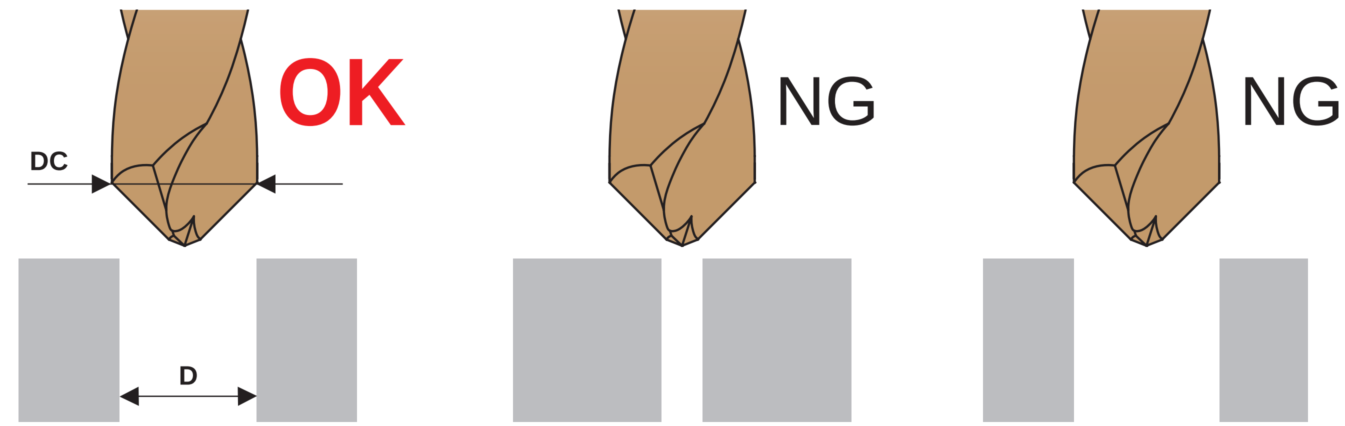
DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter
SIG = Point Angle

● : USA Stock

Drill Diameter Selection

When Chamfering

With respect to guide hole diameter **D**, select the drill diameter (cutting diameter) **DC** to be within the range of **D** < **DC** < 2**D**.



If DC is equal to or greater than 2D:

If DC is a drill diameter equal to D:

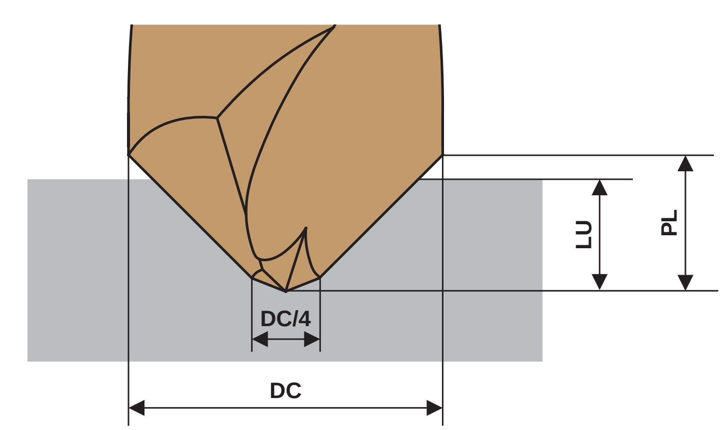
Example) If guide hole diameter **D** is .197": Drill diameter **DC** should be equal to or greater than .236" but less than .394". Select a **DC** of .236", .276", or .315".

If drill diameter **DC** is too large compared to guide hole diameter **D** (equal to or greater than 2**D**), chamfering cannot be performed.

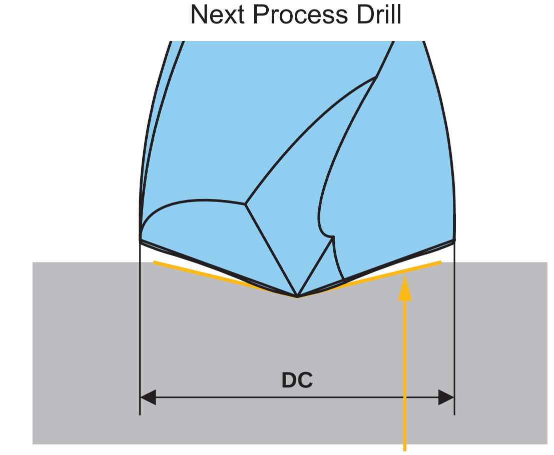
Chamfering cannot be performed if drill diameter **DC** is the same as guide hole diameter **D**.

When Centering

The centering diameter should be less than the drill diameter (processing diameter) **DC** and the usable length **LU** should be referred to as a guideline.
The central area of holes (approx 25% of the full diameter) formed by two step point angles will not have their respective 60º and 90º angles. Chamfering is also not possible in the center areas.
Select a centering drill with a larger point angle than the final hole drill if is desired to make initial contact with the center.

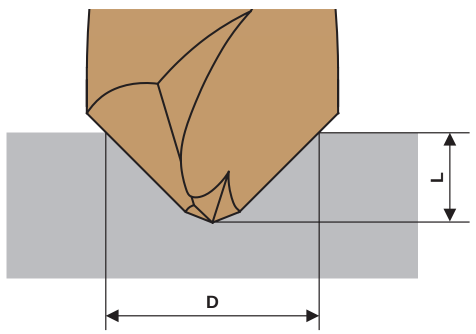


Next Process Drill



Centering of Point Angle SIG145°

Drilling Depth (L) Chart by Tool Diameter



(inch)

DC		SIG 90°			
		Min.		Max.	
(mm)	(inch)	D	L	D	L
1.0	**.0394**	.020	.007	.031	.013
1.5	**.0591**	.031	.011	.051	.021
2.0	**.0787**	.039	.014	.075	.031
2.5	**.0984**	.051	.019	.094	.039
3.0	**.1181**	.059	.020	.110	.047
4.0	**.1575**	.079	.028	.150	.063
5.0	**.1969**	.098	.035	.185	.079
6.0	**.2362**	.118	.043	.224	.094
7.0	**.2756**	.138	.047	.260	.110
8.0	**.3150**	.157	.055	.299	.126
10.0	**.3937**	.197	.071	.382	.161
12.0	**.4724**	.236	.083	.457	.193
16.0	**.6299**	.315	.110	.610	.260

DC		SIG 60°				SIG 120°				SIG 145°			
		Min.		Max.		Min.		Max.		Min.		Max.	
(mm)	(inch)	D	L	D	L	D	L	D	L	D	L	D	L
3.0	**.1181**	.059	.031	.114	.079	.059	.016	.110	.031	.059	.008	.098	.016
4.0	**.1575**	.079	.043	.154	.106	.079	.024	.150	.043	.079	.012	.126	.020
5.0	**.1969**	.098	.051	.193	.134	.098	.028	.177	.051	.098	.016	.173	.028
6.0	**.2362**	.118	.063	.228	.157	.118	.035	.217	.063	.118	.020	.201	.031
7.0	**.2756**	.138	.075	.268	.185	.138	.039	.260	.075	.138	.024	.248	.039
8.0	**.3150**	.157	.083	.307	.213	.157	.047	.299	.087	.157	.024	.276	.043
10.0	**.3937**	.197	.106	.386	.268	.197	.055	.382	.110	.197	.031	.350	.055
12.0	**.4724**	.236	.126	.457	.319	.236	.067	.449	.130	.236	.035	.425	.067

M

DRILLING

Point Angle SIG 60°

RECOMMENDED CUTTING CONDITIONS

(inch)

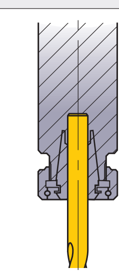
Workpiece Material		Mild Steels (≤180HB) AISI 1010 etc.		Carbon Steels, Alloy Steels (180−280HB) AISI 1045, 4140 etc.		Carbon Steels, Alloy Steels (280−350HB) AISI 4340 etc.	
DC		Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)
(mm)	(inch)						
3	.1181	245	.0020 (.0012–.0028)	210	.0020 (.0012–.0028)	195	.0016 (.0008–.0024)
4	.1575	245	.0020 (.0012–.0028)	210	.0020 (.0012–.0028)	195	.0016 (.0008–.0024)
5	.1969	260	.0024 (.0016–.0031)	230	.0024 (.0016–.0031)	210	.0020 (.0012–.0028)
6	.2362	260	.0024 (.0016–.0031)	230	.0024 (.0016–.0031)	210	.0020 (.0012–.0028)
7	.2756	260	.0028 (.0016–.0035)	230	.0028 (.0016–.0035)	210	.0020 (.0012–.0028)
8	.3150	260	.0028 (.0016–.0035)	230	.0028 (.0016–.0035)	210	.0020 (.0012–.0028)
10	.3937	280	.0031 (.0016–.0039)	245	.0031 (.0016–.0039)	230	.0024 (.0012–.0031)
12	.4724	280	.0031 (.0016–.0039)	245	.0031 (.0016–.0039)	230	.0024 (.0012–.0031)

Workpiece Material		Austenitic Stainless Steels (≤200HB) AISI 304, 316 etc.		Gray Cast Irons (≤350MPa) AISI No45B etc.		Ductile Cast Irons (≤450MPa) AISI 60-40-18 etc.	
DC		Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.−Max.) (IPR)
(mm)	(inch)						
3	.1181	50	.0012 (.0004–.0020)	245	.0020 (.0012–.0028)	180	.0020 (.0012–.0028)
4	.1575	50	.0012 (.0004–.0020)	245	.0020 (.0012–.0028)	180	.0020 (.0012–.0028)
5	.1969	65	.0016 (.0008–.0024)	260	.0024 (.0016–.0031)	195	.0024 (.0016–.0031)
6	.2362	65	.0016 (.0008–.0024)	260	.0024 (.0016–.0031)	195	.0024 (.0016–.0031)
7	.2756	65	.0016 (.0008–.0024)	260	.0028 (.0016–.0035)	195	.0024 (.0016–.0031)
8	.3150	65	.0016 (.0008–.0024)	260	.0028 (.0016–.0035)	195	.0024 (.0016–.0031)
10	.3937	65	.0016 (.0008–.0024)	280	.0031 (.0016–.0039)	195	.0028 (.0016–.0035)
12	.4724	65	.0016 (.0008–.0024)	280	.0031 (.0016–.0039)	195	.0028 (.0016–.0035)

Note 1) When chamfering a circumference of a guide hole, make sure that the tool diameter(**DC**) is **D** <**DC** <2**D**.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the time of dwell program or lower the rotation speed.
Note 5) When centering, please do not exceed the **LU** (usable length).

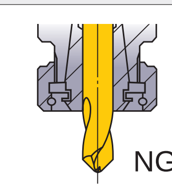
■ Operational Guidance

Drill Holding



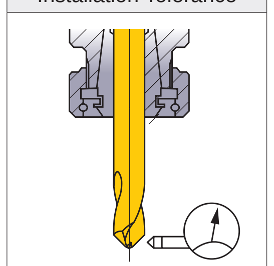
Collet chuck holds the drill securely.

Drill Installation



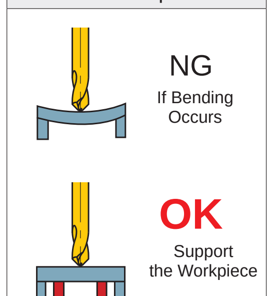
Do not clamp on the flutes.

Installation Tolerance

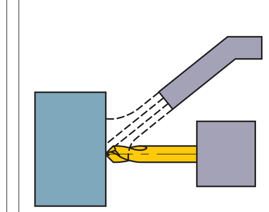


Run-out ≤ .001 inch

Thin Workpiece



Coolant Method



Coolant positions,at the end at the center are ideal.

M

DRILLING

Point Angle SIG 90°, 120° and 145°

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material		Mild Steels (≲180HB) AISI 1010 etc.		Carbon Steels, Alloy Steels (180—280HB) AISI 1045, 4140 etc.		Carbon Steels, Alloy Steels (280—350HB) AISI 4340 etc.	
DC (mm)	DC (inch)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)
1.0	.0394	100	.0008 (.0004—.0012)	65	.0008 (.0004—.0012)	15	.0008 (.0004—.0012)
1.5	.0591	150	.0008 (.0004—.0012)	115	.0008 (.0004—.0012)	30	.0008 (.0004—.0012)
2.0	.0787	195	.0016 (.0012—.0020)	165	.0016 (.0012—.0020)	45	.0016 (.0012—.0020)
2.5	.0984	245	.0016 (.0012—.0020)	210	.0016 (.0012—.0020)	195	.0016 (.0012—.0020)
3.0	.1181	245	.0024 (.0016—.0031)	210	.0024 (.0016—.0031)	195	.0020 (.0012—.0028)
4.0	.1575	245	.0024 (.0016—.0031)	210	.0024 (.0016—.0031)	195	.0020 (.0012—.0028)
5.0	.1969	260	.0028 (.0020—.0035)	230	.0028 (.0020—.0035)	210	.0024 (.0016—.0031)
6.0	.2362	260	.0028 (.0020—.0035)	230	.0028 (.0020—.0035)	210	.0024 (.0016—.0031)
7.0	.2756	260	.0031 (.0020—.0039)	230	.0031 (.0020—.0039)	210	.0024 (.0016—.0031)
8.0	.3150	260	.0031 (.0020—.0039)	230	.0031 (.0020—.0039)	210	.0024 (.0016—.0031)
10.0	.3937	280	.0035 (.0020—.0043)	245	.0035 (.0020—.0043)	230	.0028 (.0016—.0035)
12.0	.4724	280	.0035 (.0020—.0043)	245	.0035 (.0020—.0043)	230	.0028 (.0016—.0035)
16.0	.6299	295	.0047 (.0039—.0055)	260	.0047 (.0039—.0055)	245	.0031 (.0024—.0039)

Workpiece Material		Austenitic Stainless Steels (≲200HB) AISI 304, 316 etc.		Gray Cast Irons (≲350MPa) AISI No45B etc.		Ductile Cast Irons (≲450MPa) AISI 60-40-18 etc.	
DC (mm)	DC (inch)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)
1.0	.0394	65	.0004 (.0002—.0006)	100	.0008 (.0004—.0012)	30	.0008 (.0004—.0012)
1.5	.0591	65	.0004 (.0002—.0006)	150	.0008 (.0004—.0012)	80	.0008 (.0004—.0012)
2.0	.0787	65	.0016 (.0012—.0020)	195	.0016 (.0012—.0020)	130	.0016 (.0012—.0020)
2.5	.0984	65	.0016 (.0012—.0020)	245	.0016 (.0012—.0020)	180	.0016 (.0012—.0020)
3.0	.1181	65	.0016 (.0008—.0024)	245	.0024 (.0016—.0031)	180	.0024 (.0016—.0031)
4.0	.1575	65	.0016 (.0008—.0024)	245	.0024 (.0016—.0031)	180	.0024 (.0016—.0031)
5.0	.1969	65	.0024 (.0016—.0031)	260	.0028 (.0020—.0035)	195	.0028 (.0020—.0035)
6.0	.2362	65	.0024 (.0016—.0031)	260	.0028 (.0020—.0035)	195	.0028 (.0020—.0035)
7.0	.2756	65	.0024 (.0016—.0031)	260	.0031 (.0020—.0039)	195	.0028 (.0020—.0035)
8.0	.3150	65	.0024 (.0016—.0031)	260	.0031 (.0020—.0039)	195	.0028 (.0020—.0035)
10.0	.3937	65	.0024 (.0016—.0031)	280	.0035 (.0020—.0043)	195	.0031 (.0020—.0039)
12.0	.4724	65	.0024 (.0016—.0031)	280	.0035 (.0020—.0043)	195	.0031 (.0020—.0039)
16.0	.6299	65	.0031 (.0024—.0039)	295	.0047 (.0039—.0055)	195	.0043 (.0035—.0051)

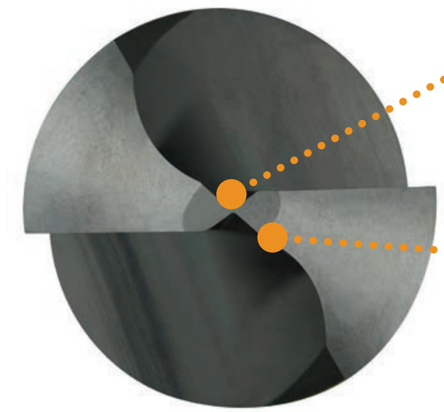
Note 1) When chamfering a circumference of a guide hole, make sure that the tool diameter(**DC**) is **D** <**DC** <2**D**.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the time of dwell program or lower the rotation speed.
Note 5) When centering, please do not exceed the **LU** (usable length).

Solid Carbide Drills for Centering and Chamfering

Leading Drill Series

DLE

SIG 90° Mini Size ø.0394"—ø.0984"



Thinning Geometry

Chip evacuation space in center part improves the bite performance, and ensure for good finished hole position accuracy.

Two-step Point Angles

Two-step point angles ensure strength at the center and prevent sudden fracturing.

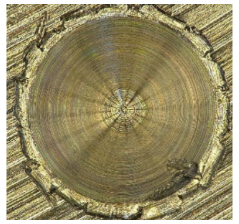
*The central area will not have a 90° hole bottom.

Unique Cutting Edge Shape

Large rake angle and sharp cutting edges can minimize the generation of burrs.

AISI 304
Cutting Example

DLE



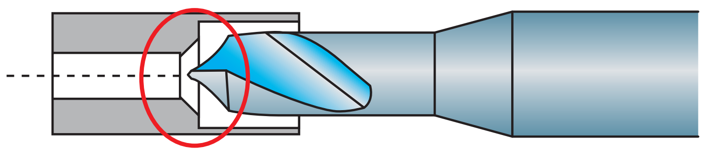
Conventional

New Grade "DP102A" Excellent Lubricity and Heat Resistance

The PVD-coated carbide grade DP102A has excellent lubricity and heat resistance, and exhibit outstanding wear resistance particularly under low-speed to medium-speed cutting speed.

Long-neck Design

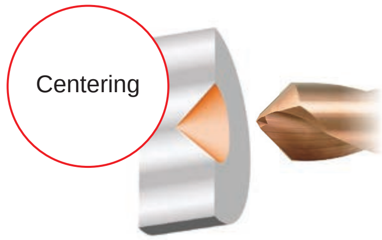
Long neck length allows to use the chamfering even deep inside holes.

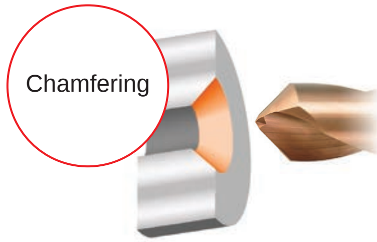


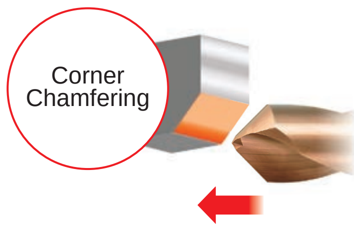
Solid Carbide Drills for Centering and Chamfering

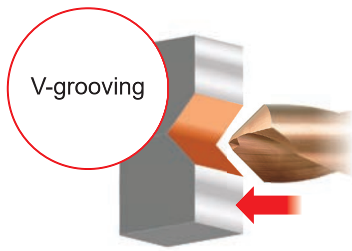
Leading Drill Series DLE

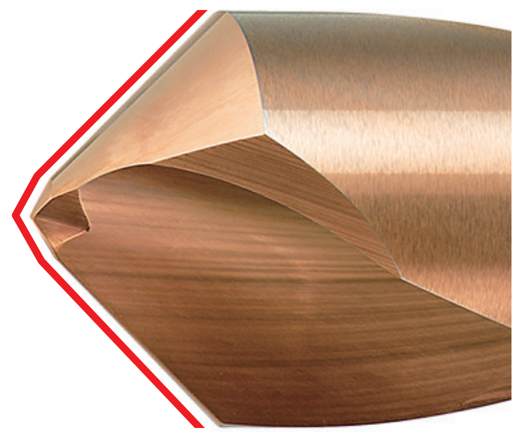
Completes strict standards for centering and chamfering.





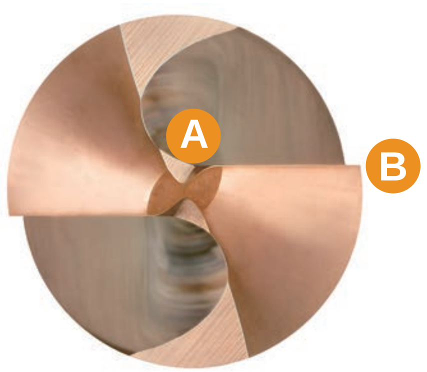




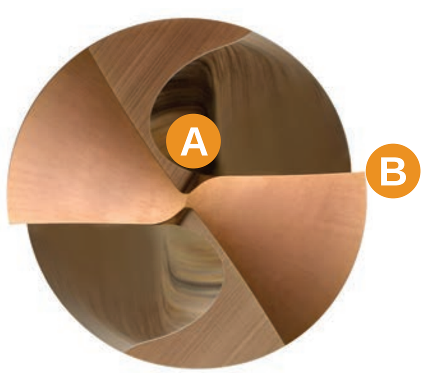


— Range of Use

Features



Point Angles SIG 60° 90°



Point Angles SIG 120° 145°

A Thinning Geometry

The thinning pocket promotes smooth chip evacuation and provides excellent hole position accuracy. Additionally, the negative cutting edge of the drill point offers high cutting edge strength.

B Sharp Cutting Edge and High Fracture Resistance

Sharp cutting edge and high fracture resistance provides stable cutting and burr prevention.

DLE

Conventional

M DRILLING

Two-step Point Angles 60°, 90°

Two-step point angles ensure strength at the center and prevent sudden fracturing.

*The central area will not have a 60°, 90° bottom hole angle.

DLE

High Strength of Center

Conventional

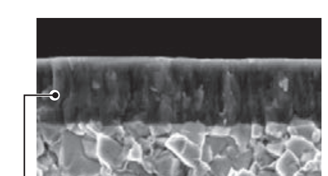
Fractures of Center

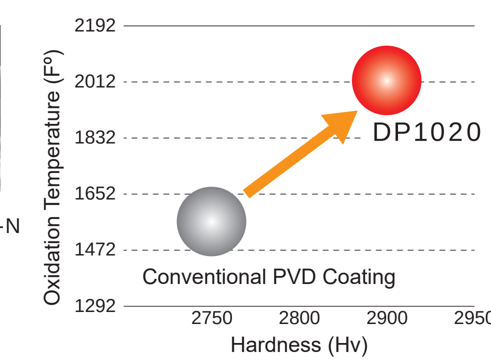
One-step Point Angles 120°, 145°

One-step point angles help high-speed steel or carbide drills to bite from the center in next processes.

Coated Grade DP1020

DP1020 grade offers excellent wear resistance and reduced friction for longer tool life and a versatile range of applications.





Extensive Support for CNC Automatic Lathes

Diverse lineup of shanks compatible with ER collets.

DCON(Connection Diameter)	.197 inch=ER8
DCON	.276 inch=ER11

M DRILLING

STAW

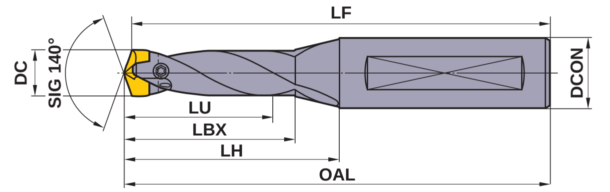
- Wavy cutting edge design for good chip control.
- Highly rigid clamping system offers stability and reliability for small hole drilling.

P | M | K | N | S | H

DC=.3906"	.3906"<DC<.7188"
0 / −.00087"	0 / −.00106"

INCH STANDARD

Internal Coolant



HOLDERS

DC (inch)	L/D	Holder Order Number	Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert Order Number	Insert Stock VP15TF
.3906	1.5	STAWSS0026	●	.661	.937	1.33	3.22	3.15	.625	TIP06F	* STAWN0025TH	●
	3	STAWSN0026	●	1.252	1.531	1.92	3.81	3.74	.625	TIP06F	STAWN0025TH	●
	5	STAWMN0026	●	2.039	2.311	2.71	4.60	4.53	.625	TIP06F	STAWN0025TH	●
	8	STAWLN0026	●	3.220	3.501	3.89	5.78	5.71	.625	TIP06F	STAWN0025TH	●
.4062	1.5	STAWSS0026	●	.661	.940	1.33	3.22	3.15	.625	TIP06F	* STAWN0026TH	●
	3	STAWSN0026	●	1.252	1.534	1.92	3.81	3.74	.625	TIP06F	STAWN0026TH	●
	5	STAWMN0026	●	2.039	2.314	2.71	4.60	4.53	.625	TIP06F	STAWN0026TH	●
	8	STAWLN0026	●	3.220	3.504	3.89	5.78	5.71	.625	TIP06F	STAWN0026TH	●
.4219	1.5	STAWSS0027	●	.697	.943	1.34	3.23	3.15	.625	TIP06F	* STAWN0027TH	●
	3	STAWSN0027	●	1.315	1.537	1.93	3.82	3.74	.625	TIP06F	STAWN0027TH	●
	5	STAWMN0027	●	2.142	2.317	2.72	4.61	4.53	.625	TIP06F	STAWN0027TH	●
	8	STAWLN0027	●	3.382	3.507	3.90	5.79	5.71	.625	TIP06F	STAWN0027TH	●
.4375	1.5	STAWSS0028	●	.728	1.064	1.50	3.39	3.31	.625	TIP06F	* STAWN0028TH	●
	3	STAWSN0028	●	1.378	1.690	2.13	4.02	3.94	.625	TIP06F	STAWN0028TH	●
	5	STAWMN0028	●	2.244	2.680	3.11	5.00	4.92	.625	TIP06F	STAWN0028TH	●
	8	STAWLN0028	●	3.543	3.860	4.29	6.18	6.10	.625	TIP06F	STAWN0028TH	●
.4531	1.5	STAWSS0030	●	.764	1.067	1.50	3.39	3.31	.625	TIP06F	* STAWN0029TH	●
	3	STAWSN0030	●	1.441	1.693	2.13	4.02	3.94	.625	TIP06F	STAWN0029TH	●
	5	STAWMN0030	●	2.346	2.683	3.11	5.00	4.92	.625	TIP06F	STAWN0029TH	●
	8	STAWLN0030	●	3.705	3.863	4.29	6.18	6.10	.625	TIP06F	STAWN0029TH	●
.4688	1.5	STAWSS0030	●	.764	1.069	1.51	3.40	3.31	.625	TIP06F	* STAWN0030TH	●
	3	STAWSN0030	●	1.441	1.695	2.14	4.03	3.94	.625	TIP06F	STAWN0030TH	●
	5	STAWMN0030	●	2.346	2.685	3.12	5.01	4.92	.625	TIP06F	STAWN0030TH	●
	8	STAWLN0030	●	3.705	3.865	4.30	6.19	6.10	.625	TIP06F	STAWN0030TH	●

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : USA Stock

DC (inch)	L/D	Holder Order Number	Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert Order Number	Insert Stock VP15TF
.4844	1.5	STAWSS0031	●	.795	1.148	1.63	3.52	3.43	.625	TIP06F	* STAWN0031TH	●
	3	STAWSN0031	●	1.504	1.858	2.33	4.22	4.13	.625	TIP06F	STAWN0031TH	●
	5	STAWMN0031	●	2.449	2.848	3.32	5.21	5.12	.625	TIP06F	STAWN0031TH	●
	8	STAWLN0031	●	3.866	4.218	4.70	6.59	6.50	.625	TIP06F	STAWN0031TH	●
.5000	1.5	STAWSS0032	●	.831	1.151	1.63	3.52	3.43	.625	TIP06F	* STAWN0032TH	●
	3	STAWSN0032	●	1.567	1.861	2.33	4.22	4.13	.625	TIP06F	STAWN0032TH	●
	5	STAWMN0032	●	2.551	2.851	3.32	5.21	5.12	.625	TIP06F	STAWN0032TH	●
	8	STAWLN0032	●	4.028	4.221	4.70	6.59	6.50	.625	TIP06F	STAWN0032TH	●
.5156	1.5	STAWSS0034	●	.862	1.274	1.79	3.67	3.58	.625	TIP08W	* STAWN0033TH	●
	3	STAWSN0034	●	1.630	2.024	2.53	4.42	4.33	.625	TIP08W	STAWN0033TH	●
	5	STAWMN0034	●	2.654	3.004	3.52	5.40	5.31	.625	TIP08W	STAWN0033TH	●
	8	STAWLN0034	●	4.189	4.584	5.09	6.98	6.89	.625	TIP08W	STAWN0033TH	●
.5312	1.5	STAWSS0034	●	.862	1.277	1.80	3.68	3.58	.625	TIP08W	* STAWN0034TH	●
	3	STAWSN0034	●	1.630	2.027	2.54	4.43	4.33	.625	TIP08W	STAWN0034TH	●
	5	STAWMN0034	●	2.654	3.007	3.53	5.41	5.31	.625	TIP08W	STAWN0034TH	●
	8	STAWLN0034	●	4.189	4.587	5.10	6.99	6.89	.625	TIP08W	STAWN0034TH	●
.5469	1.5	STAWSS0035	●	.898	1.280	1.80	3.68	3.58	.625	TIP08W	* STAWN0035TH	●
	3	STAWSN0035	●	1.693	2.030	2.54	4.43	4.33	.625	TIP08W	STAWN0035TH	●
	5	STAWMN0035	●	2.756	3.010	3.53	5.41	5.31	.625	TIP08W	STAWN0035TH	●
	8	STAWLN0035	●	4.350	4.590	5.10	6.99	6.89	.625	TIP08W	STAWN0035TH	●
.5625	1.5	STAWSS0036	●	.925	1.322	1.87	3.76	3.66	.625	TIP08W	* STAWN0036TH	●
	3	STAWSN0036	●	1.752	2.192	2.74	4.63	4.53	.625	TIP08W	STAWN0036TH	●
	5	STAWMN0036	●	2.854	3.372	3.92	5.81	5.71	.625	TIP08W	STAWN0036TH	●
	8	STAWLN0036	●	4.508	4.902	5.49	7.38	7.28	.625	TIP08W	STAWN0036TH	●
.5781	1.5	STAWSS0037	●	.961	1.325	1.88	3.77	3.66	.625	TIP08W	* STAWN0037TH	●
	3	STAWSN0037	●	1.815	2.195	2.75	4.64	4.53	.625	TIP08W	STAWN0037TH	●
	5	STAWMN0037	●	2.957	3.375	3.93	5.82	5.71	.625	TIP08W	STAWN0037TH	●
	8	STAWLN0037	●	4.669	4.905	5.50	7.39	7.28	.625	TIP08W	STAWN0037TH	●

STAW

DC (inch)	L/D	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert Order Number	Insert Stock VP15TF
.5938	1.5	STAWSS0039	●	.992	1.408	2.00	3.97	3.86	.750	TIP08W	* STAWN0038TH	●
	3	STAWSN0039	●	1.878	2.468	3.06	5.03	4.92	.750	TIP08W	STAWN0038TH	●
	5	STAWMN0039	●	3.059	3.648	4.24	6.21	6.10	.750	TIP08W	STAWN0038TH	●
	8	STAWLN0039	●	4.831	5.228	5.94	7.91	7.80	.750	TIP08W	STAWN0038TH	●
.6094	1.5	STAWSS0039	●	.992	1.411	2.00	3.97	3.86	.750	TIP08W	* STAWN0039TH	●
	3	STAWSN0039	●	1.878	2.471	3.06	5.03	4.92	.750	TIP08W	STAWN0039TH	●
	5	STAWMN0039	●	3.059	3.651	4.24	6.21	6.10	.750	TIP08W	STAWN0039TH	●
	8	STAWLN0039	●	4.831	5.231	5.94	7.91	7.80	.750	TIP08W	STAWN0039TH	●
.6250	1.5	STAWSS0041	●	1.028	1.454	2.08	4.05	3.94	.750	TIP10W	* STAWN0040T	●
	3	STAWSN0041	●	1.941	2.474	3.26	5.23	5.12	.750	TIP10W	STAWN0040T	●
	5	STAWMN0041	●	3.161	3.654	4.64	6.61	6.50	.750	TIP10W	STAWN0040T	●
	8	STAWLN0041	●	4.992	5.544	6.33	8.30	8.19	.750	TIP10W	STAWN0040T	●
.6406	1.5	STAWSS0041	●	1.028	1.457	2.09	4.06	3.94	.750	TIP10W	* STAWN0041T	●
	3	STAWSN0041	●	1.941	2.477	3.27	5.24	5.12	.750	TIP10W	STAWN0041T	●
	5	STAWMN0041	●	3.161	3.657	4.65	6.62	6.50	.750	TIP10W	STAWN0041T	●
	8	STAWLN0041	●	4.992	5.547	6.34	8.31	8.19	.750	TIP10W	STAWN0041T	●
.6563	1.5	STAWSS0044	●	1.094	1.539	2.21	4.18	4.06	.750	TIP10W	* STAWN0042T	●
	3	STAWSN0044	●	2.067	2.519	3.47	5.43	5.31	.750	TIP10W	STAWN0042T	●
	5	STAWMN0044	●	3.366	3.859	4.84	6.81	6.69	.750	TIP10W	STAWN0042T	●
	8	STAWLN0044	●	5.315	5.859	6.66	8.62	8.50	.750	TIP10W	STAWN0042T	●
.6719	1.5	STAWSS0044	●	1.094	1.542	2.21	4.18	4.06	.750	TIP10W	* STAWN0043T	●
	3	STAWSN0044	●	2.067	2.522	3.47	5.43	5.31	.750	TIP10W	STAWN0043T	●
	5	STAWMN0044	●	3.366	3.862	4.84	6.81	6.69	.750	TIP10W	STAWN0043T	●
	8	STAWLN0044	●	5.315	5.862	6.66	8.62	8.50	.750	TIP10W	STAWN0043T	●
.6875	1.5	STAWSS0044	●	1.094	1.545	2.22	4.19	4.06	.750	TIP10W	* STAWN0044T	●
	3	STAWSN0044	●	2.067	2.525	3.48	5.44	5.31	.750	TIP10W	STAWN0044T	●
	5	STAWMN0044	●	3.366	3.865	4.85	6.82	6.69	.750	TIP10W	STAWN0044T	●
	8	STAWLN0044	●	5.315	5.865	6.67	8.63	8.50	.750	TIP10W	STAWN0044T	●

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : USA Stock

DC (inch)	L/D	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert Order Number	Insert Stock VP15TF
.7031	1.5	STAWSS0046	●	1.161	1.588	2.30	4.26	4.13	.750	TIP10W	* STAWN0045T	●
	3	STAWSN0046	●	2.193	2.648	3.67	5.64	5.51	.750	TIP10W	STAWN0045T	●
	5	STAWMN0046	●	3.571	4.068	5.05	7.02	6.89	.750	TIP10W	STAWN0045T	●
	8	STAWLN0046	●	5.638	6.188	6.98	8.95	8.82	.750	TIP10W	STAWN0045T	●
.7188	1.5	STAWSS0046	●	1.161	1.591	2.30	4.26	4.13	.750	TIP10W	* STAWN0046T	●
	3	STAWSN0046	●	2.193	2.651	3.67	5.64	5.51	.750	TIP10W	STAWN0046T	●
	5	STAWMN0046	●	3.571	4.071	5.05	7.02	6.89	.750	TIP10W	STAWN0046T	●
	8	STAWLN0046	●	5.638	6.191	6.98	8.95	8.82	.750	TIP10W	STAWN0046T	●

STAW

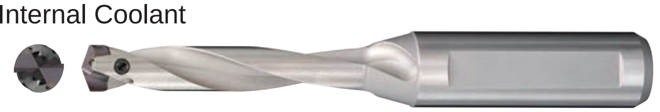
●Wavy cutting edge design for good chip control.
●Highly rigid clamping system offers stability and reliability for small hole drilling.

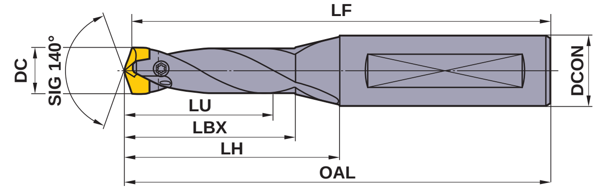
P | M | K | N | S | H

DC=10	10<DC<18.4
0 / −0.022	0 / −0.027

METRIC STANDARD

Internal Coolant





■HOLDERS

DC (mm)	L/D	Holder Order Number	Stock	LU	LBX	LH	OAL	LF	DCON	Wrench
10.0 – 10.4	1.5	STAWSS1000S16	★	15	23.8	33.8	81.8	80	16	TIP06F
	3	STAWSN1000S16	★	30	38.8	48.8	96.8	95	16	TIP06F
	5	STAWMN1000S16	★	50	58.9	68.9	116.9	115	16	TIP06F
	8	STAWLN1000S16	★	80	88.9	98.9	146.9	145	16	TIP06F
10.5 – 10.9	1.5	STAWSS1050S16	★	15.75	23.9	33.9	81.9	80	16	TIP06F
	3	STAWSN1050S16	★	31.5	38.9	48.9	96.9	95	16	TIP06F
	5	STAWMN1050S16	★	52.5	59.0	69.0	117.0	115	16	TIP06F
	8	STAWLN1050S16	★	84	89.0	99.0	147.0	145	16	TIP06F
11.0 – 11.4	1.5	STAWSS1100S16	★	16.5	27.0	38.0	86.0	84	16	TIP06F
	3	STAWSN1100S16	★	33	43.0	54.0	102.0	100	16	TIP06F
	5	STAWMN1100S16	★	55	68.1	79.1	127.1	125	16	TIP06F
	8	STAWLN1100S16	★	88	98.1	109.1	157.1	155	16	TIP06F
11.5 – 11.9	1.5	STAWSS1150S16	★	17.25	27.1	38.1	86.1	84	16	TIP06F
	3	STAWSN1150S16	★	34.5	43.1	54.1	102.1	100	16	TIP06F
	5	STAWMN1150S16	★	57.5	68.1	79.1	127.1	125	16	TIP06F
	8	STAWLN1150S16	★	92	98.2	109.2	157.2	155	16	TIP06F
12.0 – 12.4	1.5	STAWSS1200S16	★	18	29.2	41.2	89.2	87	16	TIP06F
	3	STAWSN1200S16	★	36	47.2	59.2	107.2	105	16	TIP06F
	5	STAWMN1200S16	★	60	72.2	84.2	132.2	130	16	TIP06F
	8	STAWLN1200S16	★	96	107.3	119.3	167.3	165	16	TIP06F

Insert DC (mm)	Insert Order Number	Stock VP15TF
10.0	* STAWN1000TH	★
10.1	STAWN1010TH	★
10.2	STAWN1020TH	★
10.3	STAWN1030TH	★
10.4	STAWN1040TH	★
10.5	* STAWN1050TH	★
10.6	STAWN1060TH	★
10.7	STAWN1070TH	★
10.8	STAWN1080TH	★
10.9	STAWN1090TH	★
11.0	* STAWN1100TH	★
11.1	STAWN1110TH	★
11.2	STAWN1120TH	★
11.3	STAWN1130TH	★
11.4	STAWN1140TH	★
11.5	* STAWN1150TH	★
11.6	STAWN1160TH	★
11.7	STAWN1170TH	★
11.8	STAWN1180TH	★
11.9	STAWN1190TH	★
12.0	* STAWN1200TH	★
12.1	STAWN1210TH	★
12.2	STAWN1220TH	★
12.3	STAWN1230TH	★
12.4	STAWN1240TH	★

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

★ : Stocked in Japan

M

DRILLING

DC (mm)	L/D	Holder Order Number	Stock	LU	LBX	LH	OAL	LF	DCON	Wrench
12.5 – 12.9	1.5	STAWSS1250S16	★	18.75	29.3	41.3	89.3	87	16	①TIP06F
	3	STAWSN1250S16	★	37.5	47.3	59.3	107.3	105	16	①TIP06F
	5	STAWMN1250S16	★	62.5	72.3	84.3	132.3	130	16	①TIP06F
	8	STAWLN1250S16	★	100	107.3	119.3	167.3	165	16	①TIP06F
13.0 – 13.4	1.5	STAWSS1300S16	★	19.5	32.4	45.4	93.4	91	16	②TIP08W
	3	STAWSN1300S16	★	39	51.4	64.4	112.4	110	16	②TIP08W
	5	STAWMN1300S16	★	65	76.4	89.4	137.4	135	16	②TIP08W
	8	STAWLN1300S16	★	104	116.4	129.4	177.4	175	16	②TIP08W
13.5 – 13.9	1.5	STAWSS1350S16	★	20.25	32.5	45.5	93.5	91	16	②TIP08W
	3	STAWSN1350S16	★	40.5	51.5	64.5	112.5	110	16	②TIP08W
	5	STAWMN1350S16	★	67.5	76.5	89.5	137.5	135	16	②TIP08W
	8	STAWLN1350S16	★	108	116.5	129.5	177.5	175	16	②TIP08W
14.0 – 14.4	1.5	STAWSS1400S16	★	21	33.5	47.5	95.5	93	16	②TIP08W
	3	STAWSN1400S16	★	42	55.6	69.6	117.6	115	16	②TIP08W
	5	STAWMN1400S16	★	70	85.6	99.6	147.6	145	16	②TIP08W
	8	STAWLN1400S16	★	112	124.6	139.6	187.6	185	16	②TIP08W
14.5 – 14.9	1.5	STAWSS1450S16	★	21.75	33.6	47.6	95.6	93	16	②TIP08W
	3	STAWSN1450S16	★	43.5	55.7	69.7	117.7	115	16	②TIP08W
	5	STAWMN1450S16	★	72.5	85.7	99.7	147.7	145	16	②TIP08W
	8	STAWLN1450S16	★	116	124.7	139.7	187.7	185	16	②TIP08W
15.0 – 15.4	1.5	STAWSS1500S20	★	22.5	35.7	50.7	100.7	98	20	②TIP08W
	3	STAWSN1500S20	★	45	62.7	77.7	127.7	125	20	②TIP08W
	5	STAWMN1500S20	★	75	92.8	107.8	157.8	155	20	②TIP08W
	8	STAWLN1500S20	★	120	132.8	150.8	200.8	198	20	②TIP08W

Insert DC (mm)	Insert Order Number	Stock VP15TF
12.5	* STAWN1250TH	★
12.6	STAWN1260TH	★
12.7	STAWN1270TH	★
12.8	STAWN1280TH	★
12.9	STAWN1290TH	★
13.0	* STAWN1300TH	★
13.1	STAWN1310TH	★
13.2	STAWN1320TH	★
13.3	STAWN1330TH	★
13.4	STAWN1340TH	★
13.5	* STAWN1350TH	★
13.6	STAWN1360TH	★
13.7	STAWN1370TH	★
13.8	STAWN1380TH	★
13.9	STAWN1390TH	★
14.0	* STAWN1400TH	★
14.1	STAWN1410TH	★
14.2	STAWN1420TH	★
14.3	STAWN1430TH	★
14.4	STAWN1440TH	★
14.5	* STAWN1450TH	★
14.6	STAWN1460TH	★
14.7	STAWN1470TH	★
14.8	STAWN1480TH	★
14.9	STAWN1490TH	★
15.0	* STAWN1500TH	★
15.1	STAWN1510TH	★
15.2	STAWN1520TH	★
15.3	STAWN1530TH	★
15.4	STAWN1540TH	★

M

DRILLING

STAW

DC (mm)	L/D	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert DC (mm)	Insert Order Number	Insert Stock VP15TF
15.5 – 16.4	1.5	STAWSS1600S20	★	24	36.8	52.8	102.8	100	20	TIP10W	15.5	* STAWN1550T	★
											15.6	STAWN1560T	★
											15.7	STAWN1570T	★
	3	STAWSN1600S20	★	48	62.9	82.9	132.9	130	20	TIP10W	15.8	STAWN1580T	★
											15.9	STAWN1590T	★
	5	STAWMN1600S20	★	80	92.9	117.9	167.9	165	20	TIP10W	16.0	STAWN1600T	★
											16.1	STAWN1610T	★
											16.2	STAWN1620T	★
	8	STAWLN1600S20	★	128	140.9	160.9	210.9	208	20	TIP10W	16.3	STAWN1630T	★
											16.4	STAWN1640T	★
16.5 – 17.4	1.5	STAWSS1700S20	★	25.5	39.0	56.0	106.0	103	20	TIP10W	16.5	* STAWN1650T	★
											16.6	STAWN1660T	★
											16.7	STAWN1670T	★
	3	STAWSN1700S20	★	51	64.0	88.0	138.0	135	20	TIP10W	16.8	STAWN1680T	★
											16.9	STAWN1690T	★
	5	STAWMN1700S20	★	85	98.1	123.1	173.1	170	20	TIP10W	17.0	STAWN1700T	★
											17.1	STAWN1710T	★
											17.2	STAWN1720T	★
	8	STAWLN1700S20	★	136	149.1	169.1	219.1	216	20	TIP10W	17.3	STAWN1730T	★
											17.4	STAWN1740T	★

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

DC (mm)	L/D	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCON	Wrench	Insert DC (mm)	Insert Order Number	Insert Stock VP15TF
17.5 – 18.4	1.5	STAWSS1800S20	★	27	40.2	58.2	108.2	105	20	TIP10W	17.5	* STAWN1750T	★
											17.6	STAWN1760T	★
											17.7	STAWN1770T	★
	3	STAWSN1800S20	★	54	67.2	93.2	143.2	140	20	TIP10W	17.8	STAWN1780T	★
											17.9	STAWN1790T	★
	5	STAWMN1800S20	★	90	103.3	128.3	178.3	175	20	TIP10W	18.0	STAWN1800T	★
											18.1	STAWN1810T	★
											18.2	STAWN1820T	★
	8	STAWLN1800S20	★	144	157.3	177.3	227.3	224	20	TIP10W	18.3	STAWN1830T	★
											18.4	STAWN1840T	★

M

DRILLING

★ : Stocked in Japan

M

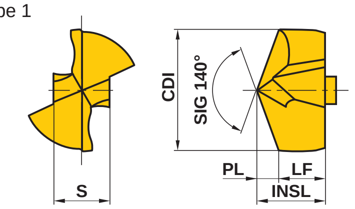
DRILLING

STAW

INSERTS

INCH STANDARD

Type 1



■ For General Use

Order Number	Coated	Dimensions (inch)					Type	Applicable Holder	
	VP15TF	CDI	INSL	LF	PL	S		inch	metric
STAWN0025TH	●	.3906	.216	.150	.066	.181	1	STAW○○0026	STAW○○1000S16
STAWN0026TH	●	.4062	.216	.150	.066	.181	1	STAW○○0026	STAW○○1000S16
STAWN0027TH	●	.4219	.226	.157	.069	.190	1	STAW○○0027	STAW○○1050S16
STAWN0028TH	●	.4375	.237	.165	.073	.199	1	STAW○○0028	STAW○○1100S16
STAWN0029TH	●	.4531	.248	.172	.076	.208	1	STAW○○0030	STAW○○1150S16
STAWN0030TH	●	.4688	.248	.172	.076	.208	1	STAW○○0030	STAW○○1150S16
STAWN0031TH	●	.4844	.259	.180	.079	.217	1	STAW○○0031	STAW○○1200S16
STAWN0032TH	●	.5000	.270	.187	.083	.226	1	STAW○○0032	STAW○○1250S16
STAWN0033TH	●	.5156	.280	.194	.086	.235	1	STAW○○0034	STAW○○1300S16
STAWN0034TH	●	.5312	.280	.194	.086	.235	1	STAW○○0034	STAW○○1300S16
STAWN0035TH	●	.5469	.291	.202	.089	.244	1	STAW○○0035	STAW○○1350S16
STAWN0036TH	●	.5625	.302	.209	.093	.254	1	STAW○○0036	STAW○○1400S16
STAWN0037TH	●	.5781	.313	.217	.096	.263	1	STAW○○0037	STAW○○1450S16
STAWN0038TH	●	.5938	.324	.224	.099	.272	1	STAW○○0039	STAW○○1500S20
STAWN0039TH	●	.6094	.324	.224	.099	.272	1	STAW○○0039	STAW○○1500S20
STAWN0040T	●	.6250	.334	.232	.102	.281	1	STAW○○0041	STAW○○1600S20
STAWN0041T	●	.6406	.334	.232	.102	.281	1	STAW○○0041	STAW○○1600S20
STAWN0042T	●	.6563	.356	.247	.109	.299	1	STAW○○0044	STAW○○1700S20
STAWN0043T	●	.6719	.356	.247	.109	.299	1	STAW○○0044	STAW○○1700S20
STAWN0044T	●	.6875	.356	.247	.109	.299	1	STAW○○0044	STAW○○1700S20
STAWN0045T	●	.7031	.378	.262	.116	.317	1	STAW○○0046	STAW○○1800S20
STAWN0046T	●	.7188	.378	.262	.116	.317	1	STAW○○0046	STAW○○1800S20

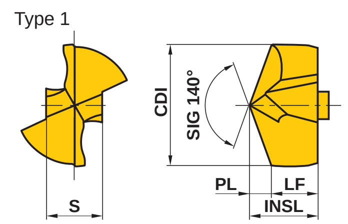
● : USA Stock
<One insert in one case>

Memo

STAW

INSERTS

METRIC STANDARD



For General Use

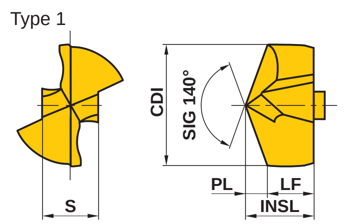
Order Number	Coated VP15TF	Dimensions (mm) CDI	INSL	LF	PL	S	Type	Applicable Holder inch	Applicable Holder metric
STAWN1000TH	●	10.0	5.6	3.8	1.8	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1010TH	●	10.1	5.6	3.8	1.8	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1020TH	●	10.2	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1030TH	●	10.3	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1040TH	●	10.4	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1050TH	●	10.5	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1060TH	●	10.6	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1070TH	●	10.7	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1080TH	●	10.8	6.0	4.0	2.0	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1090TH	●	10.9	6.0	4.0	2.0	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1100TH	●	11.0	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1110TH	●	11.1	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1120TH	●	11.2	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1130TH	●	11.3	6.3	4.2	2.1	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1140TH	●	11.4	6.3	4.2	2.1	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1150TH	●	11.5	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1160TH	●	11.6	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1170TH	●	11.7	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1180TH	●	11.8	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1190TH	●	11.9	6.6	4.4	2.2	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1200TH	●	12.0	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1210TH	●	12.1	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1220TH	●	12.2	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1230TH	●	12.3	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1240TH	●	12.4	6.9	4.6	2.3	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1250TH	●	12.5	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1260TH	●	12.6	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1270TH	●	12.7	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1280TH	●	12.8	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1290TH	●	12.9	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1300TH	●	13.0	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1310TH	●	13.1	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1320TH	●	13.2	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1330TH	●	13.3	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1340TH	●	13.4	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1350TH	●	13.5	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1360TH	●	13.6	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1370TH	●	13.7	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1380TH	●	13.8	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1390TH	●	13.9	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1400TH	●	14.0	7.8	5.3	2.5	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1410TH	●	14.1	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1420TH	●	14.2	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1430TH	●	14.3	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1440TH	●	14.4	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1450TH	●	14.5	8.1	5.5	2.6	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1460TH	●	14.6	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1470TH	●	14.7	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1480TH	●	14.8	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1490TH	●	14.9	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1500TH	●	15.0	8.4	5.7	2.7	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1510TH	●	15.1	8.4	5.7	2.7	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1520TH	●	15.2	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1530TH	●	15.3	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1540TH	●	15.4	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1550T	●	15.5	8.7	5.9	2.8	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1560T	●	15.6	8.7	5.9	2.8	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1570T	●	15.7	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1580T	●	15.8	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1590T	●	15.9	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1600T	●	16.0	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1610T	●	16.1	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1620T	●	16.2	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1630T	●	16.3	8.9	5.9	3.0	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1640T	●	16.4	8.9	5.9	3.0	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1650T	●	16.5	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1660T	●	16.6	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1670T	●	16.7	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1680T	●	16.8	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1690T	●	16.9	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1700T	●	17.0	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1710T	●	17.1	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1720T	●	17.2	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1730T	●	17.3	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1740T	●	17.4	9.5	6.3	3.2	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1750T	●	17.5	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1760T	●	17.6	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1770T	●	17.7	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1780T	●	17.8	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1790T	●	17.9	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1800T	●	18.0	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1810T	●	18.1	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1820T	●	18.2	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1830T	●	18.3	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1840T	●	18.4	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16

● : USA Stock
<One insert in one case>

STAW

INSERTS

METRIC STANDARD



For General Use

Order Number	Coated VP15TF	Dimensions (mm) CDI	INSL	LF	PL	S	Type	Applicable Holder inch	Applicable Holder metric
STAWN1000TH	●	10.0	5.6	3.8	1.8	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1010TH	●	10.1	5.6	3.8	1.8	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1020TH	●	10.2	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1030TH	●	10.3	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1040TH	●	10.4	5.7	3.8	1.9	4.6	1	STAW○○0026	STAW○○1000S16
STAWN1050TH	●	10.5	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1060TH	●	10.6	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1070TH	●	10.7	5.9	4.0	1.9	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1080TH	●	10.8	6.0	4.0	2.0	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1090TH	●	10.9	6.0	4.0	2.0	4.8	1	STAW○○0027	STAW○○1050S16
STAWN1100TH	●	11.0	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1110TH	●	11.1	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1120TH	●	11.2	6.2	4.2	2.0	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1130TH	●	11.3	6.3	4.2	2.1	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1140TH	●	11.4	6.3	4.2	2.1	5.1	1	STAW○○0028	STAW○○1100S16
STAWN1150TH	●	11.5	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1160TH	●	11.6	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1170TH	●	11.7	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1180TH	●	11.8	6.5	4.4	2.1	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1190TH	●	11.9	6.6	4.4	2.2	5.3	1	STAW○○0030	STAW○○1150S16
STAWN1200TH	●	12.0	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1210TH	●	12.1	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1220TH	●	12.2	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1230TH	●	12.3	6.8	4.6	2.2	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1240TH	●	12.4	6.9	4.6	2.3	5.5	1	STAW○○0031	STAW○○1200S16
STAWN1250TH	●	12.5	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1260TH	●	12.6	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1270TH	●	12.7	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1280TH	●	12.8	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1290TH	●	12.9	7.1	4.8	2.3	5.8	1	STAW○○0032	STAW○○1250S16
STAWN1300TH	●	13.0	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1310TH	●	13.1	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1320TH	●	13.2	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1330TH	●	13.3	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1340TH	●	13.4	7.3	4.9	2.4	6.0	1	STAW○○0034	STAW○○1300S16
STAWN1350TH	●	13.5	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1360TH	●	13.6	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1370TH	●	13.7	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1380TH	●	13.8	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1390TH	●	13.9	7.6	5.1	2.5	6.2	1	STAW○○0035	STAW○○1350S16
STAWN1400TH	●	14.0	7.8	5.3	2.5	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1410TH	●	14.1	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1420TH	●	14.2	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1430TH	●	14.3	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1440TH	●	14.4	7.9	5.3	2.6	6.4	1	STAW○○0036	STAW○○1400S16
STAWN1450TH	●	14.5	8.1	5.5	2.6	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1460TH	●	14.6	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1470TH	●	14.7	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1480TH	●	14.8	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1490TH	●	14.9	8.2	5.5	2.7	6.7	1	STAW○○0037	STAW○○1450S16
STAWN1500TH	●	15.0	8.4	5.7	2.7	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1510TH	●	15.1	8.4	5.7	2.7	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1520TH	●	15.2	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1530TH	●	15.3	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1540TH	●	15.4	8.5	5.7	2.8	6.9	1	STAW○○0039	STAW○○1500S16
STAWN1550T	●	15.5	8.7	5.9	2.8	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1560T	●	15.6	8.7	5.9	2.8	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1570T	●	15.7	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1580T	●	15.8	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1590T	●	15.9	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1600T	●	16.0	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1610T	●	16.1	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1620T	●	16.2	8.8	5.9	2.9	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1630T	●	16.3	8.9	5.9	3.0	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1640T	●	16.4	8.9	5.9	3.0	7.1	1	STAW○○0041	STAW○○1600S16
STAWN1650T	●	16.5	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1660T	●	16.6	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1670T	●	16.7	9.3	6.3	3.0	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1680T	●	16.8	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1690T	●	16.9	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1700T	●	17.0	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1710T	●	17.1	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1720T	●	17.2	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1730T	●	17.3	9.4	6.3	3.1	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1740T	●	17.4	9.5	6.3	3.2	7.6	1	STAW○○0044	STAW○○1700S16
STAWN1750T	●	17.5	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1760T	●	17.6	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1770T	●	17.7	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1780T	●	17.8	9.9	6.7	3.2	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1790T	●	17.9	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1800T	●	18.0	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1810T	●	18.1	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1820T	●	18.2	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1830T	●	18.3	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16
STAWN1840T	●	18.4	10.0	6.7	3.3	8.1	1	STAW○○0046	STAW○○1800S16

● : USA Stock
<One insert in one case>

STAW

■ HONE WIDTH

If an insert with honing other than standard is needed, please order using the symbols below.

(Insert Order Number)

S T A W N 1 0 0 0 T ◌

- S T A W — TAW Product Name
- N — N : General Use / K : Cuting tooth form for cast iron
- 1 0 0 0 — Insert Diameter
- T — Honing Symbol
- ◌ — Honing Type

(Honing Standard)

Honing Type	Hone Width (inch)
F	0
G	.0008 — .0020
H	.0020 — .0039
-	.0039 — .0059
K	.0059 — .0079
S	.0079 — .0098
M	.0098 — .0118

RECOMMENDED CUTTING CONDITIONS

	Work Material	DC	ϕ.3906"—ϕ.5000" ϕ10.0—ϕ12.9mm		ϕ.5156"—ϕ.5469" ϕ13.0—ϕ13.9mm		ϕ.5625"—ϕ.6094" ϕ14.0—ϕ15.4mm		ϕ.62506"—ϕ.7188" ϕ15.5—ϕ18.4mm	
		Hardness \ Conditions	Cutting Speed vc (SFM)	Feed fr (IPR)	Cutting Speed vc (SFM)	Feed fr (IPR)	Cutting Speed vc (SFM)	Feed fr (IPR)	Cutting Speed vc (SFM)	Feed fr (IPR)
P	Mild Steel	≤180HB	260 (195—330)	.008 (.006—.010)	295 (230—360)	.010 (.008—.012)	330 (260—390)	.012 (.010—.014)	330 (260—390)	.014 (.010—.016)
P	Carbon Steel Alloy Steel	180—280HB	260 (195—330)	.008 (.006—.010)	295 (230—360)	.010 (.008—.012)	330 (260—390)	.012 (.010—.014)	330 (260—390)	.014 (.010—.016)
P	Carbon Steel Alloy Steel	280—350HB	230 (195—295)	.008 (.006—.010)	260 (195—330)	.010 (.008—.012)	295 (230—360)	.010 (.008—.012)	295 (230—360)	.012 (.008—.014)
M	Stainless Steel	≤200HB	130 (100—165)	.005 (.004—.006)	165 (130—195)	.006 (.005—.007)	195 (165—230)	.007 (.006—.008)	195 (165—230)	.006 (.005—.008)

Note 1) When using a drill for DCx1.5 depth of hole, it is possible to increase the feed rate by approx. 20%.
Note 2) When using a drill for DCx8 depth of hole, please decrease the cutting speed by approx. 20%.
Note 3) When using a drill for DCx8 depth of hole, it is recommended to make a pilot hole of the same size.
Note 4) For stainless steel, please use internal coolant. (Mist & MQL are not recommended).

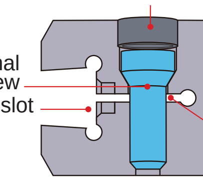
SPARE PARTS

Applicable Holder			Pack Order Number (Internal screw & stopper)	Internal Screw	Stopper
	inch	mm			
STAWSS STAWSN STAWMN STAWLN	0026	1000S16	WS203107TPS-35LH	WS203107TPS	WS35LH
	0027	1050S16	WS203107TPS-35LH	WS203107TPS	WS35LH
	0028	1100S16	WS203108TPS-35LH	WS203108TPS	WS35LH
	0030	1150S16	WS203108TPS-35LH	WS203108TPS	WS35LH
	0031	1200S16	WS203108TPS-35LH	WS203108TPS	WS35LH
	0032	1250S16	WS203108TPS-35LH	WS203108TPS	WS35LH
	0034	1300S16	WS253909TPS-45LH	WS253909TPS	WS45LH
	0035	1350S16	WS253909TPS-45LH	WS253909TPS	WS45LH
	0036	1400S16	WS253909TPS-45LH	WS253909TPS	WS45LH
	0037	1450S16	WS253909TPS-45LH	WS253909TPS	WS45LH
	0039	1500S20	WS253909TPS-45LH	WS253909TPS	WS45LH
	0041	1600S20	WS304912TPS-55LH	WS304912TPS	WS55LH
	0044	1700S20	WS304912TPS-55LH	WS304912TPS	WS55LH
	0046	1800S20	WS304912TPS-55LH	WS304912TPS	WS55LH

∗ Clamp Torque (lbf-in) : WS203107TPS=8.9, WS203108TPS=8.9, WS253909TPS=17.7, WS304912TPS=22.1
Note 1) The parts included in the package are internal screw, stopper and operation manual. Please replace the parts in accordance with the operation manual.

NOTES ON USE

■INSERT INSTALLATION



1. Before inserting the insert into the holder, ensure that there are no foreign objects or dirt in the holder slot or slit. Clean using compressed air if necessary.

2. Use the wrench provided to loosen the inner screw to open the tip of the holder, then place the insert into the holder slot as shown in figure 1.
∗Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.

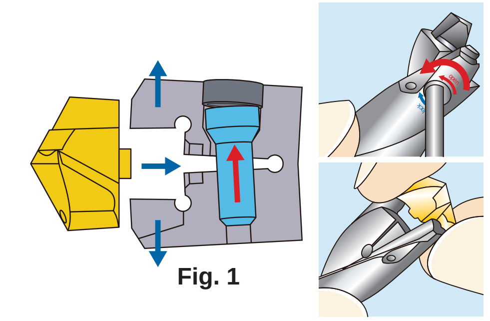


Fig. 1

3. After the insert has been set in the holder slot, tighten the inner screw while pushing the insert lightly into the pocket as shown in figure 2 to securely clamp and locate the insert.
∗Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.

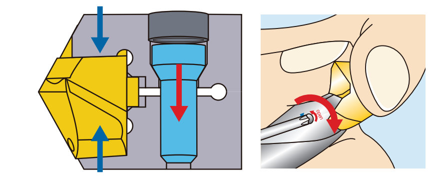


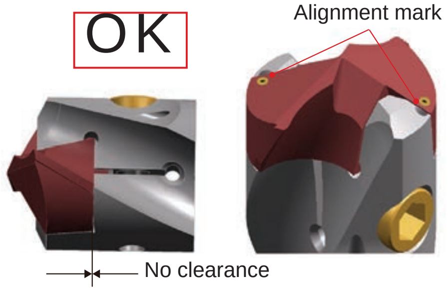
Fig. 2

Tighten clamp screws referring to the table for torque.

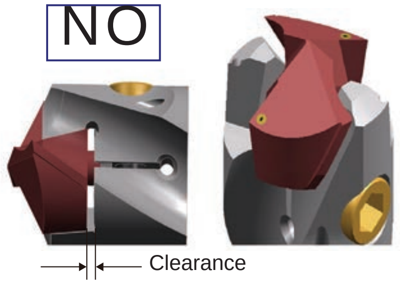
DC		Clamping Force	
		lbf-in	N · m
.3906"—.4844"	10mm—12.5mm	8.9	1
.5000"—.5781"	13mm—15mm	17.7	2
.5938"—.7188"	16mm—18mm	22.1	2.5

4. Check there is no gap between the bottom of the insert and holder slot.

OK



NO



Note 1) Poor or incorrect clamping of inserts can cause poor drilling performance and/or drill breakage.
Therefore ensure that the alignment marks on both the body and insert are aligned when setting.
When machining, use safety guards and goggles.

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Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627

For Your Safety

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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