

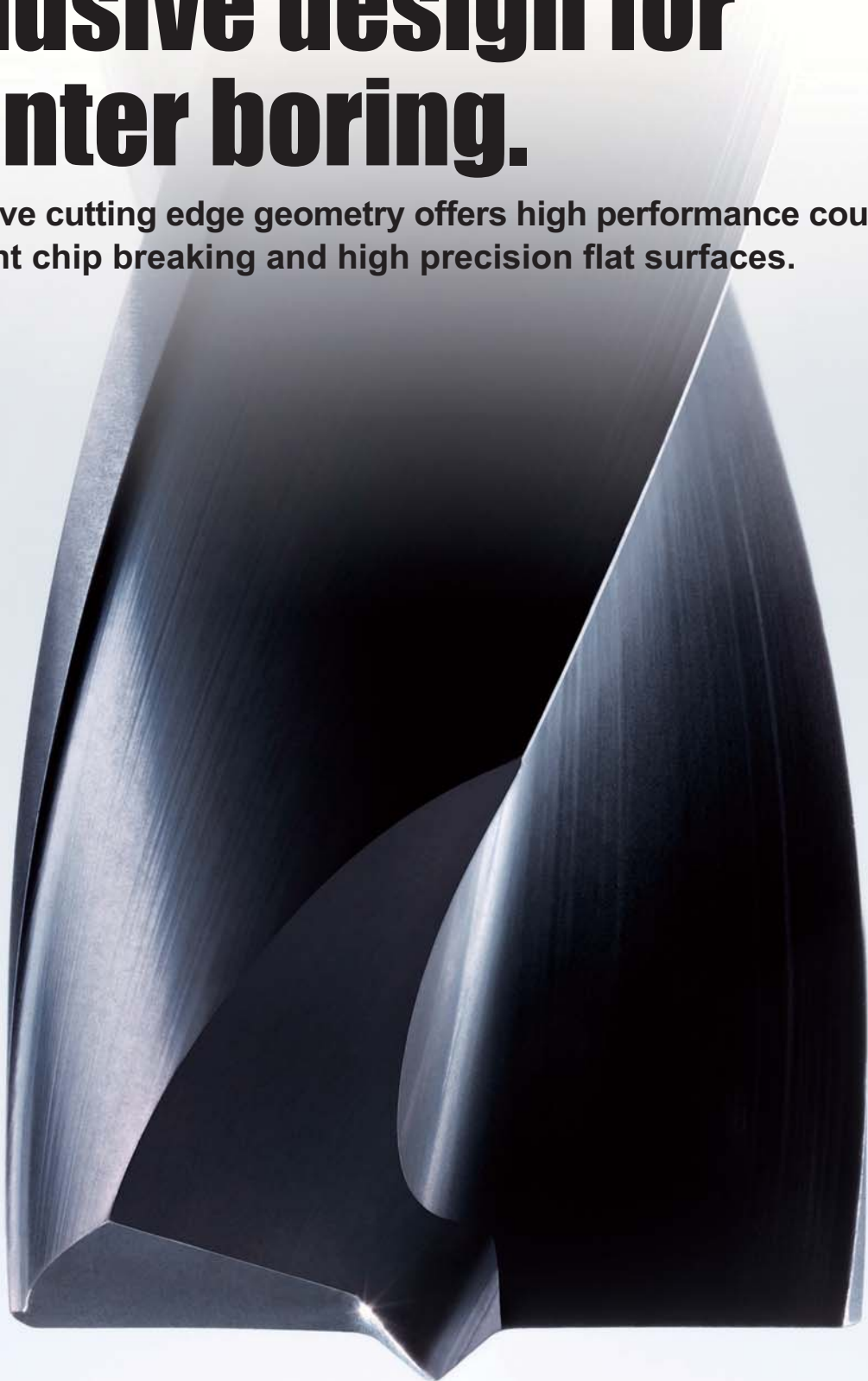
Expansion

Violet Series, High Precision Drills for Counter Boring

**VA-PDS-CB**

# Exclusive design for counter boring.

- Innovative cutting edge geometry offers 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

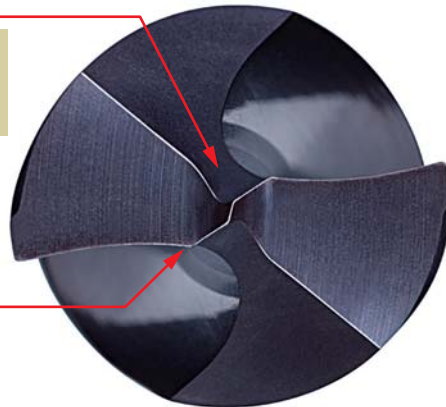
Unique thinning geometry is employed to offer excellent chip breaking.

#### High precision flat surface

Can obtain the same level of flatness\* as that of conventional counter boring tools.  
(- 14.0 : under0.05mm / 15.0 - : under0.1mm)

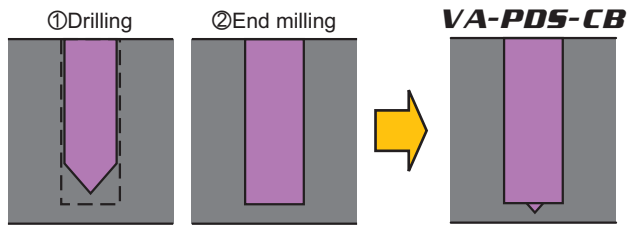
#### Centre cutting edge

Ensures stable, high feed machining.



### Process consolidation for drilling of flat holes

### Ideal chip geometry



Conventional cutting method

Possible to machine 2-3xD hole depths with continuous feed.

\* A dimple will be left at the centre.

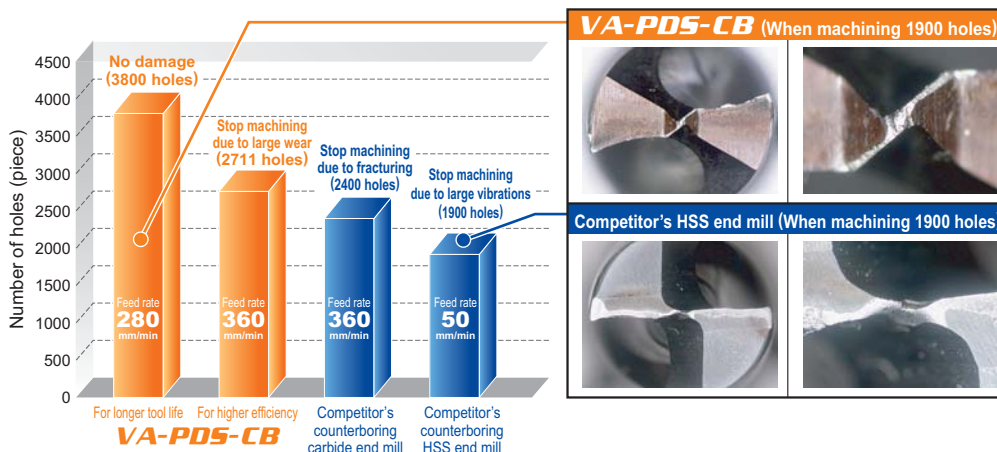


#### ■ Cutting conditions

Drill	VAPDSCBD0800 (φ8)
Workpiece	JIS S50C
Cutting speed	35m/min
Feed rate	280mm/min
Feed	0.20mm/rev
Pilot drilling	None
Coolant	W.S.O.

### Achieves high speed machining

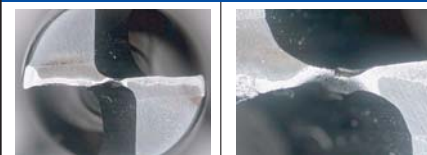
The VA-PDS-CB delivers longer tool life than a counter boring carbide end mill. Also gives longer tool life than standard HSS tools when high speed machining.



#### VA-PDS-CB (When machining 1900 holes)



#### Competitor's HSS end mill (When machining 1900 holes)



#### ■ Cutting conditions

Drill	VAPDSCBD0800 (φ8)
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.

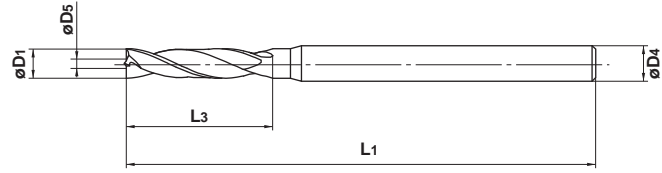
# VA-PDS-CB

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≤20
D1 Tolerance (mm)	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



- 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	●
D0350	3.5	0.8	19	70	4	●
D0400	4.0	1.0	21	70	4	●
D0450	4.5	1.0	23	80	6	●
D0500	5.0	1.4	25	80	6	●
D0550	5.5	1.4	27	80	6	●
D0600	6.0	1.4	27	80	6	●
D0650	6.5	1.4	30	80	8	●
D0700	7.0	1.8	32	80	8	●
D0750	7.5	1.8	32	80	8	●
D0800	8.0	2.0	35	85	8	●
D0850	8.5	2.0	35	90	10	●
D0900	9.0	2.8	38	93	10	●
D0950	9.5	2.8	38	93	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
VAPDSCBD1050	10.5	3.2	41	101	12	●
D1100	11.0	3.7	45	105	12	●
D1150	11.5	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	●
D1400	14.0	4.2	51	121	16	●
NEW D1500	15.0	5.5	58	123	16	●
NEW D1600	16.0	5.5	60	125	16	●
NEW D1700	17.0	5.5	62	132	20	●
NEW D1750	17.5	5.5	63	133	20	●
NEW D1800	18.0	6.5	63	133	20	●
NEW D1900	19.0	6.5	65	135	20	●
NEW D2000	20.0	7.5	67	137	20	●

● : Inventory maintained.

## Recommended Cutting Method

- The VA-PDS-CB achieves high efficiency machining without chip jamming.

General cutting method		VA-PDS-CB cutting method	
① Bolt hole drilling		① Counter boring	
② Counter boring		② Bolt hole drilling	
<b>Chip geometry</b>		<b>Chip geometry</b>	
<b>Tangled chips</b>		<b>Good</b>	

Note) When counter boring using the VA-PDS-CB, drilling with a pilot hole may produce continuous chips that can wrap around the tool.

### Recommended Cutting Conditions

Work Material	Structural steel JIS SS400		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

- 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.

#### 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.

## MITSUBISHI MATERIALS CORPORATION

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