



Counterboring cutter

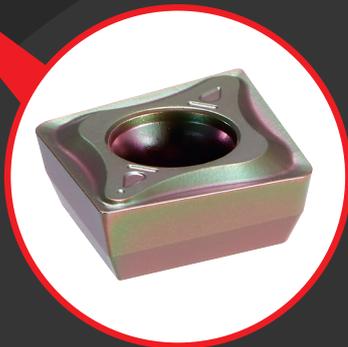
# PZAG

Volume 1.1



# KEY FEATURES: PZAG

Counterboring cutter with perfect chip control

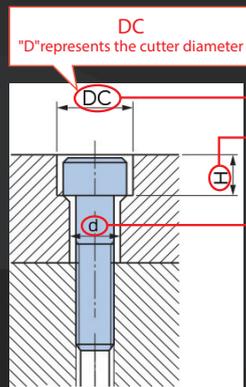


● Since counterboring process is continuous cutting, chip breaking capability is utmost important

● Excellent chip separation capability with the enhanced muscle breaker corresponding to each cutting edge.

## BROAD SIZE LINEUP

Size lineup corresponding to the cap bolt's counterbore hole size  
Corresponds to bolt screw sizes M8 to M52



Dimensions of counterbore and bolt hole with hexagon socket head bolt

Thread size	M8	M10	M12	M14	M16	M18	M20	M22	M24
DC	14	17,5	20	23	26	29	32	35	39
H	8,6	10,8	13	15,2	17,5	19,5	21,5	23,5	25,5
d	9	11	14	16	18	20	22	24	26

Thread size	M27	M30	M33	M36	M39	M42	M45	M48	M52
DC	43	48	54	58	62	67	72	76	82
H	29	32	35	38	41	44	47	50	54
d	30	33	36	39	42	45	48	52	56

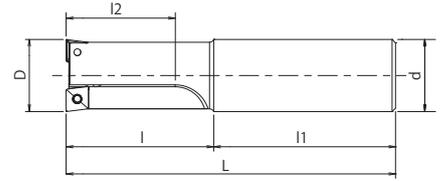
● Flat bottom geometry

# PZAG SS NEW

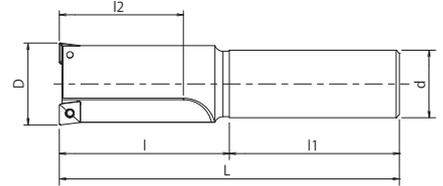
## Counterboring cutter



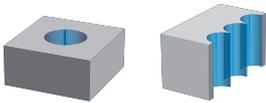
Type 1



Type 2



- Counterboring cutter straight shank
- Excellent chip breaking properties
- Cylindrical type
- 14 - 48 mm



EDP	Designation	D	z	Applicable inserts type	L	l	l1	l2	Min. Ø pilot hole*	ae**	d	Type	Price
7832100	PZAG04R014SS20-2	14	2	ZPNT04...	100	30	70	21	6	4	20	1	
7832101	PZAG06R0175SS20-2	17,5	2	ZPNT06...	105	35	70	26	5,5	6	20	1	
7832102	PZAG06R020SS20-2	20	2	ZPNT06...	110	40	70	30	8	6	20	1	
7832103	PZAG06R023SS25-2	23	2	ZPNT06...	125	50	75	34,5	11	6	25	1	
7832104	PZAG09R026SS25-2	26	2	ZPNT09...	130	55	75	39	8	9	25	1	
7832105	PZAG09R029SS32-2	29	2	ZPNT09...	140	60	80	43,5	11	9	32	1	
7832106	PZAG09R032SS32-2	32	2	ZPNT09...	145	65	80	48	14	9	32	1	
7832107	PZAG09R035SS32-2	35	2	ZPNT09...	150	70	80	52,5	17	9	32	2	
7832108	PZAG09R039SS32-2	39	2	ZPNT09...	160	80	80	58,5	21	9	32	2	
7832109	PZAG09R043SS32-2	43	2	ZPNT09...	170	90	80	64,5	25	9	32	2	
7832110	PZAG09R048SS32-2	48	2	ZPNT09...	180	100	80	72	30	9	32	2	

\* These minimum pre-drilled hole sizes are required before counterboring operations.

\*\* Maximum depth of cut in plunge milling

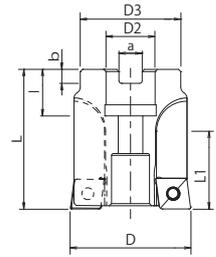
### Accessories & spare parts

Applicable drill Ø	 Clamping screw		 Wrench	
Ø 14	7808096	FS18536P (Torx 6IP)	7808223	6IP-D (Torx 6IP)
Ø 17,5 - 23	7808138	FS22550P (Torx 7IP)	7808224	7IP-D (Torx 7IP)
Ø 26 - 48	7808135	FS30570P (Torx 9IP)	7808226	9IP-D (Torx 9IP)
Ø 54 - 82	7808114	FS45510P (Torx 20IP)	7808229	20IP-D (Torx 20IP)

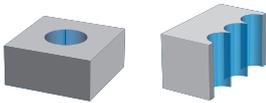


# PZAG BORE NEW

## Counterboring cutter



- Counterboring cutter
- Excellent chip breaking properties
- Bore type
- 54 - 82 mm



Counterboring cutter

EDP	Designation	z	Applicable inserts type	D	D3	D2	L1	l	a	b	Min. Ø pilot hole*	ae**	Price
7832111	PZAG13R054M22-4	4	ZPNT130...	54	45	22	35	21	10,4	6,3	29	12,5	
7832112	PZAG13R058M22-4	4	ZPNT130...	58	45	22	38	21	10,4	6,3	33	12,5	
7832113	PZAG13R062M22-4	4	ZPNT130...	62	45	22	41	21	10,4	6,3	37	12,5	
7832114	PZAG13R067M22-4	4	ZPNT130...	67	45	22	44	21	10,4	6,3	42	12,5	
7832115	PZAG13R072M22-4	4	ZPNT130...	72	45	22	47	21	10,4	6,3	47	12,5	
7832116	PZAG17R076M22-4	4	ZPNT170...	76	45	22	50	21	10,4	6,3	44	16	
7832117	PZAG17R082M22-4	4	ZPNT170...	82	45	22	54	21	10,4	6,3	50	16	

\* These minimum pre-drilled hole sizes are required before counterboring operations.

\*\* Maximum depth of cut in plunge milling

## Accessories & spare parts

Applicable drill Ø	 Clamping screw		 Wrench	
Ø 14	7808096	FS18536P (Torx 6IP)	7808223	6IP-D (Torx 6IP)
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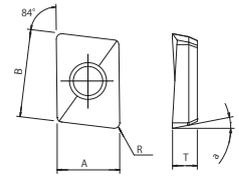
# PZAG INSERTS

Counterboring cutter | Indexables | Inserts

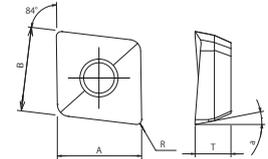


- Counterboring cutter
- 2 corners inserts

Type 1



Type 2



EDP	Designation	Z	A x B	T	α	R	Type	Grade	P		M		K		N		S		H		Price
									dry	⊖	dry	⊖	GG	GGG	dry	⊖	dry	⊖	dry	⊖	
7814101	ZPNT040104ER	2	6.35×4.45	1,76	11°	0,4	1	XP8030	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7814103	ZPNT060204EN	2	6.95×6.95	2,93	11°	0,4	2	XP8030	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7814106	ZPNT090404EN	2	9.94×9.94	4,65	11°	0,4	2	XP8030	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7814109	ZPNT130504EN	2	13.92×13.92	5,46	11°	0,4	2	XP8030	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7814111	ZPNT170608EN	2	17.85×17.85	6,31	11°	0,8	2	XP8030	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7815101	ZPNT040104ER	2	6.35×4.45	1,76	11°	0,4	1	XC8035	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7815103	ZPNT060204EN	2	6.95×6.95	2,93	11°	0,4	2	XC8035	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7815106	ZPNT090404EN	2	9.94×9.94	4,65	11°	0,4	2	XC8035	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7815109	ZPNT130504EN	2	13.92×13.92	5,46	11°	0,4	2	XC8035	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	
7815111	ZPNT170608EN	2	17.85×17.85	6,31	11°	0,8	2	XC8035	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	

Counterboring cutter



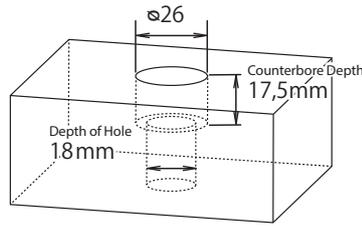
Inserts

# CUTTING DATA

Counterboring cutter | Indexables

## Counterboring in S50C

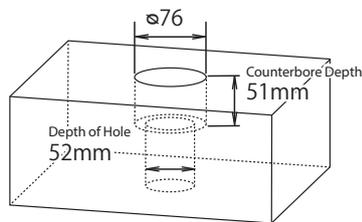
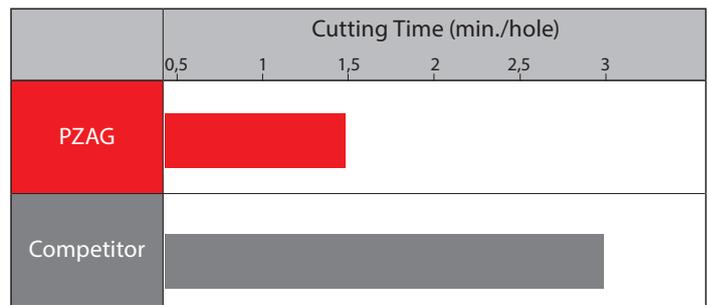
Tool	<b>PZAG09R026SS25-2 (Ø 26 x 2 flutes)</b>
Insert Grade	ZPNT090404EN (XC8035)
Work Material	S50C
Cutting Speed	150m/min (1.837min <sup>-1</sup> )
Feed	550mm/min (0.3mm/t)
Counterbore Depth	17,5mm
Coolant	Dry
Machine	Vertical Machining Center



In the counterboring of a M16 cap bolt, excellent chip breaking was performed, enabling consecutive processing.

## Counterboring of large parts in SS400

Tool	<b>PZAG17R076M22-4 (Ø 76 x 4 flutes)</b>	(Ø 30 x 4 flutes) Competitor's HSS Endmill
Insert grade	ZPNT170608EN (XP8030)	
Work Material	SS400	
Cutting speed	112m/min (470min <sup>-1</sup> )	30m/min (318min <sup>-1</sup> )
Feed	140mm/min (0,3mm/t) 0,5 Step	127mm/min (0,1mm/t)
Counterbore depth	51mm	ap=51mm ae=3mm x 4 Pass
Coolant	Water-Soluble	
Machine	Double column machining center	



A HSS end mill was used in the counterboring of a bolt for a large part in SS400. The PZAG was able to reduce machining time by half from 3 minutes per hole to 1,5 minutes.

# CUTTING CONDITIONS

Counterboring cutter | Indexables | Cutting conditions

## PZAG

	Work Material	Tensile Strength/ Hardness	Vc (m/min)	Feed Rate (mm/rev)				
				ø14~ø17.5	ø20~ø23	ø26~ø48	ø54~ø72	ø76~ø82
P	Mild Steel-Carbon Steel (S5400-S10C)	~180HB	160 (100~200)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.12~0.3)	0.4(0.2~0.6)	0.4(0.2~0.6)
	Carbon Steel-Alloy Steel (S50C-SCM440)	~280HB	150 (100~220)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.12~0.3)	0.4(0.2~0.6)	0.4(0.2~0.6)
	Die Steel (SKD11-SKD61)	~280HB	120 (80~180)	0.12(0.08~0.15)	0.14(0.1~0.2)	0.18(0.12~0.25)	0.4(0.2~0.5)	0.4(0.2~0.5)
M	Stainless Steel (SUS304-SUS420)	~250HB	130 (80~180)	0.1(0.08~0.15)	0.12(0.1~0.2)	0.16(0.12~0.25)	0.35(0.2~0.5)	0.35(0.2~0.5)
K	Cast Iron (FC250)	~350N/mm <sup>2</sup>	200 (150~280)	0.16(0.08~0.25)	0.2(0.1~0.3)	0.3(0.15~0.4)	0.6(0.3~0.8)	0.6(0.3~0.8)
	Ductile Cast Iron (FCD400)	~800N/mm <sup>2</sup>	160 (100~220)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.15~0.3)	0.4(0.3~0.6)	0.4(0.3~0.6)
N	Alluminium Alloy	~13%Si	200 (100~800)	0.16(0.08~0.25)	0.2(0.1~0.3)	0.3(0.15~0.4)	0.6(0.3~0.8)	0.6(0.3~0.8)
S	Heat Resistant Alloy (Wet) (Inconel 718)	–	50 (30~60)	0.08(0.05~0.14)	0.08(0.06~0.14)	0.12(0.08~0.2)	0.25(0.16~0.4)	0.25(0.16~0.4)
	Titanium Alloy (Wet) (Ti-6Al-4V)	–	60 (30~100)	0.08(0.05~0.14)	0.1(0.06~0.16)	0.14(0.08~0.2)	0.3(0.16~0.5)	0.3(0.16~0.5)
H	Pre-hardened Steel NAK80	40~43HRC	100 (60~120)	0.08(0.05~0.14)	0.1(0.06~0.16)	0.14(0.08~0.2)	0.3(0.16~0.5)	0.3(0.16~0.5)
	Hardened Steel SKD11	50~55HRC	60 (40~80)	0.08(0.05~0.14)	0.08(0.05~0.14)	0.12(0.08~0.2)	0.25(0.16~0.4)	0.25(0.16~0.4)





*shaping your dreams*

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