

THE NEW VALUE FRONTIER

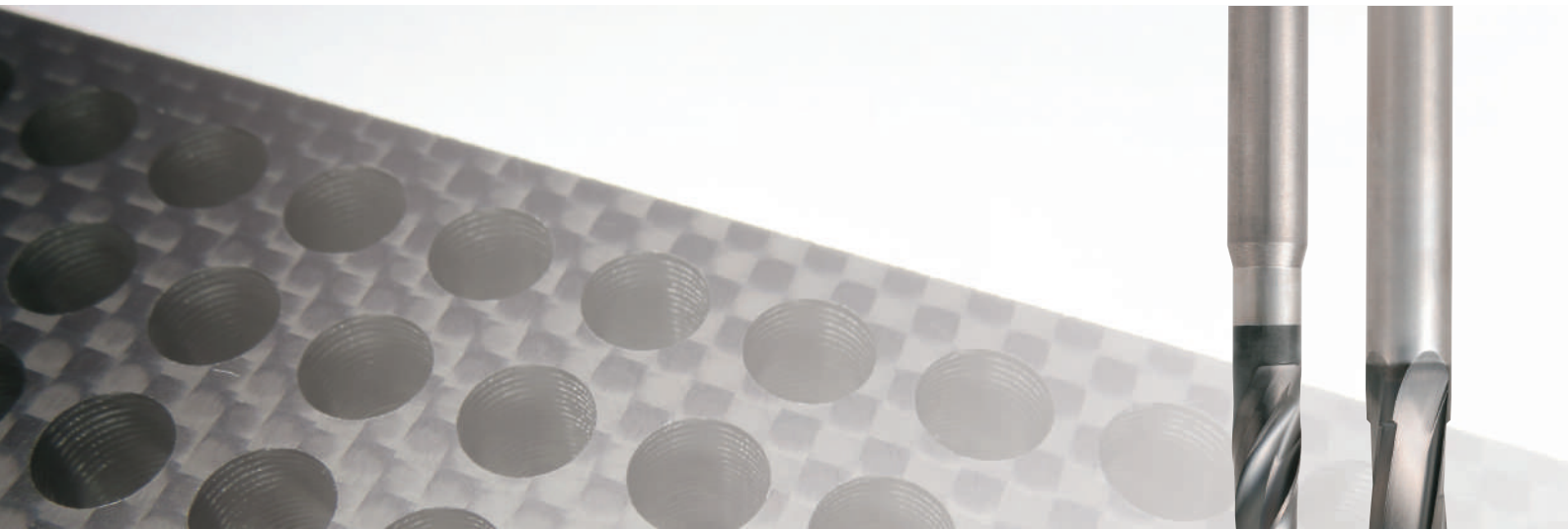


Diamond Coated Solid Tools

Drill 2ZDF-KCD
End Mill 4FCX-KCD

Solid Tools for CFRP

Diamond Coated Solid Tools



Newly Developed High Performance Diamond Coating



Superior Wear Resistance and Fracture Resistance

**High Degree of Crystallinity, Adhesion and Toughness
Improve Tool Durability**

Long Tool Life and High Precision Machining of CFRP

Diamond Coated Solid Tools

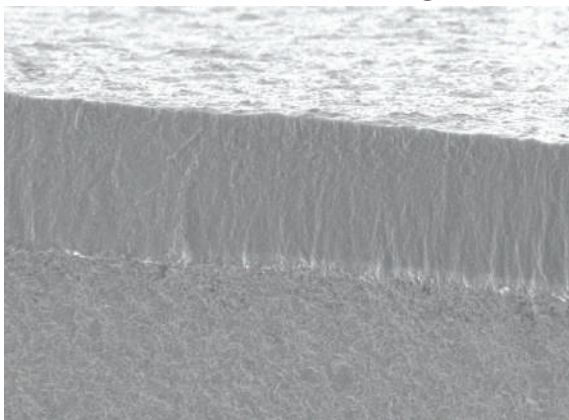
Newly Developed High Performance Diamond Coating
Long Tool Life and High Precision Machining of CFRP

Drill	2ZDF-KCD
End Mill	4FCX-KCD
Special Order Items	* Special order items such as routers are also available

1 Diamond Coating with Superior Wear Resistance and Fracture Resistance
High Degree of Crystallinity, Adhesion and Toughness Improve Tool Durability

Unique Preprocessing Technology and Special Carbide Material
Superior Adhesion Ensures Stable Machining

Smooth and Even Coating Surface

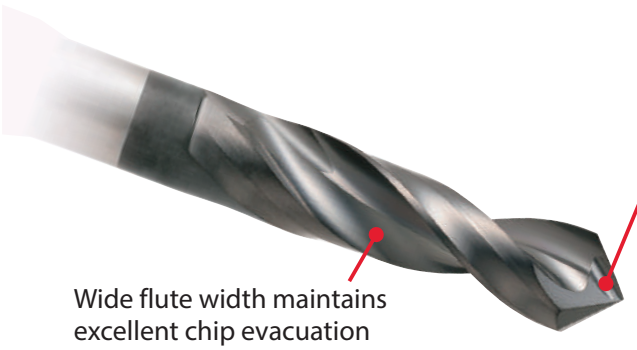


Cross-section of Diamond Coating

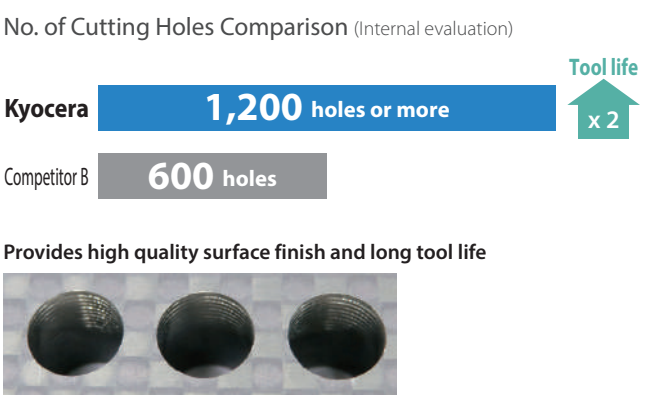
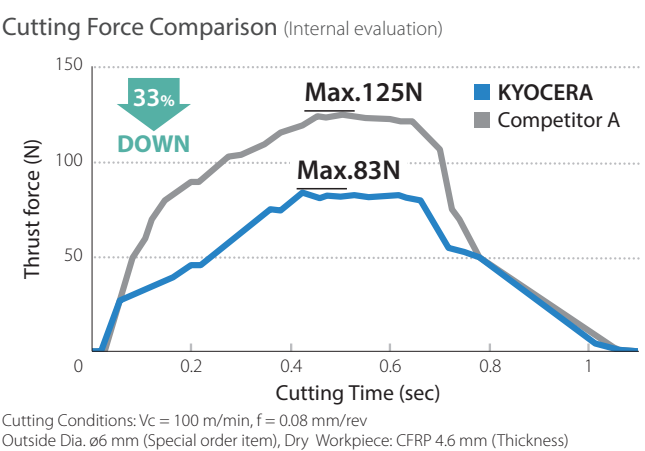
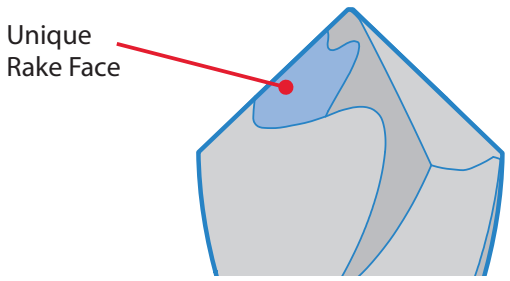


2 Special Tool Geometry Coated with a Smooth Diamond Coating Reduces Cutting Force Long Tool Life, High Precision and High Quality Machining of CFRP

Drill Unique Rake Face Delivers Sharpness at the top of Drill
Low Cutting Force Provides Long Tool Life

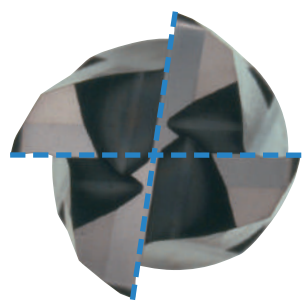


2ZDF-KCD



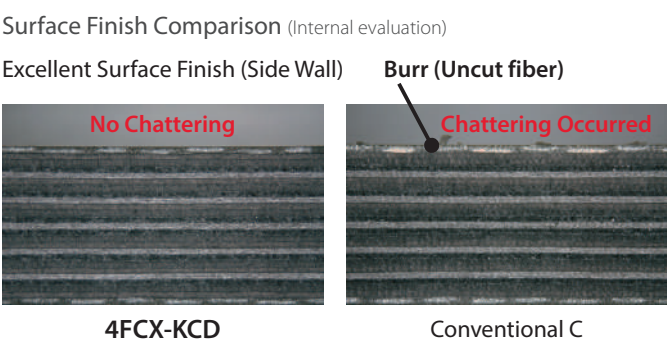
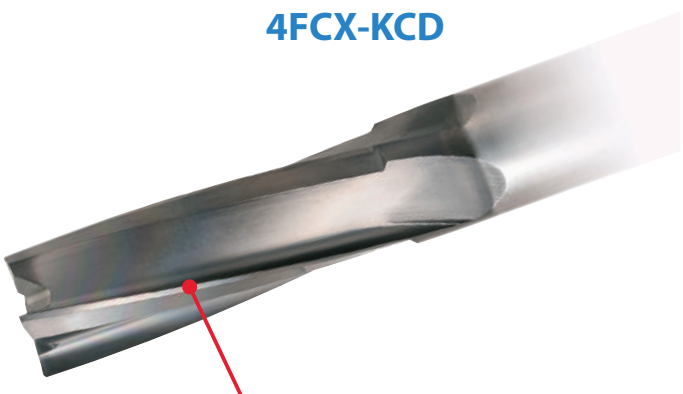
End Mill Variable Flute Design Prevents Chattering and Stable Machining Provides High-quality Surface Finishes Sharp Cutting Edges Cut Off Strong Carbon Fibers. Reduces Delamination and Burr Build Up

New Geometry (Variable Flute Design)



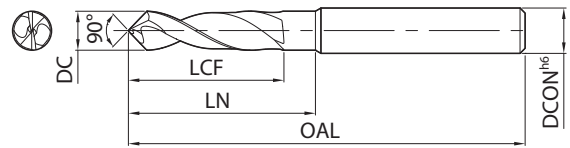
Variable flute design prevents chattering

4FCX-KCD



Cutting Conditions: $V_c = 280$ m/min, $f = 0.1$ mm/rev
Outside Dia. $\phi 10$ mm, $a_e = 10$ mm (Slotting), Dry Workpiece: CFRP 4.6 mm (Thickness)

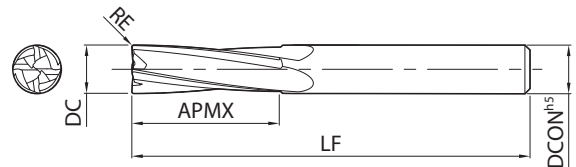
2ZDF-KCD (Drill)



Description	Stock	Outside Dia.		Dimensions (mm)				Coating
				Flute length	Under Neck Length	Overall length	Shank Dia.	
		DC (mm)	DC (inch)	LCF	LN	OAL	DCON	
2ZDF04763-KCD	●	4.763	3/16	35	40	70	6	KCD
2ZDF06350-KCD	●	6.350	1/4	40	45	90	8	KCD
2ZDF07938-KCD	●	7.938	5/16	50	55	90	8	KCD

* Special ordering is available

4FCX-KCD (End Mill)



Description	Stock	Dimensions (mm)					No. of Flutes	Coating
		Outside Dia.	Corner-R	Length of cut	Overall length	Shank Dia.		
		DC	RE	APMX	LF	DCON	ZEFP	
4FCX080-250-KCD	●	8	0.4	25	80	8	4	KCD
4FCX100-300-KCD	●	10	0.4	30	80	10	4	KCD
4FCX120-300-KCD	●	12	0.4	30	100	12	4	KCD

* Special order items such as routers are also available

Recommended Cutting Conditions

Drill

Workpiece	Cutting Conditions	DC (mm)		
		ø4.763	ø6.350	ø7.938
CFRP	Spindle Revolution (min ⁻¹)	3,400 ~ 6,700	2,500 ~ 5,000	2,000 ~ 4,000
	Feed Rate (mm/rev)	0.04 ~ 0.06	0.05 ~ 0.08	0.05 ~ 0.08

End Mill

Workpiece	Cutting Conditions	DC (mm)		
		ø8	ø10	ø12
CFRP	Spindle Revolution (min ⁻¹)	6,000 ~ 10,000	4,800 ~ 8,000	4,000 ~ 6,600
	Feed Rate (mm/rev)	0.05 ~ 0.08	0.05 ~ 0.08	0.05 ~ 0.08

Note

- The above recommended conditions are for dry machining.
- Adjustment may be needed depending on machining and workpiece rigidity and overhang length.
- Sufficient dust removal is required while machining.