Indexable Multi-Function Cutter

Vol 1

OSG PHOENIX® PMD

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osgtool.com/PMD

OSG PHOENIX® PMD

Indexable Multi-Function Cutter

A versatile series of indexable end mills for multiple applications, including milling, drilling & plunging, with a single tool.

List 53400
PMD SA (Inch)

List 78234
PMD SS (Metric)

List 52606
PMD ASF (Inch)

List 78334
PMD SF (Metric)

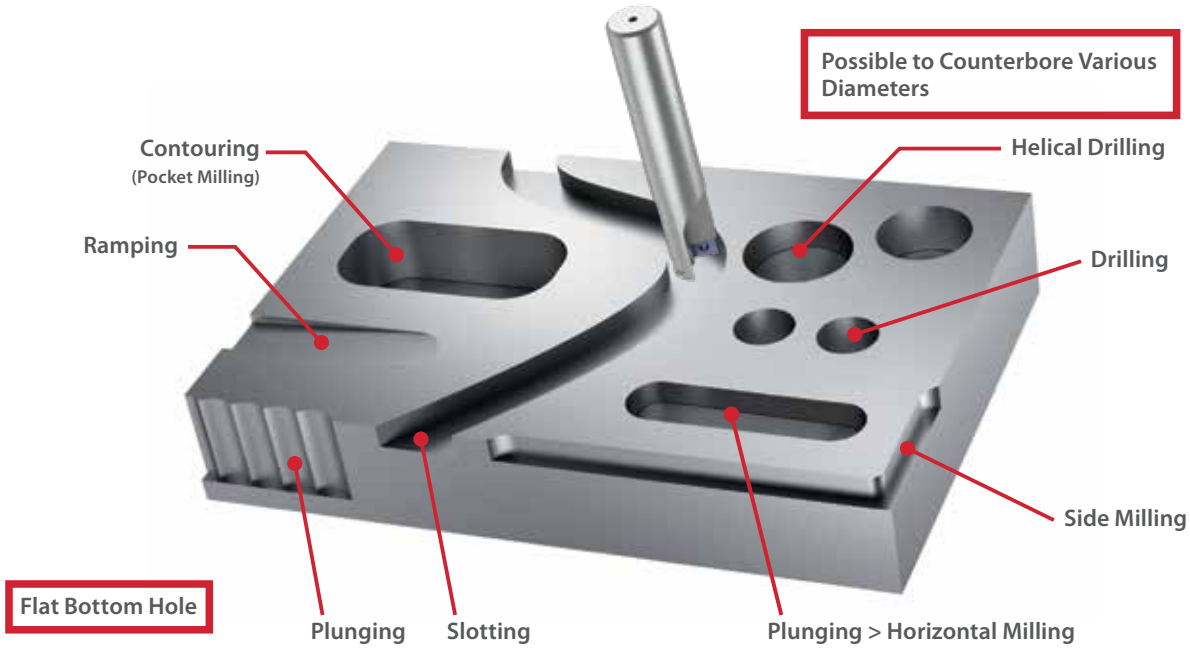
List 78PZAG
PZAG Inserts

List 78PSE
PSE inserts

List 7808H
PMD Accessories

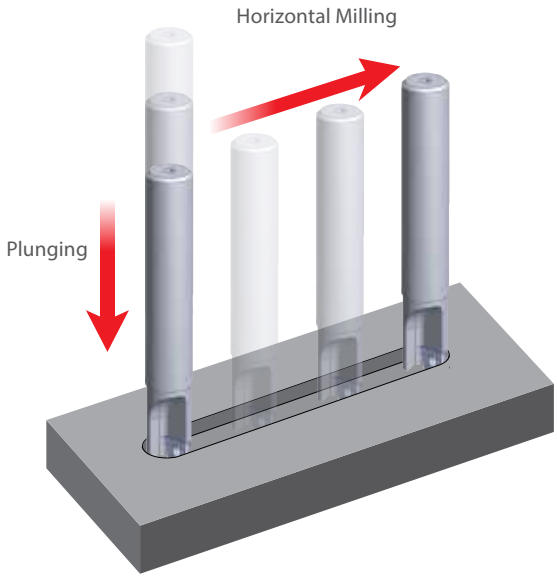
Features & Benefits

» Supports a Wide Range of Applications with a Single Tool



Features & Benefits

Two Types of Inserts to Enable Continuous Cutting - From Plunging to Horizontal Milling



Inserts for Drilling and Plunging Edge

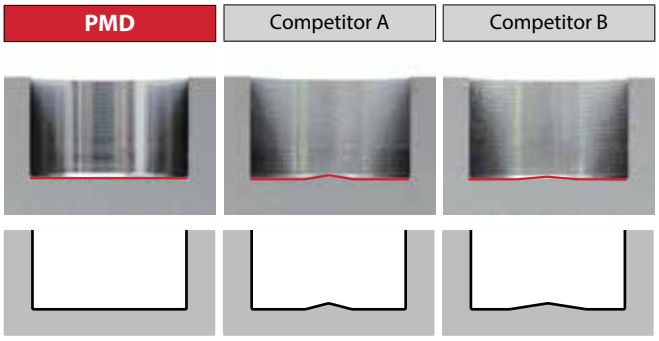
Superior chip breaking capability for stable machining without chip trouble. Uses the same insert as the PZAG counterboring cutter.

Inserts for Peripheral Cutting Edge

High rigidity and sharp cutting edge ensure stable long tool life without chattering. Uses the same insert as the PSE shoulder cutter.

Flat Bottom Hole

Tool	PMD11R025SS25-1S (Ø25×1)	Competitor A (Ø25×2)	Competitor B (Ø25×2)
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	–	–
Milling Method	Helical Drilling Ø32		
Work Material	1050 Carbon Steel		
Cutting Speed	1910 RPM (492 SFM)		
Feed	3.3 IPM (0.008 in/t)		
Depth of Cut	aa=0.787"		
Processing Angle	2.8° (Helical Pitch 0.040")		
Coolant	Air		
Machine	VMC		



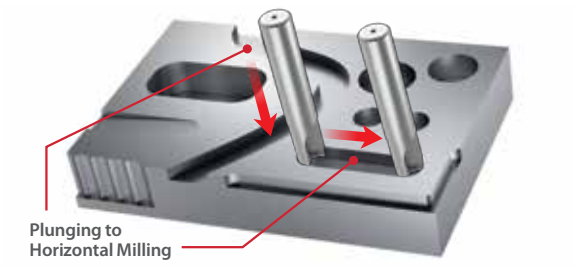
Bottom Hole Shape Comparison

Processing Data

» Plunging & Slotting - 1050 Carbon Steel

Excellent milling surface finish without chattering.

Tool	PMD11R025SS25-1S	
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	
Operation	Plunging	Slotting
Work Material	1050 Carbon Steel	
Cutting Speed	1274 RPM (330 SFM)	
Feed	4.0 IPM (0.003 in/rev)	8.0 IPM (0.006 in/rev)
Depth of Cut	Aa = 0.275", Ar = 0.984"	
Coolant	Air	
Machine	VMC	



» Slotting & Side Milling - 1050 Carbon Steel

Tool	PMD11R025SS25-1S	
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	
Operation	Slotting	Side Milling
Work Material	1050 Carbon Steel	
Cutting Speed	1910 RPM (492 SFM)	
Feed	15.0 IPM (0.008 in/rev)	
Depth of Cut	Aa = 0.275", Ar = 0.984"	Aa = 0.393", Ar = 0.098"
Coolant	Air	
Machine	VMC	

Processing Data

» Helical Drilling & Ramping - 1050 Carbon Steel

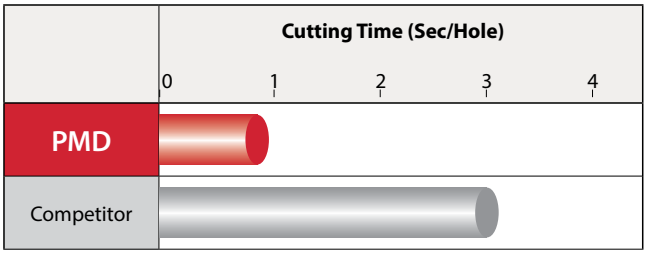
No burrs at the hole entry and no uncut material in the center of the hole after processing.

Tool	PMD11R025SS25-1S	
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	
Operation	Helical Drilling	Ramping
Processing Angle	2.5°	3°
Work Material	1050 Carbon Steel	
Cutting Speed	1910 RPM (492 SFM)	
Feed	4.2 IPM (0.006 in/rev)	11.3 IPM (0.006 in/rev)
Depth of Cut	Aa = 0.984"	Aa = 0.275"
Coolant	Air	
Machine	VMC	

» Helical Drilling & Ramping - Cast Iron

The PMD is able to achieve excellent milling surface finish and reduce processing time even on onstable, rough casted surfaces.

Tool	PMD11R025SS25-1S	Competitor
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	-
Work Material	Cast Iron	
Cutting Speed	1910 RPM (492 SFM)	1000 RPM (255 SFM)
Feed	11.3 IPM (0.006 in/rev)	3.9 IPM (0.004 in/rev)
Counterbore Dia	0.984"	
Depth of Cut	Aa = 0.197"	
Coolant	Air	
Machine	HMC	

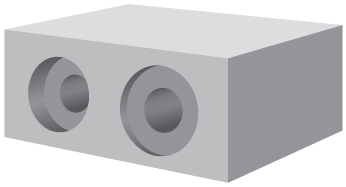


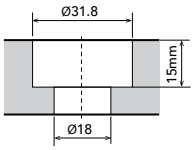
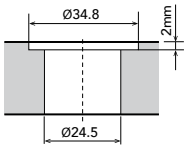
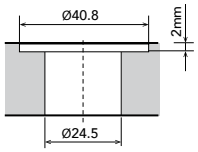
The PMD is able to achieve excellent milling surface finish and reduce processing time even on unstable rough casted surface.

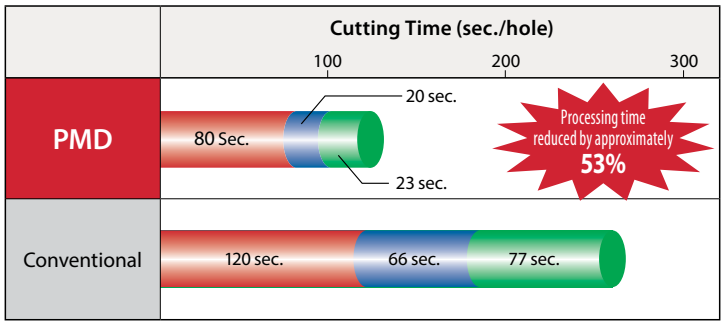
Processing Data

» Reduced Processing Time By Continuous Processing from Drilling to Contouring - FCV410

Tool	PMD11R025SS25-1S	Conventional
Insert (grade)	ZPNT130508EN (XP8030) ZDKT11T308SR-GM (XC3030)	Solid Carbide End Mill (Ø20, 4FL)
Work Material	FCV410	
Coolant	Non-Water Soluble	
Machine	VMC	



Counterboring Dia.	Ø31.8mm			Ø34.8mm			Ø40.8mm		
Processing Shape									
Tool	PMD (Ø25, 1FL)		Conventional (Ø20, 4FL)	PMD (Ø25, 1FL)		Conventional (Ø20, 4FL)	PMD (Ø25, 1FL)		Conventional (Ø20, 4FL)
Milling Method	Drilling	Contouring	Helical Drilling	Drilling	Contouring	Helical Drilling	Drilling	Contouring	Helical Drilling
Depth of Cut	0.590"	Aa = 0.197", Ar = 0.134"	Pitch = 0.197"	0.079"	Aa = 0.079", Ar = 0.193"	Pitch = 0.079"	0.079"	Aa = 0.079", Ar = 0.311"	Pitch = 0.079"
Cutting Speed	2000 RPM (515 SFM)		1000 RPM (206 SFM)	2000 RPM (515 SFM)		1000 RPM (206 SFM)	2000 RPM (515 SFM)		1000 RPM (206 SFM)
Feed	13.8 IPM (0.007 in/rev)	2.9 IPM (0.007 in/t)	2.9 IPM (0.002 in/t)	19.7 IPM (0.010 in/rev)	5.5 IPM (0.010 in/t)	3.3 IPM (0.002 in/t)	19.7 IPM (0.010 in/rev)	7.6 IPM (0.010 in/t)	4.0 IPM (0.002 in/t)
Actual processing time (calculated value)	~80 sec		~120 sec	~20 sec		~66 sec	~23 sec		~77 sec

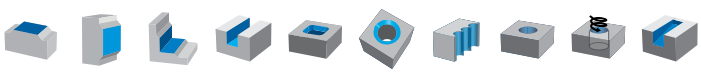


Processing time is reduced as the PMD is capable of drilling a hole and enlarging it by contouring.

Ø31.8
Ø34.8
Ø40.8

List 53400

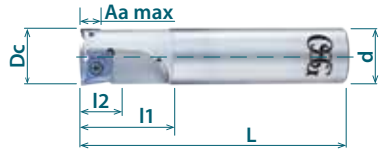
NEW



SPEED FEED P13-14

PMD SA (Inch)

Recommended Materials: p15
Accessories & Inserts: p10-12



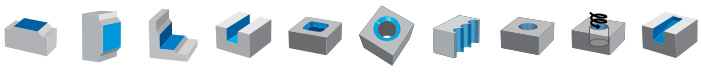
EDP No.	Body Type	Teeth Type	Designation	Tool Dia. (inch)	No. of Flutes	No. of Teeth	Shank Dia. (inch)	Overall Length (inch)	Neck Length (inch)	Effective Depth (inch)	Max Depth of Cut (inch)	Center Insert	Peripheral Insert
				D			d	L	l1	l2	Aa max		
53400001	Cylindrical Shank Short	Normal	PMD11R100SA100-1S	1.000	2	1	1.000	5.500	1.750	1.000	0.393	ZPNT13	ZDKT11
53400002			PMD11R125SA125-1S	1.250	2	1	1.250	6.000	2.000	1.250	0.393	ZPNT17	
53400004	Cylindrical Shank Long		PMD11R100SA100-1L	1.000	2	1	1.000	8.000	4.000	1.000	0.393	ZPNT13	
53400005			PMD11R125SA125-1L	1.250	2	1	1.250	9.000	5.000	1.250	0.393	ZPNT17	

Packed: 1 pc.

PXT

List 78234

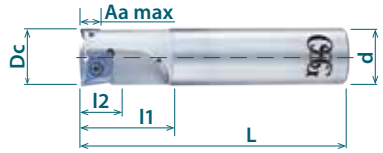
NEW



SPEED FEED P13-14

PMD SS (Metric)

Recommended Materials: p15
Accessories & Inserts: p10-12



EDP No.	Body Type	Teeth Type	Designation	Tool Dia. (mm)	No. of Flutes	No. of Teeth	Shank Dia. (mm)	Overall Length (mm)	Neck Length (mm)	Effective Depth (mm)	Max Depth of Cut (mm)	Center Insert	Peripheral Insert
				D			d	L	l1	l2	Aa max		
7803410	Cylindrical Shank Short	Normal	PMD11R020SS020-1S	20	2	1	20	130	35	20	10	ZPNT10	ZDKT11
7803411			PMD11R025SS025-1S	25	2	1	25	140	45	25	10	ZPNT13	
7803412			PMD11R032SS032-1S	32	2	1	32	150	50	28	10	ZPNT17	
7803413	Cylindrical Shank Long		PMD11R020SS020-1L	20	2	1	20	185	60	20	10	ZPNT10	
7803414			PMD11R025SS025-1L	25	2	1	25	220	75	25	10	ZPNT13	
7803415			PMD11R032SS032-1L	32	2	1	32	230	90	28	10	ZPNT17	

Packed: 1 pc.

Note: This is stocked overseas. Please contact OSG for availability and delivery.

PXT

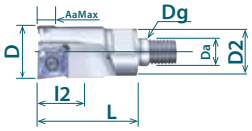
List 52606

NEW

SPEED FEED P13-14

PMD ASF (Inch)

Recommended Materials: p15
Accessories & Inserts: p10-12
SF Arbors: p1461 of Cutting Tool Solutions 2020 catalog



EDP No.	Body Type	Designation	Tool Dia. (inch)	No. of Flutes	No. of Teeth	Pilot Dia. (mm)	Thread Dia. (mm)	Overall Length (inch)	Effective Depth (inch)	Flange Dia. (inch)	Max Depth of Cut (inch)	Wrench Size	Center Insert	Peripheral Insert
			D			Da	Dg	L	l2	D2	Aa Max			
52606001	Screw Fit Head	PMD11R100ASF12-1	1.000	2	1	0.492	M12	1.890	1.000	0.905	0.393	17	ZPNT13	ZDKT11
52606002		PMD11R125ASF16-1	1.250	2	1	0.669	M16	2.087	1.250	1.102	0.393	22	ZPNT17	

Packed: 1 pc.

Note: This is stocked overseas. Please contact OSG for availability and delivery.

PXT

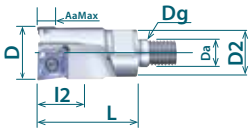
List 78334

NEW

SPEED FEED P13-14

PMD SF (Metric)

Recommended Materials: p15
Accessories & Inserts: p10-12
SF Arbors: p1462 of Cutting Tool Solutions 2020 catalog



EDP No.	Body Type	Designation	Tool Dia. (mm)	No. of Flutes	No. of Teeth	Pilot Dia. (mm)	Thread Dia. (mm)	Overall Length (mm)	Effective Depth (mm)	Flange Dia. (mm)	Max Depth of Cut (mm)	Wrench Size	Center Insert	Peripheral Insert
			D			Da	Dg	L	l2	D2	Aa Max			
7803416	Screw Fit Head	PMD11R020SF10-1	20	2	1	10.5	M10	48	20	18	10	14	ZPNT10	ZDKT11
7803417		PMD11R025SF12-1	25	2	1	12.5	M12	48	25	23	10	17	ZPNT13	
7803418		PMD11R032SF16-1	32	2	1	17	M16	58	28	28	10	22	ZPNT17	

Packed: 1 pc.

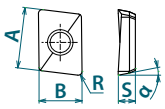
Note: This is stocked overseas. Please contact OSG for availability and delivery.

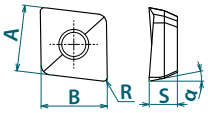
PXT

List 78PZAG

NEW

PZAG Inserts for Drilling & Plunging Edge





Designation	No. of Cutting Edges	Insert Size				EDP Number
		A x B (mm)	S (mm)	α	R (mm)	XP8030
ZPNT100408EN	2	10.95 x 10.95	4.65	11°	0.8	7814108
ZPNT130508EN	2	13.92 x 13.92	5.46	11°	0.8	7814110
ZPNT170608EN	2	17.85 x 17.85	6.31	11°	0.8	7814111

Packed: 10 pcs.

PXI

Inserts for the drilling and plunging edge are also applicable to the PZAG counterboring cutter

(excluding ZPNT100408).

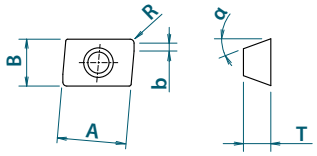
*For PMD, only corner radius (R) size 0.8 can be used.

Please refer to the Chamfering and Counterboring Catalog for details of PZAG.

List 78PSE

NEW

OSG Phoenix PSE/PSEL Inserts for Peripheral Cutting Edge



Designation	No. of Cutting Edges	Insert Size					EDP Number									
		AxB (mm)	T (mm)	α	R (mm)	b (mm)	CK010	XC3020	XP3025	XC3030	XP3035	XP2025	XP2040	XC1015	XC5035	XC5040	XP6015
ZDKT11T308FR-NM	2	11x6.8	3.8	15°	0.8	1.4	7811023	-	-	-	-	-	-	-	-	-	-
ZDKT11T308SR-GL							-	7827026	7828026	7825026	7814026	7826026	7813026	-	-	-	-
ZDKT11T308SR-GM							-	7827032	7828032	7825032	7814032	7826032	7813032	-	-	-	-
ZDKT11T308SR-GR							-	7827033	7828033	7825033	7814033	-	7813033	7812033	-	-	-
ZDKT11T308SR-HR							-	-	-	-	-	-	-	-	-	-	7824035
ZDKT11T308ER-SM							-	-	-	-	-	-	-	-	7815031	7816031	-

Packed: 10 pcs.

PXI

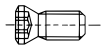
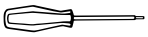
Inserts for the peripheral cutting edge are applicable for the PSE shoulder milling cutter.

*For PMD, only corner radius (R) size 0.8 can be used.

Please refer to the OSG PHOENIX Vol 7 for details of PSE.

List 7808H

PMD Accessories

Appearance	EDP No.	Designation	Applicable Insert	Applicable Cutter (mm)	Applicable Cutter (inch)	Recommended Tightening Torque
 Clamping Screw	7808107	FS25656PP (M2.5 x 5.6, Torx 8IP)	ZDKT11…	PMD11 Ø20-32	PMD11 Ø1-1.25"	1.6 Nm
	7808115	FS35686P (M3.5 x 8.6, Torx 15IP)	ZPNT10…	PMD11 Ø20	n/a	3.2 Nm
	7808114	FS45510P (M4.5 x 10, Torx 20IP)	ZPNT13…	PMD11 Ø25	PMD11 Ø1"	5.0 Nm
			ZPNT17…	PMD11 Ø32	PMD11 Ø1.25"	-
 Wrench	7808225	8IP-D (Torx 8IP)	ZDKT11…	PMD11 Ø20-32	PMD11 Ø1-1.25"	-
	7808228	15IP-D (Torx 15IP)	ZPNT10…	PMD11 Ø20	n/a	-
	7808229	20IP-D (Torx 20IP)	ZPNT13…	PMD11 Ø25	PMD11 Ø1"	-
			ZPNT17…	PMD11 Ø32	PMD11 Ø1.25"	-

Note: Wrench sold seperately.
Packed: Clamping Screws = 10 pcs.; Wrench = 1 pc.

PXT

Cutting Conditions - *For Side Milling & Slotting*

Work Material		Tensile Strength - Hardness	Side Milling Aa: 0.393" • Ar: 0.2D		Face Milling Aa: 0.118" • Ar: 1.0xD	
			Cutting Speed Vc (SFM)	Feed per Tooth fz (in/t)	Cutting Speed Vc (SFM)	Feed per Tooth fz (in/t)
P	**Mild Steels, Carbon Steels** (1010, 1018)	~180 HB	590 (330 - 820)	0.010 (0.008 - 0.020)	590 (330 - 820)	0.005 (0.002 - 0.008)
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB	590 (330 - 820)	0.008 (0.006 - 0.016)	590 (330 - 820)	0.004 (0.002 - 0.008)
	Die Steels (D2, H13)	~280 HB	495 (260 - 655)	0.008 (0.006 - 0.016)	495 (260 - 655)	0.004 (0.002 - 0.007)
M	**Stainless Steels** (Dry) (304, 420)	~250 HB	495 (260 - 655)	0.007 (0.006 - 0.016)	495 (260 - 655)	0.004 (0.002 - 0.007)
	Stainless Steels (Wet) (304, 420)	~250 HB	260 (195 - 395)	0.007 (0.006 - 0.016)	260 (195 - 395)	0.004 (0.002 - 0.007)
K	**Cast Iron** (FC250)	~350 N/mm²	590 (330 - 985)	0.010 (0.006 - 0.020)	590 (330 - 985)	0.005 (0.002 - 0.008)
	Ductile Cast Iron (60-40-18)	~800 N/mm²	590 (330 - 820)	0.006 (0.004 - 0.016)	590 (330 - 820)	0.005 (0.002 - 0.008)
N	**Aluminum Alloys** (6061, 7075)	~13% Si	985 (655 - 4920)	0.012 (0.008 - 0.020)	985 (655 - 4920)	0.006 (0.004 - 0.010)
S	**Heat Resistant Alloys** (Inconel 718)	-	115 (85 - 195)	0.006 (0.004 - 0.012)	115 (85 - 195)	0.004 (0.002 - 0.006)
	Titanium Alloy (Ti-6Al-4V)	-	130 (100 - 395)	0.007 (0.004 - 0.014)	130 (100 - 395)	0.004 (0.003 - 0.010)
H	**Pre-hardened Steel** (P20, Stavax)	40 - 43 HrC	330 (130 - 495)	0.007 (0.004 - 0.012)	295 (130 - 495)	0.004 (0.003 - 0.008)
	Die Cast Steels (A2, S7)	43 - 48 HrC	260 (130 - 395)	0.005 (0.003 - 0.008)	230 (130 - 395)	0.003 (0.002 - 0.006)
	Hardened Steels (D2)	50 - 55 HrC	195 (130 - 295)	0.004 (0.002 - 0.008)	165 (130 - 295)	0.002 (0.002 - 0.004)

1. Above recommended Cutting Speed is for short shank type; for long shank type, use 80% of the Cutting Speed shown in the above table.

Cutting Conditions - *For Counterboring & Plunging*

Work Material		Tensile Strength - Hardness	Cutting Speed Vc (SFM)	Feed Rate f (in/rev)		
				Ø0.750	Ø1.000	Ø1.250
P	Mild Steels, Carbon Steels (1010, 1018)	~180 HB	525 (330 - 655)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB	495 (330 - 655)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Die Steels (D2, H13)	~280 HB	395 (265 - 590)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
M	Stainless Steels (304, 420)	~250 HB	425 (265 - 590)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
K	Cast Iron (FC250)	~350 N/mm²	525 (330 - 855)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Ductile Cast Iron (60-40-18)	~800 N/mm²	525 (330 - 720)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
N	Aluminum Alloys (6061, 7075)	~13% Si	655 (330 - 2625)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
S	Heat Resistant Alloys (Inconel 718)	-	165 (100 - 200)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Titanium Alloy (Ti-6Al-4V)	-	195 (100 - 330)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
H	Pre-hardened Steel (P20, Stavax)	40 - 43 HrC	330 (195 - 395)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Die Cast Steels (A2, S7)	43 - 48 HrC	265 (130 - 330)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)
	Hardened Steels (D2)	50 - 55 HrC	195 (130 - 265)	0.0027 (0.002 - 0.003)	0.003 (0.002 - 0.004)	0.004 (0.003 - 0.005)

1. Above recommended Cutting Speed is for short shank type; for long shank type, use 80% of the Cutting Speed shown in the above table.

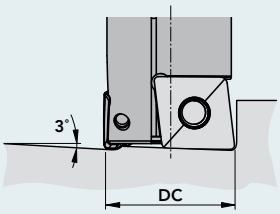
Recommended Materials by Application

Insert Grade	Chip Breaker	Coolant	P	M	K	N	S	H
XP8030	-	Yes	◎	◎	○	○	○	○
CK010	NM	Yes				◎		
XC3020	GL / GM / GR	-	◎		○			
XP3025	GL / GM / GR	Yes	◎		○			
XC3030	GL / GM / GR	-	◎		○			
XP3035	GL / GM / GR	-	◎	○	○			
		Yes	◎	○	○			
XP2025	GL / GM	Yes	○	◎			○	
XP2040	GL / GM	-	○	○				○
		Yes	○	◎			○	
XC1015	GM / GR	-			◎			
XC5035	SM	-		◎				
		Yes		○			○	
XC5040	SM	Yes		○			◎	
XP6015	HR	-	○		○			◎

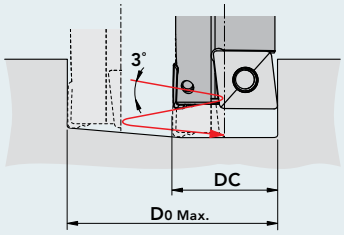
○ good ◎ best

Maximum Processing Angle During Ramping and Helical Drilling Operations <3°

Ramping



Helical Drilling



Diameter (Inch)	Maximum Helical Milling Diameter (Inch)
Dc	D_0 Max
0.750	1.381
1.000	1.881
1.250	2.381

Diameter (mm)	Maximum Helical Milling Diameter (mm)
Dc	D_0 Max
20	37
25	47
32	61

shaping your dreams

Safe use of cutting tools

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

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