MITSUBISHI MITSUBISHI MATERIALS TOOLS NEWS 2012.12 Update B159G

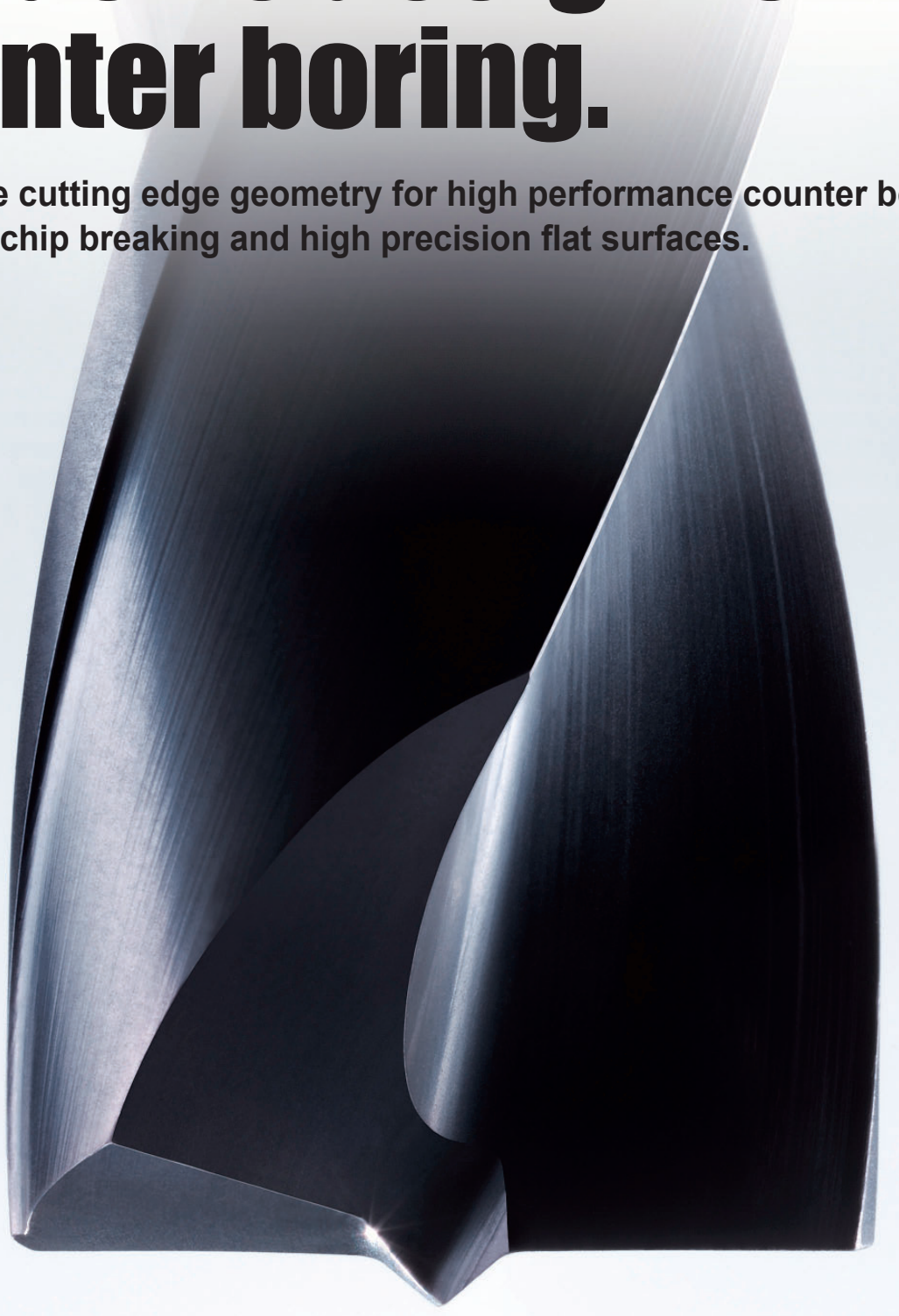
High Precision Violet Series Drills for Counter Boring

VA-PDS-CB

New sizes included

Exclusive design for counter boring.

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



High Precision Violet Series Drills for Counter Boring

VA-PDS-CB

Features

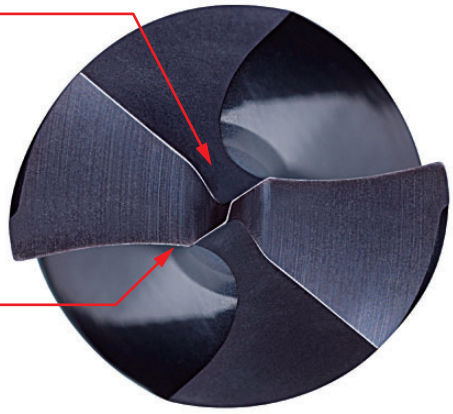
Special point geometry for excellent chip breaking

Thinning geometry

Unique thinning geometry is used to give excellent chip breaking.

Centre cutting edge

Ensures stable, high feed machining.



High precision flat surface

Can obtain the same level of flatness(under 0.05mm) as that of conventional counter boring tools.
(*ø14.1-ø20.1 : Under 0.10mm
ø22.0-ø32.0 : Under 0.15mm)

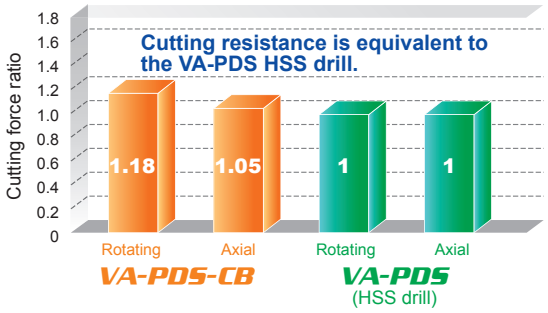
Ideal chip geometry

VA-PDS-CB

Conventional end mill

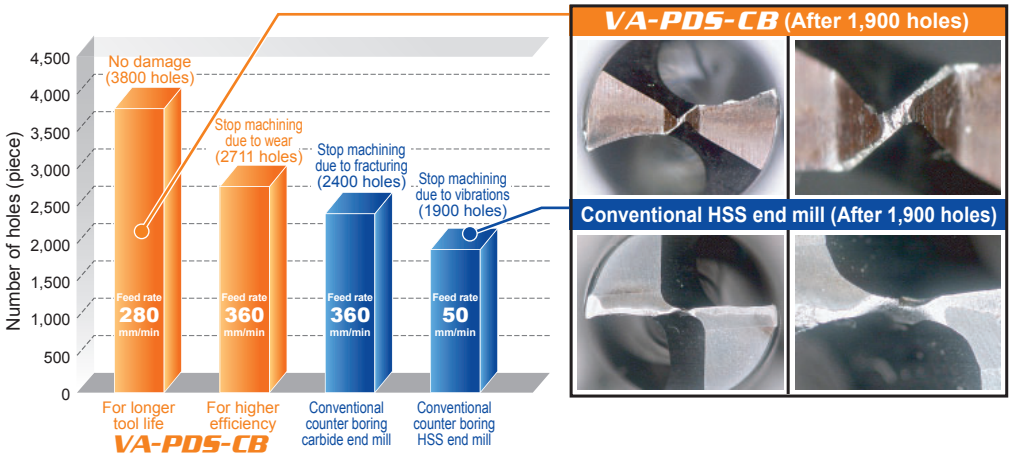
Versatile

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 gives longer tool life.



■ Cutting conditions

Drill	VAPDSCBD0800 (ø8)
Workpiece	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.

Recommended cutting method

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

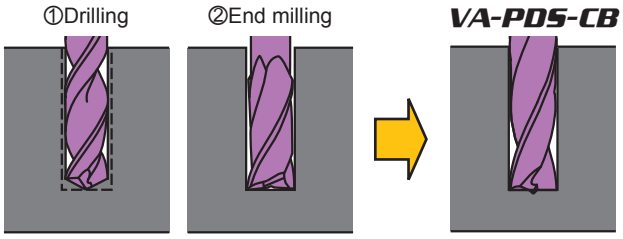
General cutting method	VA-PDS-CB cutting method
①Bolt hole drilling → Chip geometry: Good	①Counter boring → Chip geometry: Good
②Counter boring → Tangled chips	②Bolt hole drilling → Good

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 cunter boring

Since non-peck drilling is possible up to the effective flute length*, there is no need to drill a pilot hole, therefore shortening the machining time.

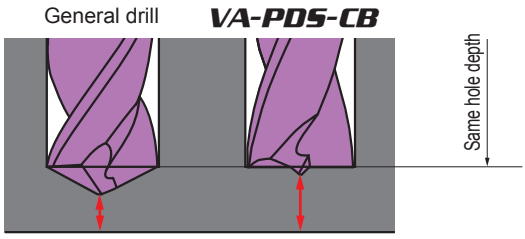


Conventional cutting method

Possible to machine 3xD hole depths with continuous feed.
*A dimple will be left in the centre.

● Blind hole

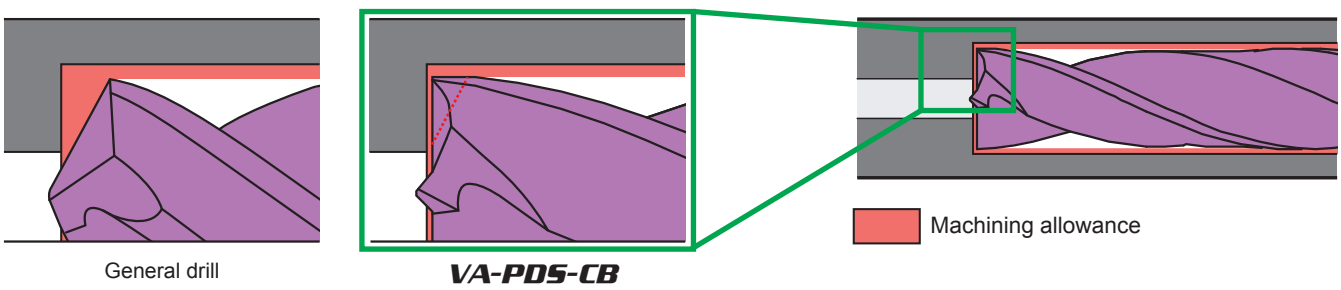
The small dimple allows a thicker base material on blind holes.



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

● Pilot hole for boring

The 180° point angle reduces the machining allowance on the end face.
This reduces vibration during the finish boring operation and extends tool life.



VIOLET DRILLS

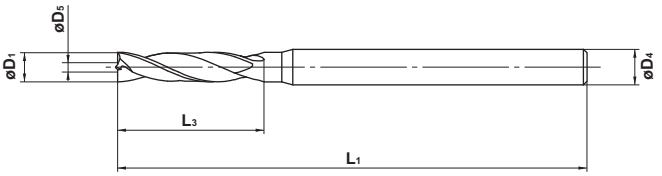
VA-PDS-CB

Short flute length, High precision, For counter boring

HG HSS | V | 180° 118° | X Thinning

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 counterbored surface.

Unit : mm

Order Number	Drill Dia. D1	118° Dia. D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
NEW VAPDSCBD0200	2.0	0.7	12	60	3	●
NEW D0210	2.1	0.7	12	60	3	●
NEW D0220	2.2	0.7	12	60	3	●
NEW D0230	2.3	0.7	13	60	3	●
NEW D0240	2.4	0.7	13	60	3	●
NEW D0250	2.5	0.7	13	60	3	●
NEW D0260	2.6	0.8	15	60	3	●
NEW D0270	2.7	0.8	15	60	3	●
NEW D0280	2.8	0.8	15	60	3	●
NEW D0290	2.9	0.8	15	60	3	●
D0300	3.0	0.8	15	60	3	●
NEW D0310	3.1	0.8	17	70	4	●
NEW D0320	3.2	0.8	17	70	4	●
D0330	3.3	0.8	19	70	4	●
D0340	3.4	0.8	19	70	4	●
D0350	3.5	0.8	19	70	4	●
NEW D0360	3.6	1.0	21	70	4	●
NEW D0370	3.7	1.0	21	70	4	●
D0380	3.8	1.0	21	70	4	●
NEW D0390	3.9	1.0	21	70	4	●
D0400	4.0	1.0	21	70	4	●
NEW D0410	4.1	1.0	21	80	6	●
D0420	4.2	1.0	21	80	6	●
D0430	4.3	1.0	23	80	6	●
NEW D0440	4.4	1.0	23	80	6	●
D0450	4.5	1.0	23	80	6	●
NEW D0460	4.6	1.4	25	80	6	●
NEW D0470	4.7	1.4	25	80	6	●
D0480	4.8	1.4	25	80	6	●
NEW D0490	4.9	1.4	25	80	6	●
D0500	5.0	1.4	25	80	6	●
D0510	5.1	1.4	25	80	6	●
NEW D0520	5.2	1.4	25	80	6	●
NEW D0530	5.3	1.4	25	80	6	●
NEW D0540	5.4	1.4	27	80	6	●
D0550	5.5	1.4	27	80	6	●
NEW D0560	5.6	1.4	27	80	6	●
NEW D0570	5.7	1.4	27	80	6	●
D0580	5.8	1.4	27	80	6	●
NEW D0590	5.9	1.4	27	80	6	●

Order Number	Drill Dia. D1	118° Dia. D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSCBD0600	6.0	1.4	27	80	6	●
D0610	6.1	1.4	30	80	8	●
NEW D0620	6.2	1.4	30	80	8	●
NEW D0630	6.3	1.4	30	80	8	●
NEW D0640	6.4	1.4	30	80	8	●
D0650	6.5	1.4	30	80	8	●
D0660	6.6	1.8	30	80	8	●
NEW D0670	6.7	1.8	30	80	8	●
D0680	6.8	1.8	32	80	8	●
D0690	6.9	1.8	32	80	8	●
D0700	7.0	1.8	32	80	8	●
D0710	7.1	1.8	32	80	8	●
NEW D0720	7.2	1.8	32	80	8	●
NEW D0730	7.3	1.8	32	80	8	●
NEW D0740	7.4	1.8	32	80	8	●
D0750	7.5	1.8	32	80	8	●
NEW D0760	7.6	2.0	35	85	8	●
NEW D0770	7.7	2.0	35	85	8	●
D0780	7.8	2.0	35	85	8	●
D0790	7.9	2.0	35	85	8	●
D0800	8.0	2.0	35	85	8	●
D0810	8.1	2.0	35	90	10	●
D0850	8.5	2.0	35	90	10	●
D0860	8.6	2.8	38	93	10	●
D0880	8.8	2.8	38	93	10	●
D0900	9.0	2.8	38	93	10	●
D0910	9.1	2.8	38	93	10	●
D0950	9.5	2.8	38	93	10	●
D0960	9.6	3.2	41	96	10	●
D0980	9.8	3.2	41	96	10	●
D1000	10.0	3.2	41	96	10	●
D1010	10.1	3.2	41	101	12	●
D1030	10.3	3.2	41	101	12	●
D1050	10.5	3.2	41	101	12	●
NEW D1080	10.8	3.7	45	105	12	●
D1100	11.0	3.7	45	105	12	●
D1110	11.1	3.7	45	105	12	●
D1150	11.5	3.7	45	105	12	●
D1180	11.8	3.7	45	105	12	●
D1200	12.0	3.7	49	109	12	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D_1	118° Dia. D_5	Flute Length L_3	Overall Length L_1	Shank Dia. D_4	Stock
VAPDSCBD1250	12.5	3.7	49	109	12	●
D1300	13.0	4.2	49	109	12	●
D1350	13.5	4.2	51	121	16	●
D1380	13.8	4.2	51	121	16	●
D1400	14.0	4.2	51	121	16	●
D1410	14.1	5.5	58	123	16	●
NEW **D1420**	14.2	5.5	58	123	16	●
NEW **D1450**	14.5	5.5	58	123	16	●
D1480	14.8	5.5	58	123	16	●
D1500	15.0	5.5	58	123	16	●
NEW **D1550**	15.5	5.5	60	125	16	●
NEW **D1570**	15.7	5.5	60	125	16	●
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	●
D1760	17.6	6.5	63	133	20	●
NEW **D1770**	17.7	6.5	63	133	20	●
D1780	17.8	6.5	63	133	20	●
D1800	18.0	6.5	63	133	20	●
D1810	18.1	6.5	65	135	20	●
D1900	19.0	6.5	65	135	20	●
D1980	19.8	7.5	67	137	20	●
D2000	20.0	7.5	67	137	20	●
D2010	20.1	7.5	67	137	20	●
NEW **D2100**	21.0	7.5	75	165	25	●
D2200	22.0	7.5	75	165	25	●
D2300	23.0	7.5	80	170	25	●
D2400	24.0	8.5	80	170	25	●
NEW **D2500**	25.0	8.5	85	180	25	●
D2600	26.0	9.0	85	180	32	●
NEW **D2700**	27.0	9.0	95	190	32	●
D2800	28.0	10.0	95	190	32	●
D2900	29.0	10.0	100	195	32	●
D3000	30.0	11.0	100	195	32	●
NEW **D3100**	31.0	11.0	105	200	32	●
D3200	32.0	13.0	105	200	32	●

RECOMMENDED CUTTING CONDITIONS

Work Material	Structural steel Aluminium alloy		Carbon steel AISI 1049 Alloy steel SCM Cast iron FCD		Alloy tool steel AISI D2 (Low-hardness materials) Ferritic stainless steel AISI 430, AISI 405 Martensitic stainless steel AISI 420, AISI 440		Alloy tool steel AISI H13 (−40HRC) Precipitation hardeningstainless steel ASTM 630, ASTM 631	
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
2.0	5600	0.07	4800	0.07	3200	0.07	2800	0.04
3.0	3700	0.10	3200	0.10	2100	0.10	1900	0.05
4.0	2800	0.12	2400	0.12	1600	0.12	1400	0.06
5.0	2200	0.14	1900	0.14	1300	0.14	1150	0.07
6.0	1850	0.15	1600	0.15	1050	0.15	950	0.08
8.0	1400	0.20	1200	0.20	800	0.20	720	0.10
10.0	1100	0.23	960	0.23	640	0.21	570	0.11
12.0	950	0.26	800	0.26	530	0.24	470	0.12
14.0	800	0.27	680	0.27	450	0.25	410	0.13
16.0	700	0.28	500	0.28	360	0.26	300	0.14
18.0	620	0.29	450	0.29	320	0.27	260	0.15
20.0	560	0.30	400	0.30	290	0.27	240	0.15
22.0	510	0.32	360	0.32	260	0.29	220	0.16
24.0	460	0.33	330	0.33	240	0.30	200	0.16
26.0	430	0.35	310	0.35	220	0.31	180	0.17
28.0	400	0.36	290	0.36	210	0.33	170	0.18
30.0	370	0.37	270	0.37	190	0.34	160	0.18
32.0	350	0.38	250	0.38	180	0.35	150	0.19

1) The above cutting conditions are for drilling 3xD hole depths without a pilot hole. When drilling holes smaller than 1xD hole depths, it is possible to increase the revolutions by 20%.
2) Drilling without a pilot hole is recommended. If there is a pilot hole, chips are not broken. Use a peck 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), reduce the revolutions by 30-60% and the feed rate by 40-60%.
5) Please use a collet type drill chuck or a milling 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 condition is standard when using water-soluble cutting fluid.
Please reduce the revolutions when using non-water-soluble cutting fluid.

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 hardened materials up to 40HRC.
VA-PDS-SUS and VA-PDM-SUS are suitable for stainless steels and softer materials.

Violet Coated High Precision Drill
VA-PDS, VA-PDM

VA-PDS ø0.5~ø13.0

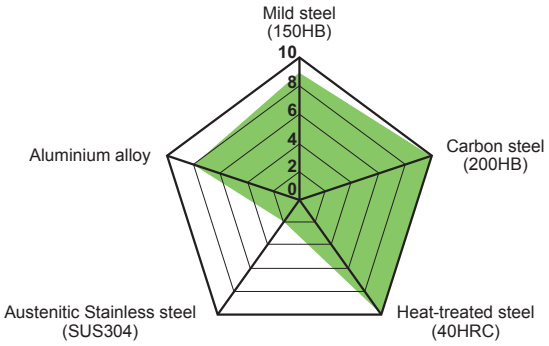
VA-PDM ø0.5~ø32.0

Violet Coated High Precision Drill for Stainless Steel
VA-PDS-SUS, VA-PDM-SUS

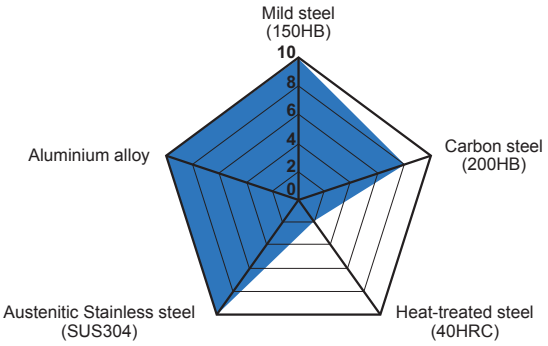
VA-PDS-SUS ø0.5~ø20.0

VA-PDM-SUS ø0.5~ø13.0

Application Radar Chart



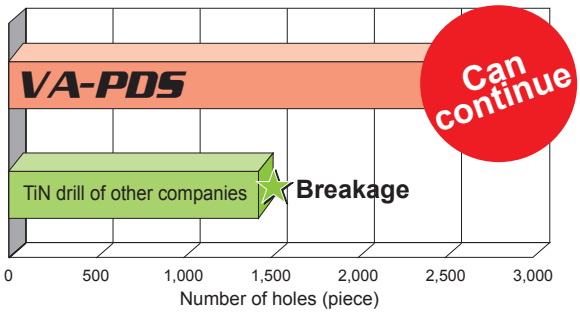
Application Radar Chart



Cutting Example

VA-PDS

Realization of long tool life with excellent abrasion resistance

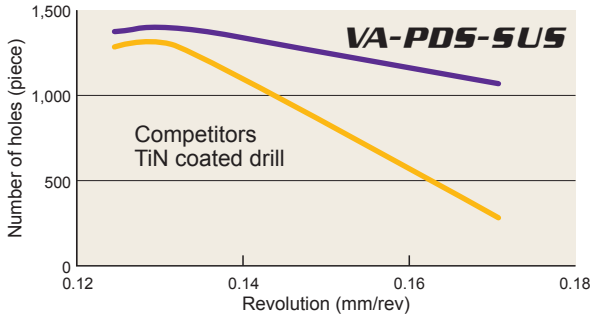


Drill	VA-PDS ø6.0
Workpiece	S50C
Revolution	1,800min^{-1} (35m/min)
Feed	0.3mm/rev
Hole depth	16mm Penetration
Coolant	Emulsion

Cutting Example

VA-PDS-SUS

High performance over a wide range of cutting conditions



Drill	VA-PDS-SUS ø6.0
Workpiece	SUS304
Revolution	800min^{-1} (15m/min)
Hole depth	16mm Penetration
Coolant	Emulsion

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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(Tools specifications subject to change without notice.)

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