

Expansion

Violet Series, High Precision Drills for Counter Boring

**VA-PDS-CB**

# Exclusive design for counter boring.

- Innovative cutting edge geometry for high performance counter boring.
- Excellent chip breaking and high precision flat surfaces.



# Violet Series, High Precision Drills for Counter Boring

# VA-PDS-CB

## Features

### Special point geometry for excellent chip breaking

#### Thinning geometry

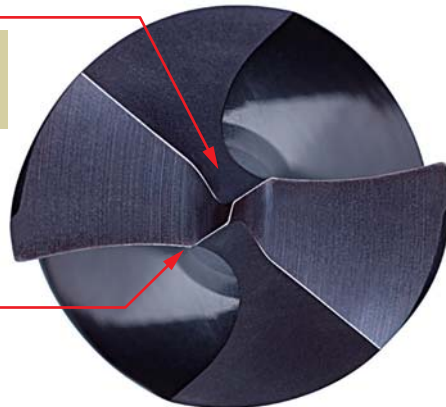
Unique thinning geometry is employed to offer excellent chip breaking.

#### High precision flat surface

Can obtain the same level of flatness (under 0.05mm) as that of conventional counter boring tools.  
 (\* $\phi$  14.1- $\phi$  20.1 : Under 0.10mm  
 $\phi$  22.0- $\phi$  32.0 : Under 0.15mm)

#### Centre cutting edge

Ensures stable, high feed machining.



### Ideal chip geometry

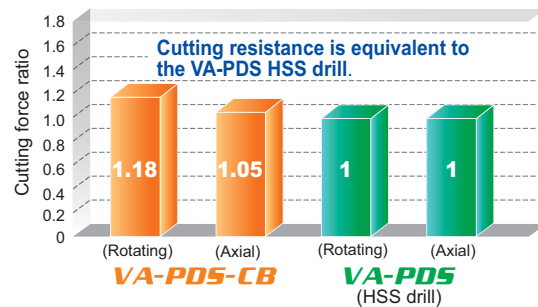


#### Cutting conditions

Drill	VAPDSCBD0800 ( $\phi$ 8)
Workpiece	JIS S50C
Cutting speed	35m/min
Feed rate	280mm/min
Feed	0.20mm/rev
Pilot drilling	None
Coolant	W.S.O.

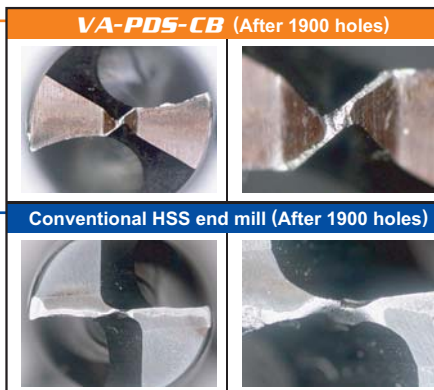
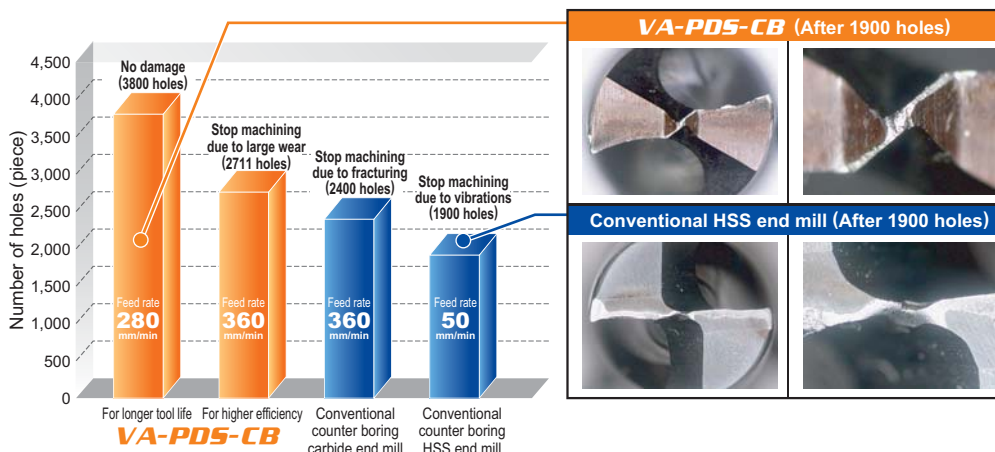
### Versatile

Low cutting force means suitability for all machines that can use HSS drills.



### High efficiency machining

The VA-PDS-CB drill delivers the same high performance as a conventional counter boring end mill but realises longer tool life.



#### Cutting conditions

Drill	VAPDSCBD0800 ( $\phi$ 8)
Workpiece	JIS S50C
Cutting speed	35m/min (for longer tool life) 45m/min (for higher efficiency)
Feed rate	280mm/min (for longer tool life) 360mm/min (for higher efficiency)
Feed	0.20mm/rev
Pilot drilling	None
Coolant	W.S.O.

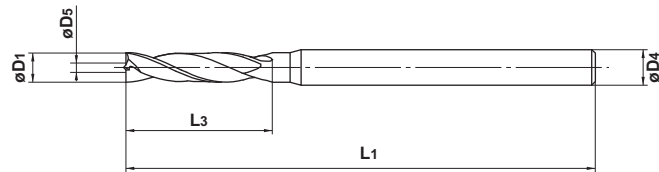
# VA-PDS-CB

Short flute length, High precision, For counter boring



Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		○	○	○	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤30	30<D1≤32
D1 Tolerance (mm)	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033	0 -0.039



- Unique geometry offers high efficiency counter boring. Excellent chip breaking and flat counter bored surface.

Unit : mm

Order Number	Dia. D1	Dia. (118°) D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSCBD0300	3.0	0.8	15	60	3	●
NEW D0330	3.3	0.8	19	70	4	●
NEW D0340	3.4	0.8	19	70	4	●
D0350	3.5	0.8	19	70	4	●
NEW D0380	3.8	1.0	21	70	4	●
D0400	4.0	1.0	21	70	4	●
NEW D0420	4.2	1.0	21	80	6	●
NEW D0430	4.3	1.0	23	80	6	●
D0450	4.5	1.0	23	80	6	●
NEW D0480	4.8	1.4	25	80	6	●
D0500	5.0	1.4	25	80	6	●
NEW D0510	5.1	1.4	25	80	6	●
D0550	5.5	1.4	27	80	6	●
NEW D0580	5.8	1.4	27	80	6	●
D0600	6.0	1.4	27	80	6	●
NEW D0610	6.1	1.4	30	80	8	●
D0650	6.5	1.4	30	80	8	●
NEW D0660	6.6	1.8	30	80	8	●
NEW D0680	6.8	1.8	32	80	8	●
NEW D0690	6.9	1.8	32	80	8	●
D0700	7.0	1.8	32	80	8	●
NEW D0710	7.1	1.8	32	80	8	●
D0750	7.5	1.8	32	80	8	●
NEW D0780	7.8	2.0	35	85	8	●
NEW D0790	7.9	2.0	35	85	8	●
D0800	8.0	2.0	35	85	8	●
NEW D0810	8.1	2.0	35	90	10	●
D0850	8.5	2.0	35	90	10	●
NEW D0860	8.6	2.8	38	93	10	●
NEW D0880	8.8	2.8	38	93	10	●
D0900	9.0	2.8	38	93	10	●
NEW D0910	9.1	2.8	38	93	10	●
D0950	9.5	2.8	38	93	10	●
NEW D0960	9.6	3.2	41	96	10	●
NEW D0980	9.8	3.2	41	96	10	●
D1000	10.0	3.2	41	96	10	●

Order Number	Dia. D1	Dia. (118°) D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
NEW VAPDSCBD1010	10.1	3.2	41	101	12	●
NEW D1030	10.3	3.2	41	101	12	●
D1050	10.5	3.2	41	101	12	●
D1100	11.0	3.7	45	105	12	●
NEW D1110	11.1	3.7	45	105	12	●
D1150	11.5	3.7	45	105	12	●
NEW D1180	11.8	3.7	45	105	12	●
D1200	12.0	3.7	49	109	12	●
D1250	12.5	3.7	49	109	12	●
D1300	13.0	4.2	49	109	12	●
D1350	13.5	4.2	51	121	16	●
NEW D1380	13.8	4.2	51	121	16	●
D1400	14.0	4.2	51	121	16	●
NEW D1410	14.1	5.5	58	123	16	●
NEW D1480	14.8	5.5	58	123	16	●
D1500	15.0	5.5	58	123	16	●
NEW D1580	15.8	5.5	60	125	16	●
D1600	16.0	5.5	60	125	16	●
D1700	17.0	5.5	62	132	20	●
D1750	17.5	5.5	63	133	20	●
NEW D1760	17.6	6.5	63	133	20	●
NEW D1780	17.8	6.5	63	133	20	●
D1800	18.0	6.5	63	133	20	●
NEW D1810	18.1	6.5	65	135	20	●
D1900	19.0	6.5	65	135	20	●
NEW D1980	19.8	7.5	67	137	20	●
D2000	20.0	7.5	67	137	20	●
NEW D2010	20.1	7.5	67	137	20	●
NEW D2200	22.0	7.5	75	165	25	●
NEW D2300	23.0	7.5	80	170	25	●
NEW D2400	24.0	8.5	80	170	25	●
NEW D2600	26.0	9.0	85	180	32	●
NEW D2800	28.0	10.0	95	190	32	●
NEW D2900	29.0	10.0	100	195	32	●
NEW D3000	30.0	11.0	100	195	32	●
NEW D3200	32.0	13.0	105	200	32	●

● : Inventory maintained.

## Recommended Cutting Conditions

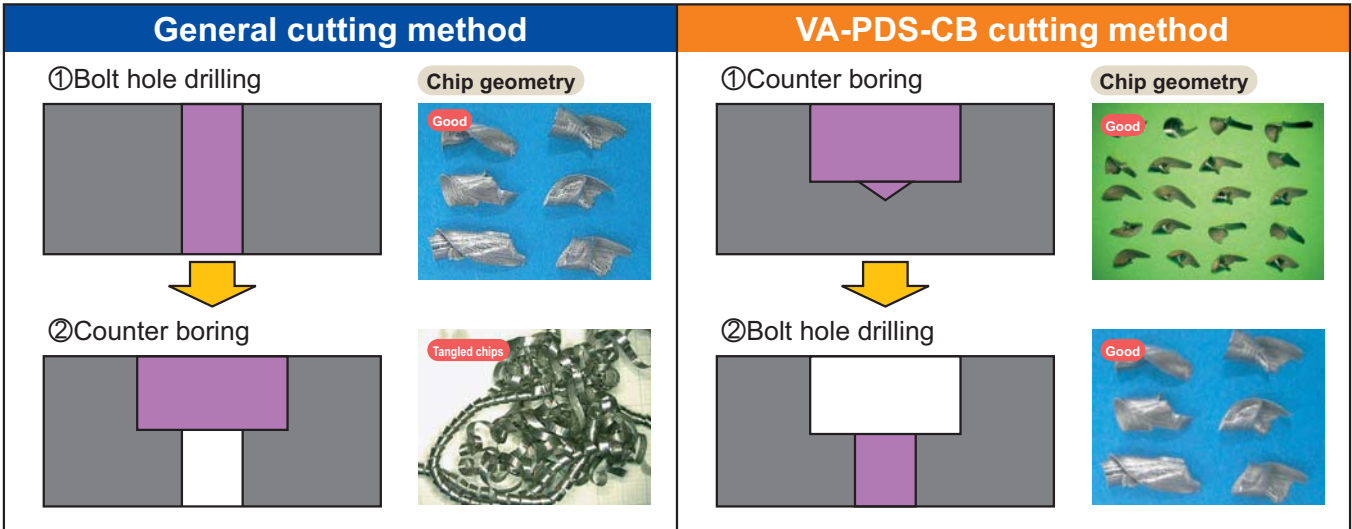
Work Material	Structural steel JIS SS400 Aluminium alloy		Carbon steel JIS S50C Alloy steel JIS SCM Ductile Cast Iron JIS FCD		Alloy tool steel JIS SKD11 (Low-hardness materials) Ferritic stainless steel JIS SUS430, 405 Martensitic stainless steel JIS SUS420, 440		Alloy tool steel SKD61 (-40HRC) hardeningstainless steel JIS SUS630, 631	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/rev)	Revolution (min <sup>-1</sup> )	Feed rate (mm/rev)	Revolution (min <sup>-1</sup> )	Feed rate (mm/rev)	Revolution (min <sup>-1</sup> )
<b>3.0</b>	3700	0.10	3200	0.10	2100	0.10	1900	0.05
<b>4.0</b>	2800	0.12	2400	0.12	1600	0.12	1400	0.06
<b>5.0</b>	2200	0.14	1900	0.14	1300	0.14	1150	0.07
<b>6.0</b>	1850	0.15	1600	0.15	1050	0.15	950	0.08
<b>8.0</b>	1400	0.20	1200	0.20	800	0.20	720	0.10
<b>10.0</b>	1100	0.23	960	0.23	640	0.21	570	0.11
<b>12.0</b>	950	0.26	800	0.26	530	0.24	470	0.12
<b>14.0</b>	800	0.27	680	0.27	450	0.25	410	0.13
<b>16.0</b>	700	0.28	500	0.28	360	0.26	300	0.14
<b>18.0</b>	620	0.29	450	0.29	320	0.27	260	0.15
<b>20.0</b>	560	0.30	400	0.30	290	0.27	240	0.15
<b>22.0</b>	510	0.32	360	0.32	260	0.29	220	0.16
<b>24.0</b>	460	0.33	330	0.33	240	0.30	200	0.16
<b>26.0</b>	430	0.35	310	0.35	220	0.31	180	0.17
<b>28.0</b>	400	0.36	290	0.36	210	0.33	170	0.18
<b>30.0</b>	370	0.37	270	0.37	190	0.34	160	0.18
<b>32.0</b>	350	0.38	250	0.38	180	0.35	150	0.19

- 1) The above cutting conditions are for drilling 2-3xD hole depths without a pilot hole.  
When drilling holes smaller than 1xD hole depths, it is possible to increase the revolution speed by 20%.
- 2) Drilling without a pilot hole is recommended.  
If there is a pilot hole, chips are not broken. Use a pick feed when chip breaking is necessary.
- 3) For counter boring of a sloped face, a carbide end mill is recommended.
- 4) When machining austenitic stainless steels (JIS SUS304, SUS316), set the revolution at 40%-70% and the feed rate 40%-60%.
- 5) Please use a collet type drill chuck.
- 6) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
- 7) Use sufficient cutting fluid.

The above-mentioned cutting conditions are a guide when using water-soluble cutting fluid.  
Please reduce the revolution when using non-water-soluble cutting fluid.

# Recommended cutting method

VA-PDS-CB breaks up chips and prevents them wrapping around the tool.

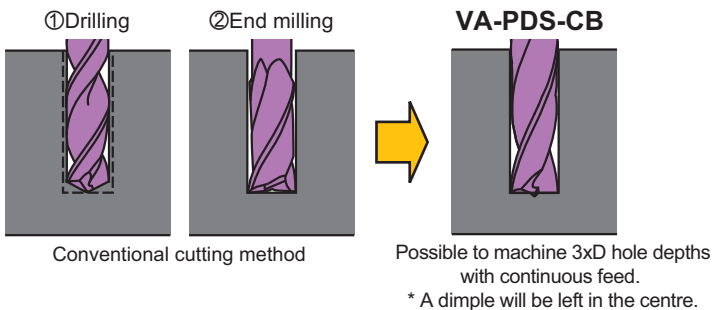


Note) When counter boring using the VA-PDS-CB after drilling a bolt hole (pilot hole), unbroken chips may form and wrap around the tool.

# Other machining examples

## Deep counter boring

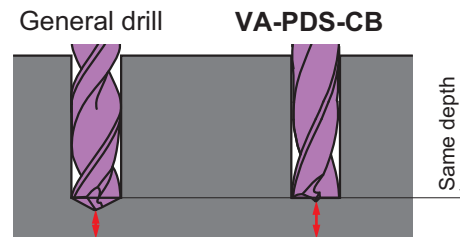
Since non-step drillings is possible up to the effective flute length\*, there is no need to drill a pilot hole and the process will be shortened.



\*Effective flute length = Flute length - Diameter × (1.0 to 1.5) - Penetration length

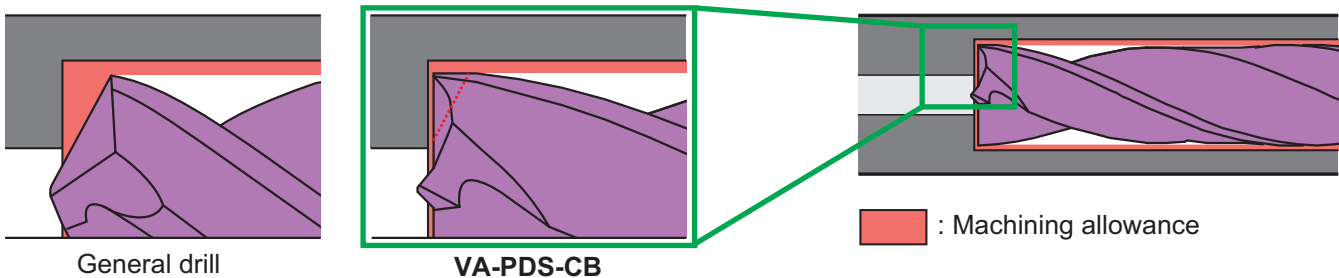
## Blind hole

The small dimple allows a thicker base material on blind holes.



## Pilot hole for boring

The 180° point angle reduces the machining allowance on the inner end face. This suppresses vibration when boring and extends tool life.





## Violet Coated High Precision Drill

The superior heat and abrasion resistance combined with geometries designed for specific purposes gives greater precision, efficiency and longer tool life.

VA-PDS and VA-PDM are for steel and materials hardened up to 40HRC.

VA-PDS-SUS and VA-PDM-SUS are suitable for stainless steels and softer materials.

Drill Type (Series Title)	Applications	Product Code	Size Range	Tool material	Coolant	Coating	Work Material						Shape
							P	H	M	K	N	S	
Violet Coated Drills	General, High Precision	<b>VA-PDS</b>	φ0.5 -φ13.0	High Grade, High Speed Steel	External	V	○		○	○		○	
		<b>VA-PDM</b>	φ0.5 -φ32.0				○		○	○		○	
	General, High Precision For Stainless Steel	<b>VA-PDS-SUS</b>	φ0.5 -φ20.0	Cobalt High Speed Steel	External	V	○		◎	○	○		
		<b>VA-PDM-SUS</b>	φ0.5 -φ13.0				○		◎	○	○		

**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 using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

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(Tools specifications subject to change without notice.)