MITSUBISHI
MITSUBISHI MATERIALS

TOOLS NEWS

B184G

CVD diamond coated drill
WSTAR drill series
MCS

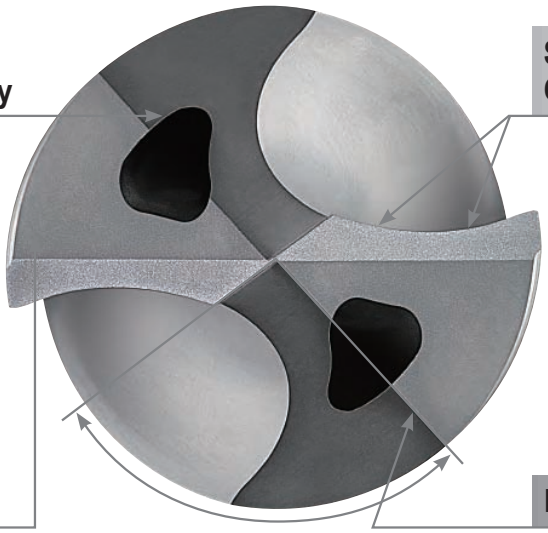
WSTAR series drill for CFRP machining

High quality drilled holes in CFRP.

- The low resistance wavy cutting edge reduces delamination and burrs when drilling CFRP and CFRP/aluminium stacks.
- Proprietary fine multilayer CVD diamond coating achieves outstanding abrasion resistance and smoothness.
- **TRI Cooling technology®** (PAT.P), an original coolant hole shape, improves chip removal when machining CFRP/aluminum stacks and achieves highly accurate holes.
- Eight sizes from 0.1719inch (4.366mm) to 0.501inch (12.725mm).

CVD diamond coating with outstanding abrasion resistance and superior sharpness for high quality CFRP drilling.

CVD diamond coated drill
WSTAR drill series
MCS



Unique coolant hole geometry

TRI Cooling technology (PAT.P) based on a new concept improves chip removal when machining CFRP/ aluminum stacks.
(Coolant holes on drills larger than ϕ6mm)

Special wavy cutting edge for CFRP and CFRP/aluminum stacks

The low resistance and extremely sharp wavy cutting edge reduces burrs with CFRP and aluminum alloys.

New tool grade DD2010

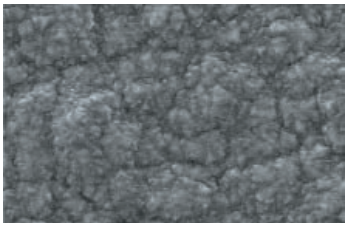
Long-lasting and smooth CVD diamond coating using proprietary fine multilayer crystal control technology.

Back clearance

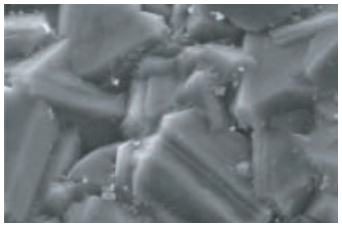
Large back clearance for smooth ejection of chips from the center.

Proprietary CVD diamond coating

■CVD diamond coating surface comparison



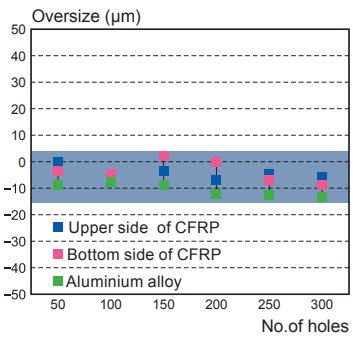
DD2010



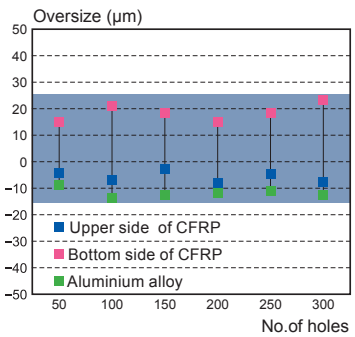
Competitor's

The newly developed DD2010 CVD diamond coated carbide material achieves outstanding abrasion resistance and smoothness, with proprietary fine multilayer diamond crystal control technology.

An original coolant hole shape



MCS



Conventional

With TRI Cooling technology, the MCS drill improves hole accuracy compared with earlier types.

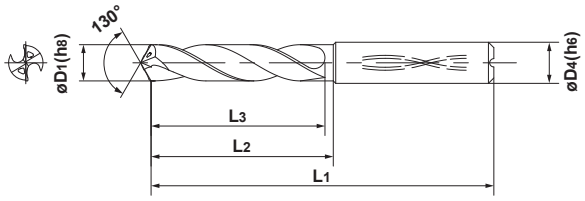
Work material	: CFRP or Aluminium stack
Drill	: ϕ6.375mm
Thickness	: 13mm (CFRP) + 5mm (Aluminium alloy)
Machine	: Machining centre
Cutting speed	: 60m/min (n=2,997min^{-1})
Feed	: 0.03mm/rev
Air brow	

CVD Diamond Coated Drill

MCS
For CFRP

CFRP	CFRP with Aluminium stack
◎	◎

	3<D≤6	6<D≤10	10<D≤18
D1 Tolerance (mm)	0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	0 −0.008	0 −0.009	0 −0.011



(Note) MCS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (inch)	Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock DD2010	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
0.1719	**4.366**	3	Int.	●	**MCS01719X3DB**	23	28	65	6
0.1915	**4.864**	3	Int.	●	**01915X3DB**	27	28	65	6
0.2510	**6.375**	3	Int.	●	**02510X3DB**	33	41	78	8
0.3125	**7.938**	3	Int.	●	**03125X3DB**	40	41	78	8
0.3760	**9.550**	3	Int.	●	**03760X3DB**	45	46	87	10
0.3765	**9.563**	3	Int.	●	**03765X3DB**	45	46	87	10
0.4380	**11.125**	3	Int.	●	**04380X3DB**	53	54	100	12
0.5010	**12.725**	3	Int.	●	**05010X3DB**	58	59	105	14

(Note) Please contact Mitsubishi Materials for special grades and geometries other than our standard products.

RECOMMENDED CUTTING CONDITIONS

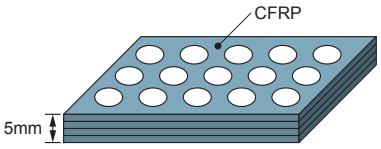
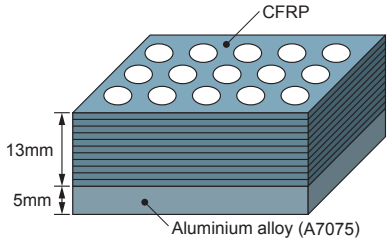
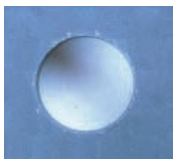
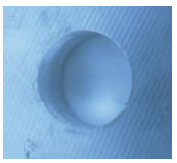
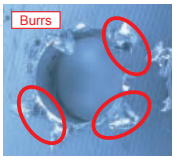
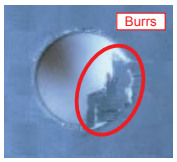
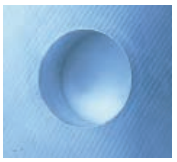
Work material	CFRP		CFRP with Aluminium stack	
Dia. (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
4.366 4.864	85 (50−120)	0.04 (0.03−0.08)	55 (40−70)	0.04 (0.03−0.06)
6.375 7.938	95 (60−130)	0.05 (0.03−0.10)	65 (50−80)	0.05 (0.03−0.07)
9.550 9.563	95 (60−130)	0.07 (0.04−0.12)	65 (50−80)	0.06 (0.04−0.08)
11.125	100 (60−150)	0.10 (0.05−0.15)	70 (50−100)	0.07 (0.05−0.10)
12.725	100 (60−150)	0.10 (0.05−0.15)	70 (50−100)	0.08 (0.05−0.12)

● : **Inventory maintained.**

CVD Diamond Coated Drill

MCS
For CFRP

CUTTING PERFORMANCE

Drill Diameter		ϕ6.375mm	ϕ6.375mm
Work Material		CFRP 	CFRP or Aluminium alloy 
Cutting Conditions	Spindle Speed (min^{-1})	4995	4995
	Cutting Speed (m/min)	100	100
	Feed (mm/rev)	0.04	0.04
Coolant		Air blow	Air blow
Machine		Machining centre	Machining centre
Results		Bottom side of CFRP	Bottom side of aluminium alloy
	MCS		MCS 
	Conventional Drill A for CFRP		Conventional Drill A for CFRP 
	Conventional Drill B for CFRP or aluminium alloy		Conventional Drill B for CFRP or aluminium alloy 
		Earlier types of drill produced large burrs but with the MCS drill are vastly reduced.	

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 attaching inserts or spare parts, please use only the correct wrench or spanner. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tools specifications subject to change without notice.)

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