



Indexable Flat Drill

Vol 1

OSG PHOENIX[®] PDZ



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OSG PHOENIX[®] PDZ

Indexable Flat Drill

An indexable drill series designed for stable flat-bottom holemaking. It is an ideal solution for a wide variety of materials such as carbon and alloy steel, stainless steel, and cast iron.

List 52513

PDZ (Inch)

List 78537

PDZ (Metric)

List 78PZAG

PZAG Inserts for PDZ

List 7808H

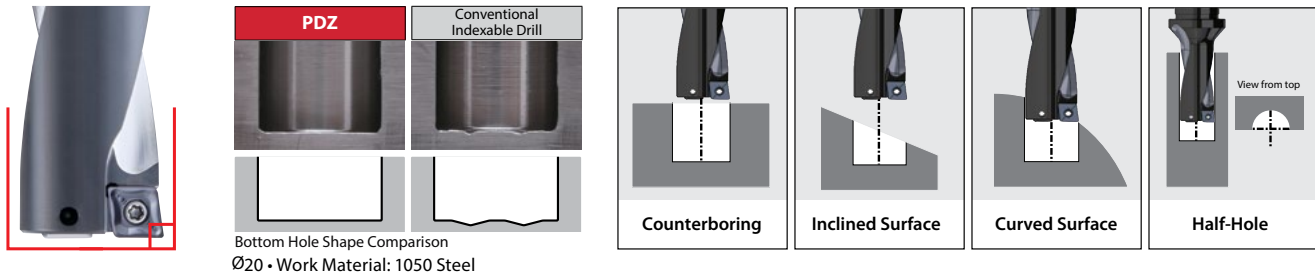
PDZ Accessories

Features & Benefits



» Flat Bottom Cutting Edge Configuration

The PDZ's flat bottom cutting edge configuration makes it compatible with a wide range of applications including drilling, counterboring, inclined surface drilling and more.



» Superior Chip Breaking Capability

The PDZ has superior chip breaking capability during drilling, counterboring and turning.



Excellent chip breaking capability with the enhanced muscle breaker.

- Uses the same insert as the PZAG counterboring cutter and the PMD multi-function cutter series
- Economical 4-corner insert design maximizes cost efficiency, with the same insert applicable to both peripheral and center cutting edge*

*2 corners for the peripheral cutting edge and 2 corners for the center cutting edge, adding up to a total of 4 corners.



Ø20 hole processing
(non-step drilling)
Work Material: 1050 Steel
Cutting Conditions:
Vc=492 SFM • f=0.004 in/rev

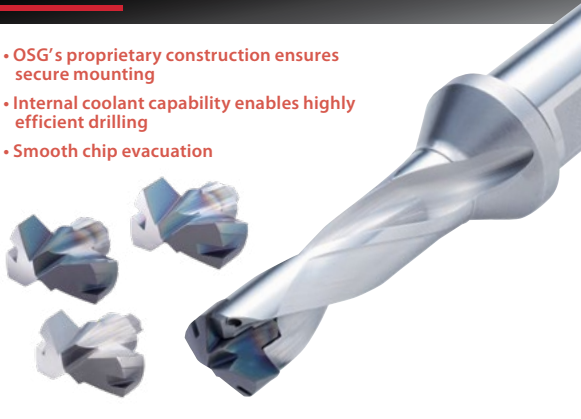
» Efficient Chip Evacuation

High precision finishing on flute improves rigidity, chip evacuation and reduces cutting force.

» OSG Product Lineup for Indexable Holemaking

» PXD Exchangeable Head Drill for 3D, 5D

- OSG's proprietary construction ensures secure mounting
- Internal coolant capability enables highly efficient drilling
- Smooth chip evacuation



» PD Indexable Drill

- The same insert is used for both the peripheral and center cutting edge
- Supports 2 x D up to 5 x D
- Extensive lineup



» PHP Indexable Drill for 3D

- Unique design supports many types of drilling
 - Inclined plane
 - Cast surface
 - Stacked plates
- High rigidity of body






» PDZ Indexable Flat Drill

- Flat bottom cutting edge configuration
- Efficient chip evacuation
- Superior chip breaking capability during drilling, counterboring, and turning



» OSG Product Lineup for Flat-Bottom Holemaking

	PDZ	PZAG	PMD
			
Shape	Indexable Flat Drill	Counterboring Cutter	Multi-Function Cutter
Bottom Hole Shape	Flat	Flat	Flat
Drilling Efficiency	○	◎	△
Requires a Pilot Hole when Drilling	No	Yes	No
Horizontal Milling	No	No	Yes
Insert designation	ZPNT...	ZPNT...	ZPNT... (center) ZDKT... (peripheral)

○ good ◎ best

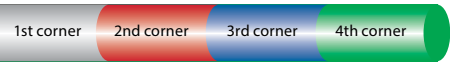



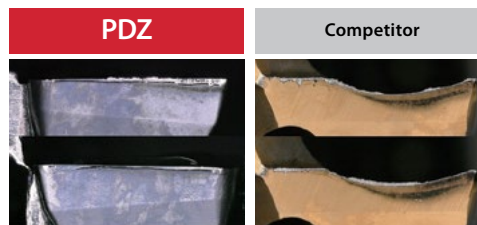
Processing Data

» Higher Cost Performance than Exchangeable Head Drills - 1050 Carbon Steel

PDZ was able to process over 3,500 holes per insert with 1.5 times the efficiency, compared to 880 holes by the competitor's exchangeable head drill.

Tool	PDZ1600FS20M05-2D	Competitor Exchangeable Head Drill
Insert (grade)	ZPNT050204EN (XP8030)	-
Work Material	1050 Carbon Steel	
Cutting Speed	2984 RPM (492 SFM)	1989 RPM (328 SFM)
Feed	11.7 IPM (0.004 in/rev)	7.8 IPM (0.004 in/rev)
Depth of Hole	0.945 in (Through)	
Coolant	Water-soluble	
Machine	HMC	

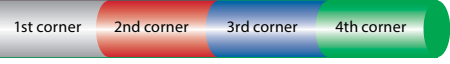

	Number of Holes			
	880	1,760	2,640	3,520
PDZ				
Competitor				



» Higher Cost Performance than Exchangeable Head Drills - 304 Stainless Steel

PDZ was able to process over 3,800 holes per insert, compared to 1,900 holes by the competitor's exchangeable head drill.

Tool	PDZ1600FS20M05-2D	Competitor Exchangeable Head Drill
Insert (grade)	ZPNT050204EN (XP8030)	-
Work Material	304 Stainless Steel	
Cutting Speed	1591 RPM (262 SFM)	
Feed	3.1 IPM (0.002 in/rev)	
Depth of Hole	0.945 in (Through)	
Coolant	Water-soluble	
Machine	HMC	

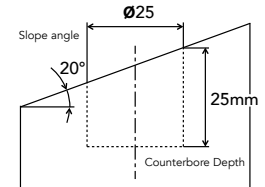
	Number of Holes			
	960	1,920	2,880	3,840
PDZ				
Competitor				



Processing Data

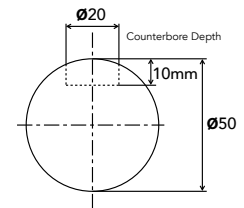
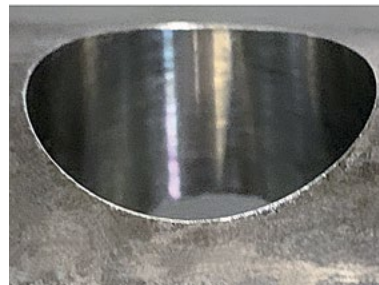
» Efficient Drilling on Angled Surfaces - 1050 Carbon Steel

Tool	PDZ2500FS25M07-2D
Insert (grade)	ZPNT070304EN (XP8030)
Work Material	1050 Carbon Steel
Cutting Speed	764 RPM (196 SFM)
Feed	1.8 IPM (0.002 in/rev)
Depth of Hole	0.984 in (20° incline)
Coolant	Air
Machine	HMC



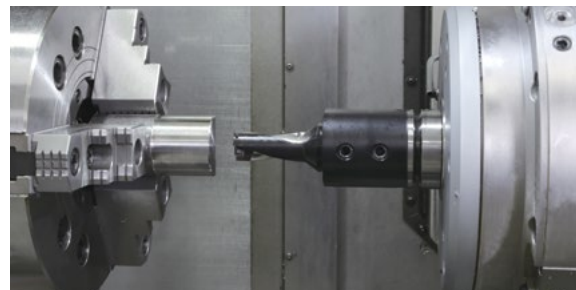
» Efficient Drilling on Curved Surfaces - 4118 Alloy Steel

Tool	PDZ2000FS25M06-2D
Insert (grade)	ZPNT060204EN (XP8030)
Work Material	4118 Alloy Steel
Cutting Speed	800 RPM (164 SFM)
Feed	3.1 IPM (0.004 in/rev)
Depth of Hole	0.394 in
Coolant	Water-Soluble
Machine	Multifunction Lathe



» Multiple Operations by Turning - 4140 Alloy Steel

Tool	PDZ2500FS25M07-2D	
Insert (grade)	ZPNT070304EN (XP8030)	
Work Material	4140 Alloy Steel	
Operation	Drilling	Contouring
Cutting Speed	1273 RPM (328 SFM)	328 SFM
Feed	5.0 IPM (0.004 in/rev)	0.0047 in/rev Aa = 0.079 (4 passes)
Coolant	Air	
Machine	Multifunction Lathe	

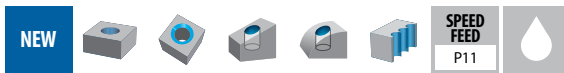


Workpiece

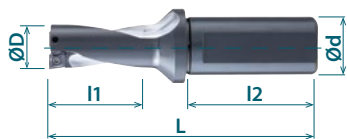


List 52513

PDZ (Inch)



Recommended Materials: p10
Accessories & Inserts: p9-10



EDP No.	Body Type	Designation	Drill Dia. (inch)	Drilling Depth (inch)	Overall Length (inch)	Shank Dia. (inch)	Shank Length (inch)	Applicable Insert
			D	L1	L	d	L2	
52513002	Flat Shank	PDZ0688FS075A05-2D	0.6875	1.375	4.053	0.750	1.969	ZPNT05
52513003		PDZ0750FS100A06-2D	0.7500	1.500	4.413	1.000	2.205	ZPNT06
52513004		PDZ0812FS100A06-2D	0.8125	1.625	4.537	1.000	2.205	
52513005		PDZ0875FS100A06-2D	0.8750	1.750	4.860	1.000	2.205	
52513006		PDZ0937FS125A07-2D	0.9375	1.875	5.142	1.250	2.362	ZPNT07
52513007		PDZ1000FS125A07-2D	1.0000	2.000	5.268	1.250	2.362	
52513008		PDZ1062FS125A08-2D	1.0625	2.125	5.392	1.250	2.362	
52513009		PDZ1125FS125A08-2D	1.1250	2.250	5.518	1.250	2.362	ZPNT08
52513010		PDZ1187FS125A08-2D	1.1875	2.375	5.642	1.250	2.362	
52513011		PDZ1250FS125A09-2D	1.2500	2.500	5.768	1.250	2.362	
52513012		PDZ1312FS150A09-2D	1.3125	2.625	6.285	1.500	2.756	ZPNT09
52513013		PDZ1375FS150A09-2D	1.3750	2.750	6.411	1.500	2.756	
52513014		PDZ1437FS150A10-2D	1.4375	2.875	6.535	1.500	2.756	ZPNT10
52513015		PDZ1500FS150A10-2D	1.5000	3.000	6.661	1.500	2.756	

Packed: 1 pc.



List 78537

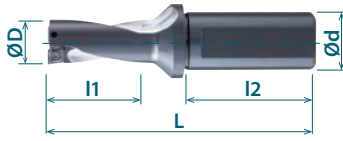
PDZ (Metric)

NEW



SPEED FEED
P11

Recommended Materials: p10
Accessories & Inserts: p9-10



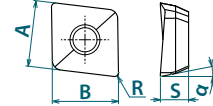
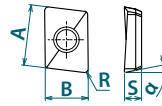
EDP No.	Body Type	Designation	Drill Dia. (mm)	Drilling Depth (mm)	Overall Length (mm)	Shank Dia. (mm)	Shank Length (mm)	Applicable Insert
			D	l1	L	d	l2	
7803776	Flat Shank	PDZ1600FS20M05-2D	16.0	32	97	20	50	ZPNT05
7803777		PDZ1650FS20M05-2D	16.5	33	98	20	50	
7803778		PDZ1700FS20M05-2D	17.0	34	102	20	50	
7803779		PDZ1750FS25M05-2D	17.5	35	109	25	56	
7803780		PDZ1800FS25M05-2D	18.0	36	110	25	56	
7803781		PDZ1850FS25M05-2D	18.5	37	111	25	56	
7803782		PDZ1900FS25M06-2D	19.0	38	112	25	56	
7803783		PDZ1950FS25M06-2D	19.5	39	113	25	56	
7803784		PDZ2000FS25M06-2D	20.0	40	114	25	56	
7803785		PDZ2100FS25M06-2D	21.0	42	121	25	56	
7803786		PDZ2200FS25M06-2D	22.0	44	123	25	56	
7803787		PDZ2300FS25M07-2D	23.0	46	125	25	56	
7803788		PDZ2400FS25M07-2D	24.0	48	127	25	56	
7803790		PDZ2500FS32M07-2D	25.0	50	133	32	60	
7803791		PDZ2600FS32M07-2D	26.0	52	135	32	60	
7803792		PDZ2700FS32M08-2D	27.0	54	137	32	60	
7803793		PDZ2800FS32M08-2D	28.0	56	139	32	60	
7803794		PDZ2900FS32M08-2D	29.0	58	141	32	60	
7803795		PDZ3000FS32M08-2D	30.0	60	143	32	60	
7803796		PDZ3100FS32M08-2D	31.0	62	145	32	60	
7803797		PDZ3200FS32M09-2D	32.0	64	147	32	60	
7803798		PDZ3300FS40M09-2D	33.0	66	159	40	70	
7803799		PDZ3400FS40M09-2D	34.0	68	161	40	70	
7803800		PDZ3500FS40M10-2D	35.0	70	163	40	70	
7803801		PDZ3600FS40M10-2D	36.0	72	165	40	70	
7803802		PDZ3700FS40M10-2D	37.0	74	167	40	70	
7803803		PDZ3800FS40M10-2D	38.0	76	169	40	70	
7803804		PDZ3900FS40M13-2D	39.0	78	178	40	70	
7803805		PDZ4000FS40M13-2D	40.0	80	180	40	70	
7803806		PDZ4100FS40M13-2D	41.0	82	182	40	70	
7803807		PDZ4200FS40M13-2D	42.0	84	184	40	70	
7803808		PDZ4300FS40M13-2D	43.0	86	186	40	70	

Packed: 1 pc.



List 78PZAG

PZAG Inserts for PDZ



Designation	No. of Cutting Edges	Insert Size					EDP Number	
		A x B (mm)	S (mm)	α	R (mm)	Type	XP8030	XC8035
ZPNT050204EN	2	5.9 x 5.9	2.25	11°	0.4	2	7814102	7815102
ZPNT060204EN		6.95 x 6.95	2.93		0.4	2	7814103	7815103
ZPNT070304EN		7.84 x 7.84	3.87		0.4	2	7814104	7815104
ZPNT080304EN		8.85 x 8.85	3.92		0.4	2	7814105	7815105
ZPNT090404EN		9.94 x 9.94	4.65		0.4	2	7814106	7815106
ZPNT100408EN		10.95 x 10.95	4.65		0.8	2	7814108	7815108
ZPNT130508EN		13.92 x 13.92	5.46		0.8	2	7814110	7815110

Packed: 10 pcs.

Note: XC8035 recommended for peripheral cutting edge only.

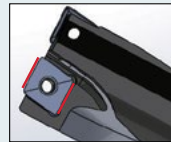


⚠ Precautions when installing the insert

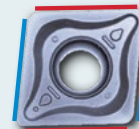
- The insert (XP8030) has a total of 4 working corners – 2 corners for the peripheral cutting edge and 2 corners for the center cutting edge.
- Use the peripheral cutting edge corner for the peripheral cutting edge and the center cutting edge corner for the center cutting edge.



Attached with peripheral cutting edge



Attached with center cutting edge


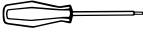


— Edges for peripheral cutting

— Edges for center cutting

List 7808H

PDZ Accessories

Appearance	EDP No.	Designation	Applicable Insert	Applicable Cutter		Recommended Tightening Torque
				(mm)	(inch)	
 Clamping Screw	7808139	FS20543P (M2 x 4.3, Torx 6IP)	ZPNT05...	PDZ Ø16-18.5	PDZ Ø0.687	0.7 Nm
	7808138	FS22550P (M2.2 x 5, Torx 7IP)	ZPNT06...	PDZ Ø19-22	PDZ Ø0.750-0.875	1.0 Nm
	7808136	FS25560P (M2.5 x 6, Torx 9IP)	ZPNT07...	PDZ Ø23-26	PDZ Ø0.937-1.000	1.6 Nm
	7808135	FS30570P (M3 x 7, Torx 9IP)	ZPNT08... ZPNT09...	PDZ Ø27-34	PDZ Ø1.062-1.375	2.2 Nm
	1808137	FS35586P (M3.5 x 8.6, Torx 15IP)	ZPNT10...	PDZ Ø35-38	PDZ Ø1.437-1.500	3.2 Nm
	7808114	FS45510P (M4.5 x 10.5, Torx 20IP)	ZPNT13...	PDZ Ø39-43	-	5.0 Nm
 Wrench	7808223	6IP-D (Torx 6IP)	ZPNT05...	PDZ Ø16-18.5	PDZ Ø0.687	-
	7808224	7IP-D (Torx 7IP)	ZPNT06...	PDZ Ø19-22	PDZ Ø0.750-0.875	-
	7808225	8IP-D (Torx 8IP)	ZPNT07...	PDZ Ø23-26	PDZ Ø0.937-1.000	-
	7808226	9IP-D (Torx 9IP)	ZPNT08... ZPNT09...	PDZ Ø27-34	PDZ Ø1.062-1.375	-
	7808228	15IP-D (Torx 15IP)	ZPNT10...	PDZ Ø35-38	PDZ Ø1.437-1.500	-
	7808229	20IP-D (Torx 20IP)	ZPNT13...	PDZ Ø39-43	-	-

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



Recommended Materials by Application

Insert Grade	Chip Breaker	Coolant	P	M	K	N	S	H
XP8030	-	Yes	⊙	⊙	○	○	○	○
XC8035	-	No	○		⊙			
		Yes	○	○				

Note: XC8035 recommended for peripheral cutting edge only.

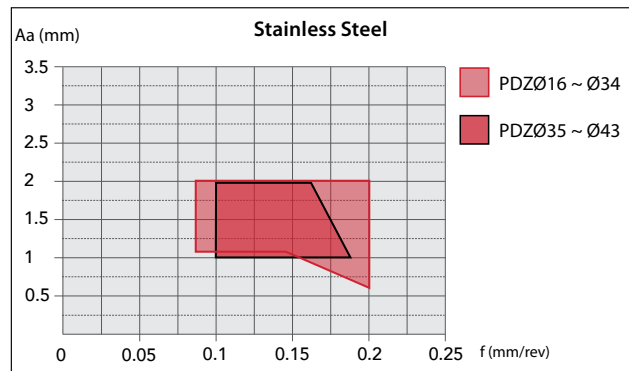
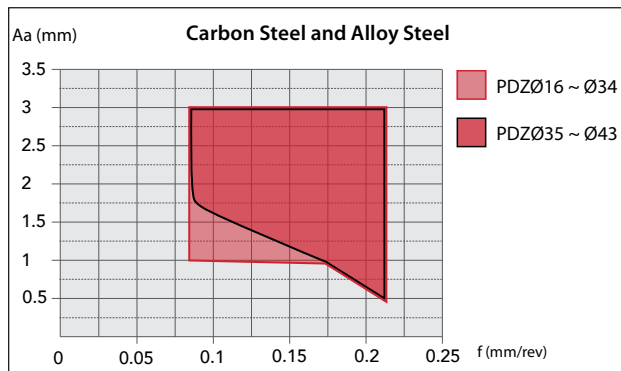
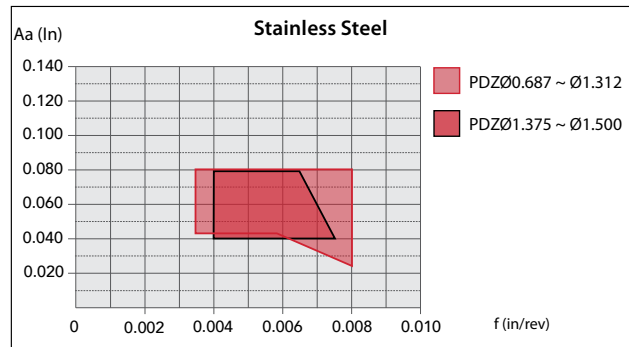
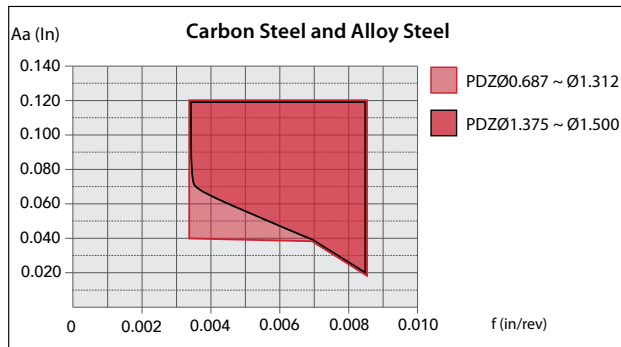
○ good ⊙ best



Cutting Conditions - Drilling


Work Material		Tensile Strength - Hardness	Drilling Speed Vc (SFM)	Feed Rate, f (in/rev)						
				Drilling Depth 2xD						
				Ø0.630-0.650 (16-16.5mm)	Ø0.669-0.728 (17-18.5mm)	Ø0.748-0.787 (19-20mm)	Ø0.827-0.945 (21-24mm)	Ø0.984-1.102 (25-28mm)	Ø1.142-1.299 (29-33mm)	Ø1.338-1.693 (34-43mm)
P	Mild Steels, Carbon Steels (1010, 1018)	~180 HB	650 (500 - 800)	.0024 (.0015 - .004)	.0024 (.0015 - .004)	.0027 (.0015 - .004)	.003 (.0015 - .0047)	.003 (.0015 - .0047)	.004 (.002 - .006)	.004 (.002 - .007)
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB	500 (330 - 720)	.003 (.0015 - .0055)	.0035 (.0015 - .0063)	.004 (.0015 - .007)	.0055 (.0015 - .008)	.007 (.0024 - .010)	.008 (.003 - .012)	.008 (.003 - .014)
	Die Steels (D2, H13)	~280 HB	400 (260 - 600)	.0024 (.0015 - .004)	.0027 (.0015 - .004)	.003 (.0015 - .0047)	.0047 (.0015 - .006)	.0055 (.0024 - .008)	.007 (.003 - .010)	.007 (.003 - .010)
M	Stainless Steels (304, 420)	~250 HB	425 (260 - 600)	.0027 (.0015 - .004)	.003 (.0015 - .004)	.0035 (.0015 - .0047)	.004 (.0015 - .006)	.005 (.0024 - .008)	.006 (.003 - .010)	.006 (.003 - .010)
K	Cast Iron (FC250)	~350 N/mm ²	650 (500 - 920)	.003 (.0015 - .0055)	.004 (.0015 - .0063)	.0047 (.0015 - .008)	.0063 (.003 - .010)	.008 (.0024 - .012)	.008 (.003 - .012)	.008 (.003 - .014)
	Ductile Cast Iron (60-40-18)	~800 N/mm ²	525 (330 - 720)	.003 (.0015 - .0047)	.0035 (.0015 - .0055)	.004 (.0015 - .007)	.0055 (.0015 - .008)	.007 (.0024 - .010)	.007 (.003 - .010)	.007 (.003 - .010)
N	Aluminum Alloys (6061, 7075)	~13% Si	650 (330 - 2600)	.003 (.0015 - .0047)	.004 (.0015 - .0063)	.0047 (.0015 - .008)	.0063 (.0015 - .010)	.008 (.0024 - .012)	.008 (.003 - .012)	.008 (.003 - .012)
S	Heat Resistant Alloys (Inconel 718)	-	165 (50 - 200)	.0015 (.0008 - .0024)	.002 (.0012 - .0024)	.002 (.0012 - .0024)	.0024 (.0015 - .003)	.003 (.0024 - .004)	.004 (.0024 - .0047)	.004 (.0024 - .0047)
	Titanium Alloy (Ti-6Al-4V)	-	200 (100 - 330)	.002 (.0015 - .003)	.0024 (.0015 - .003)	.0024 (.0015 - .003)	.003 (.0015 - .006)	.004 (.0024 - .008)	.0055 (.003 - .008)	.0055 (.003 - .008)
H	Pre-hardened Steel (P20, Stavax)	40 - 43 Hrc	330 (200 - 400)	.0024 (.0015 - .004)	.0024 (.0015 - .0047)	.0027 (.0015 - .0047)	.003 (.0015 - .0047)	.004 (.0024 - .006)	.004 (.0024 - .006)	.004 (.0024 - .006)
	Die Cast Steels (A2, S7)	43 - 48 Hrc	260 (165 - 330)	.002 (.0015 - .003)	.002 (.0015 - .003)	.0024 (.0015 - .003)	.0024 (.0015 - .003)	.003 (.0015 - .004)	.003 (.0015 - .004)	.003 (.0015 - .004)
	Hardened Steels (D2)	50 - 55 Hrc	200 (130 - 260)	.002 (.0015 - .003)	.002 (.0015 - .003)	.0024 (.0015 - .003)	.0024 (.0015 - .003)	.003 (.0015 - .004)	.003 (.0015 - .004)	.003 (.0015 - .004)

Cutting Conditions - Turning





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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