

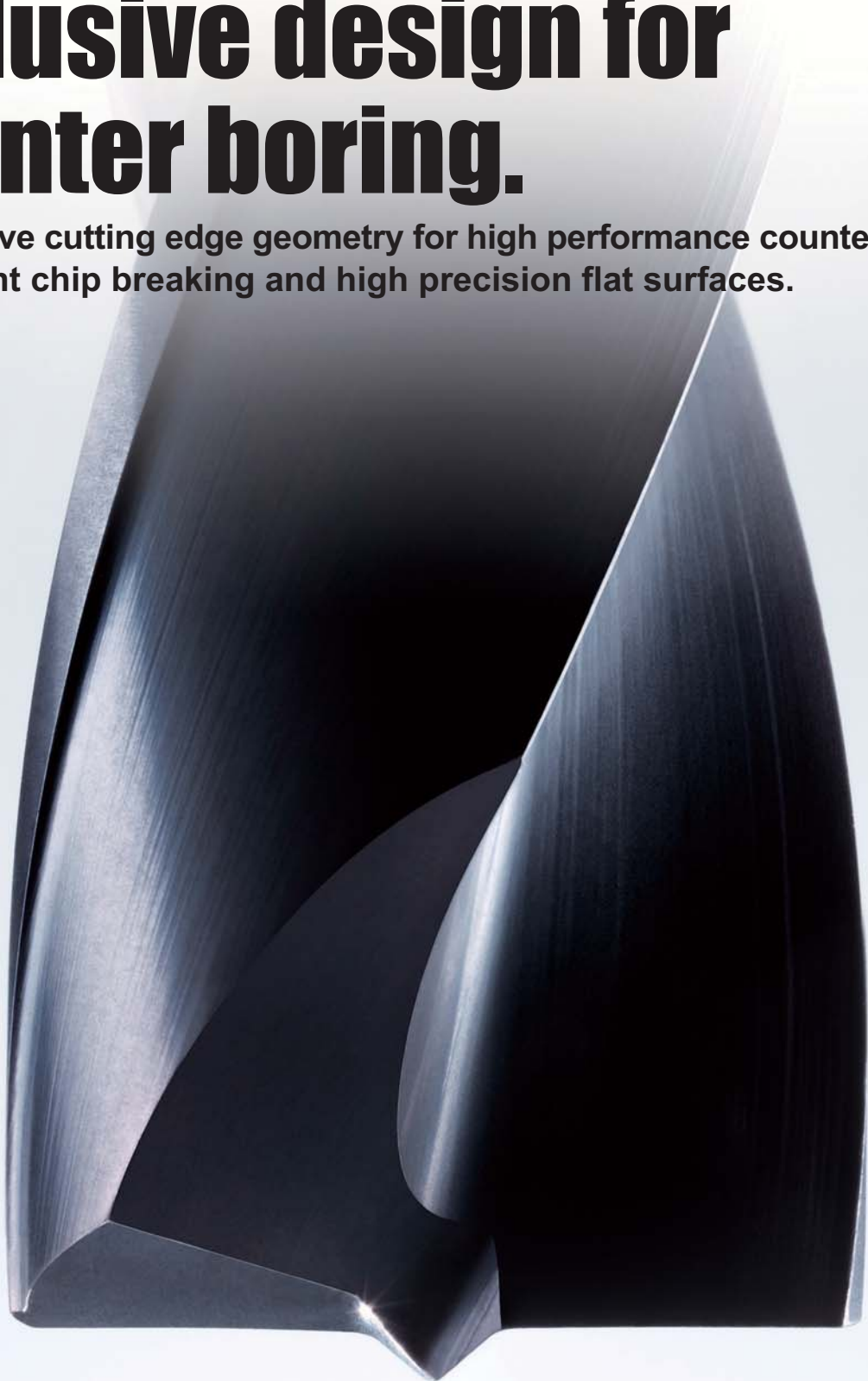
Expansion

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

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Features

Special point geometry for excellent chip breaking

Thinning geometry

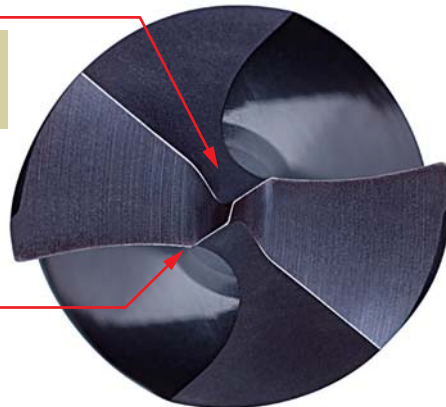
Unique thinning geometry is employed to offer excellent chip breaking.

High precision flat surface

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

Centre cutting edge

Ensures stable, high feed machining.



Ideal chip geometry

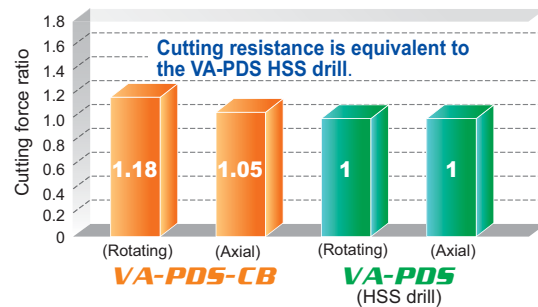


Cutting conditions

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

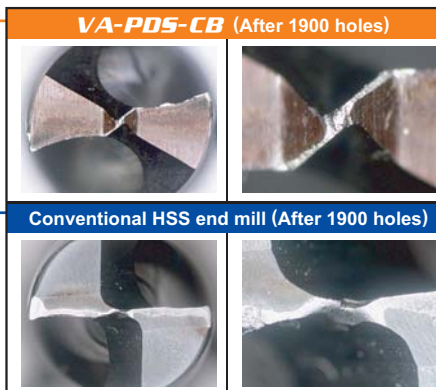
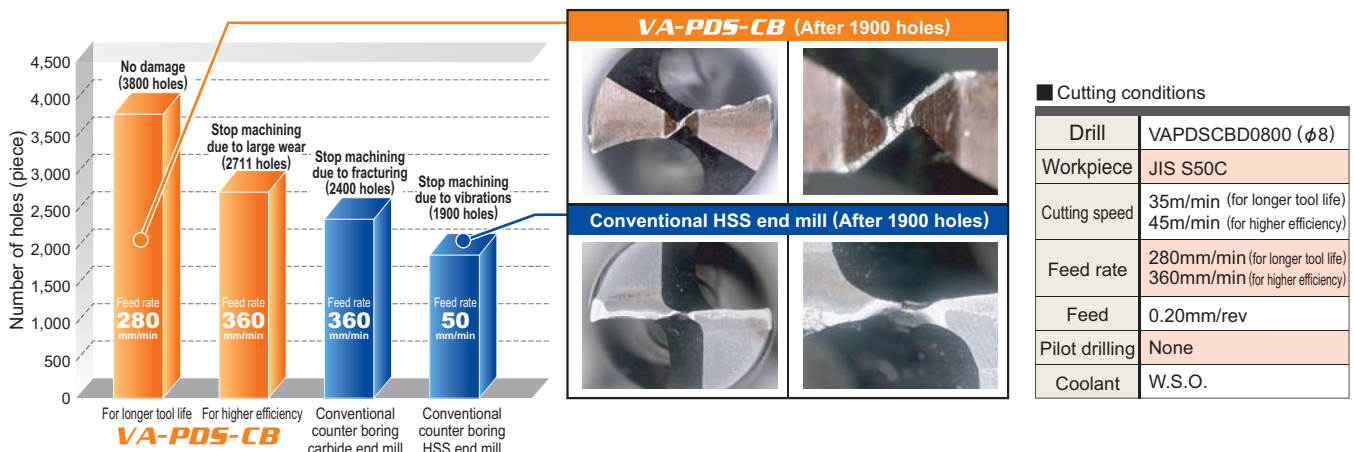
Versatile

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 (ϕ 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.

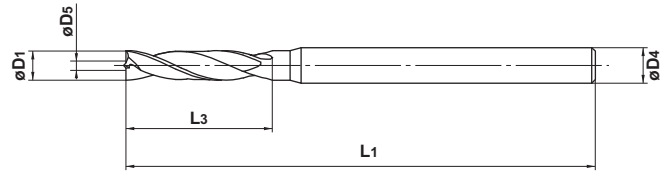
VA-PDS-CB

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

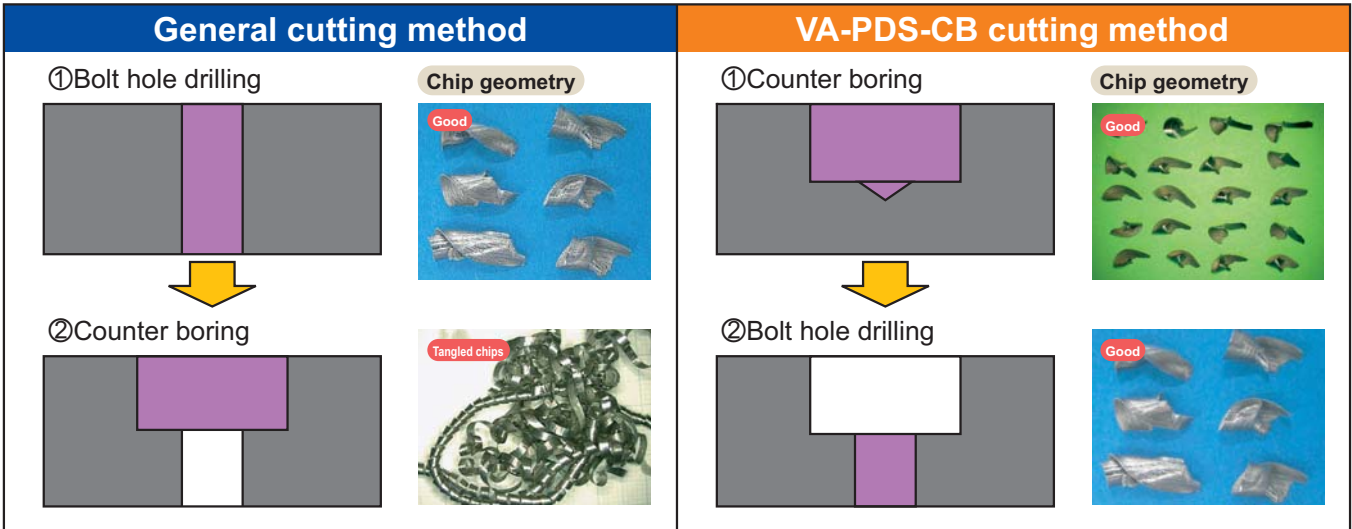
Work Material	Structural steel JIS SS400 Aluminium alloy		Carbon steel JIS S50C Alloy steel JIS SCM Ductile Cast Iron JIS FCD		Alloy tool steel JIS SKD11 (Low-hardness materials) Ferritic stainless steel JIS SUS430, 405 Martensitic stainless steel JIS SUS420, 440		Alloy tool steel SKD61 (-40HRC) hardeningstainless steel JIS SUS630, 631	
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/rev)	Revolution (min ⁻¹)	Feed rate (mm/rev)	Revolution (min ⁻¹)	Feed rate (mm/rev)	Revolution (min ⁻¹)
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 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.

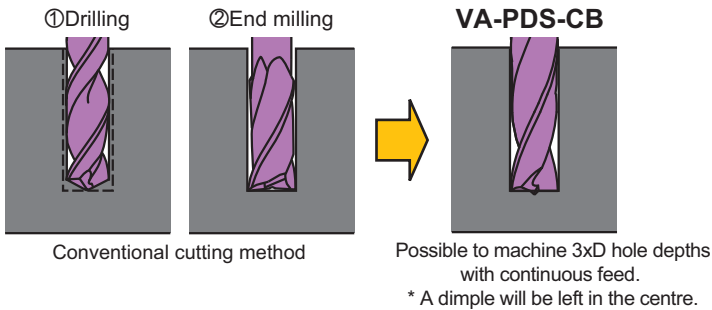


Note) When counter boring using the VA-PDS-CB after drilling a bolt hole (pilot hole), unbroken chips may form and wrap around the tool.

Other machining examples

Deep counter boring

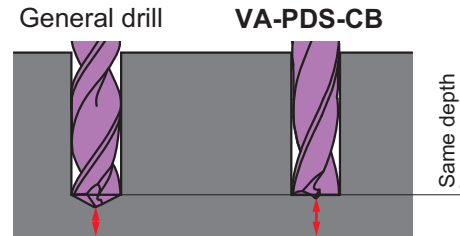
Since non-step drillings is possible up to the effective flute length*, there is no need to drill a pilot hole and the process will be shortened.



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

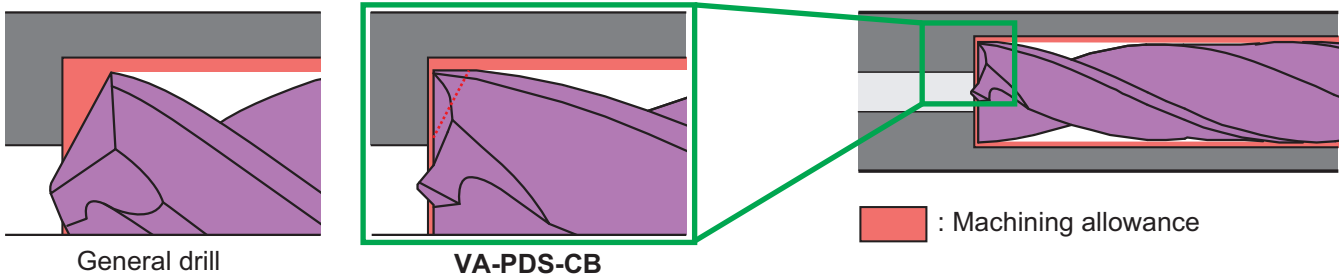
Blind hole

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	VA-PDS	φ0.5 -φ13.0	High Grade, High Speed Steel	External	V	Carbon Steel, Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	
		VA-PDM	φ0.5 -φ32.0				Carbon Steel, Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	
	General, High Precision For Stainless Steel	VA-PDS-SUS	φ0.5 -φ20.0	Cobalt High Speed Steel	External	V	Carbon Steel, Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	
		VA-PDM-SUS	φ0.5 -φ13.0				Carbon Steel, Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	

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.)