Mach Solid Drill Plus CFRP

MSD Plus CFRP

KORLOY TECH-NEWS

- KORLOY's new diamond coated grade ND2100 offers excellent wear resistance
- The optimal cutting edge reduces burrs.

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TECH-NEWS

Mach Solid Drill Plus for machining CFRP

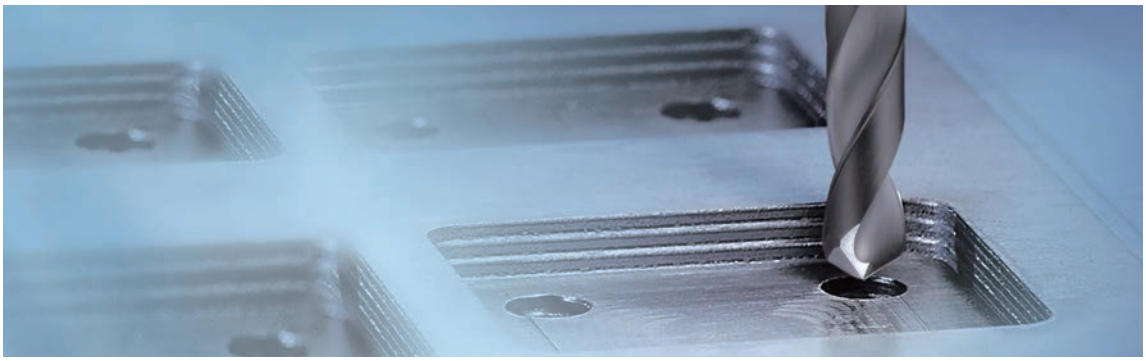
MSD Plus CFRP

The increased use of CFRP for weight reduction in the automobile and aerospace industries requires the development of applicable grades and tool design for machining this material.

Specifically, CFRP materials create burrs around the drills holes entrance and discharge point; while also causing rapid wear of the drills used.

MSD Plus CFRP can reduce the amount of burrs generated during hole making due to its two-stepped point shape. The new diamond-coated grade ND2100, improves wear resistance and durability. These facets improve machined workpiece quality.

We can proudly say MSD Plus CFRP is the ideal tool for high efficiency and high quality hole making of CFRP workpieces.



Diamond-coated grade, ND2100

- Increases tool life

Optimized design for CFRP hole making

- Improves machinability

High rake cutting edges

- Reduces burr creation

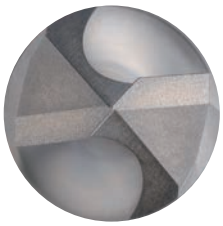
Code System

Special type

MSDP	060	-	5	C	-	100L	-	6S
Mach Solid Drill Plus	**Drill dia.** 060: Ø6.0 (One decimal place marked)		**Standard type** Aspect ratio (L/D) **Special type** Flute length 100: 100 mm	**Applications** C: CFRP		**Overall length** 100L: 100 mm		**Shank dia.** 6S: Ø6

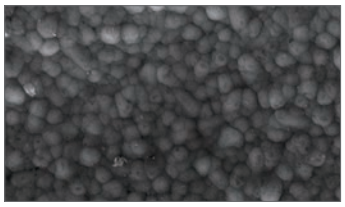
Features

- The cutting edge with a 2 step shape reduces the cutting load.
- The optimal point angle of cutting edge reduces burrs.
- Higher hardness of cutting edge increases wear resistance.

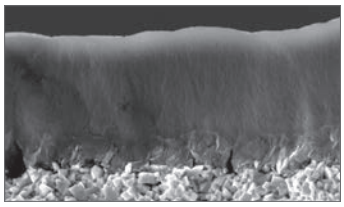


[Diamond Coating]

- Diamond coating specialized in CFRP machining
- Exclusive substrate for diamond coating optimized for CFRP cutting



High hardness diamond coating maintains well-cut shapes

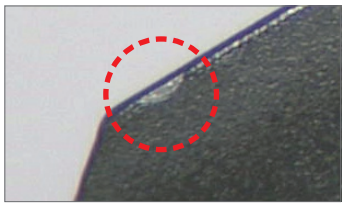


Diamond coating's strong adhesion to the substrate

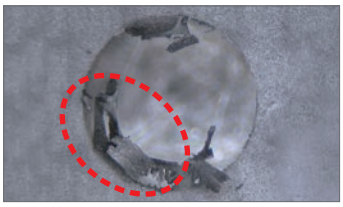
▶ Improved wear resistance and surface finish by applying high hardness diamond coating of low friction factors

Common Problems When Machining CFRP

- Wear and flaking on the relief surface due to continuous friction during machining
- Burr creation due to flaking of coated layers and deterioration in surface roughness



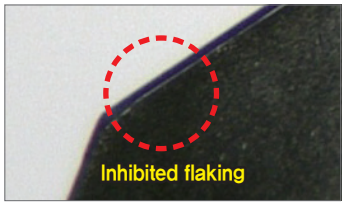
[Wear and flaking]



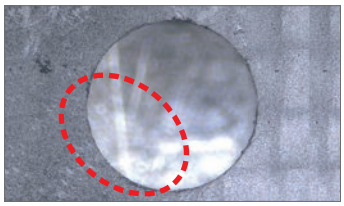
[Burrs]

▶ Burrs and deformation of cutting edges caused by wear and flaking

Development Effect



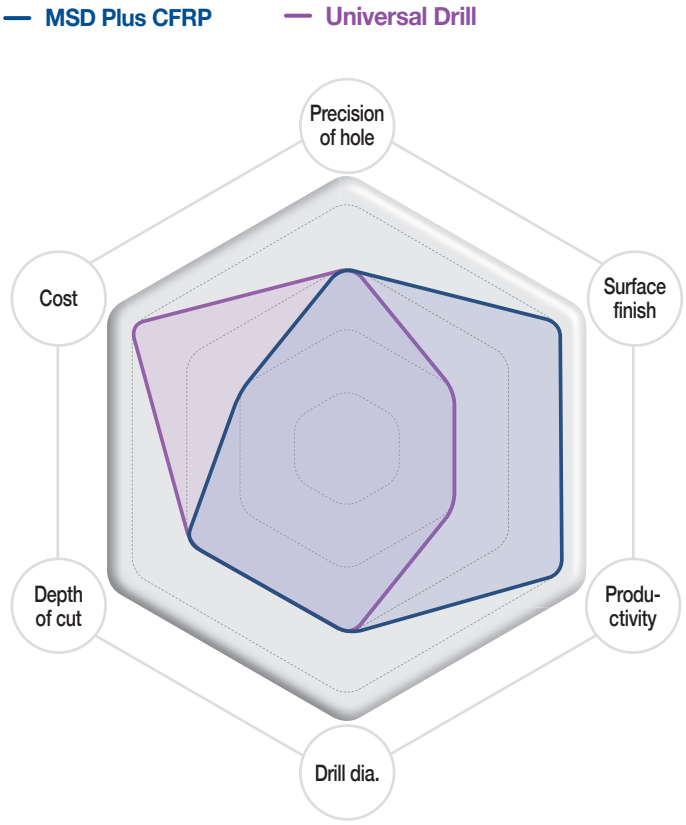
[Less wear and flaking on the rake surface]



[Fewer burrs on workpieces]

▶ Inhibited burr creation by keeping cutting edges in good shape

Drill Selection Guide



MSD Plus CFRP new

- Improved surface finish and productivity
- Decreased wear and burrs

Universal Drill

- Reasonable cost

Tools	Precision of hole	Surface finish	Productivity	Drill dia.	Depth of cut	Cost
MSD Plus CFRP new	★★★	★★★★	★★★★	★★★	★★★	★★
Universal Drill	★★★	★★	★★	★★★	★★★	★★★★

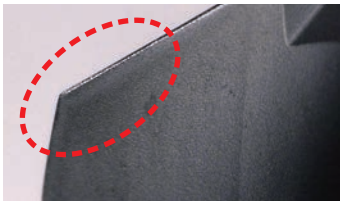
Recommended Cutting Conditions

Workpiece	Grade	Cutting speed vc (m/min)	Depth of cut = 5D Feed rate (mm/rev) per drill dia. (mm)		
			Ø2.5-Ø4.0	Ø4.1-Ø8.0	Ø8.1-Ø12.0
CFRP	ND2100	100 (100-150)	0.03-0.07	0.03-0.07	0.03-0.07

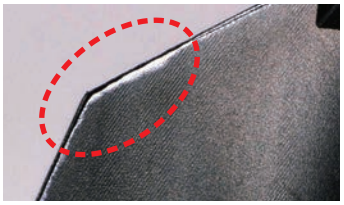
Performance Evaluation

Improved performance quality

- **Workpiece** Composite (CFRP)
- **Cutting conditions** vc (m/min) = 100, fn (mm/rev) = 0.05, ap (mm) = 10, air
- **Cutting length** 7.2 m (720 holes)
- **Tool** MSDP060-5C (ND2100)



[MSD Plus CFRP]

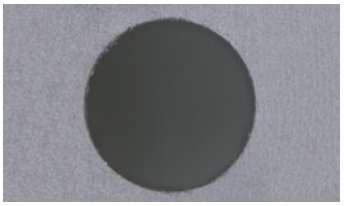


[Competitor's]

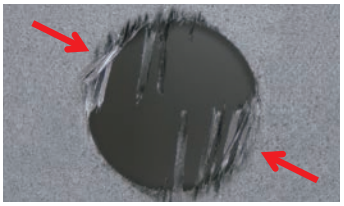
▶ Excellent resistance to flaking and improved performance quality in drilling CFRP

Machinability in high quality hole making

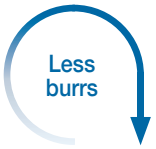
- **Workpiece** Composite (CFRP)
- **Cutting conditions** vc (m/min) = 100, fn (mm/rev) = 0.05, ap (mm) = 10, air
- **Tool** MSDP060-5C (ND2100)



[MSD Plus CFRP]



[Competitor's]

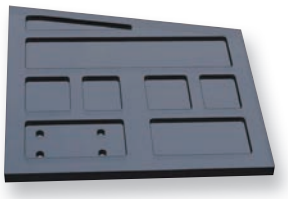


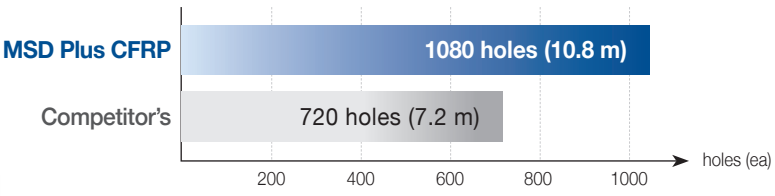
▶ Reduced burrs produces high quality hole making

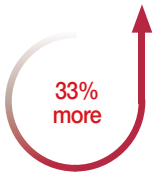
Application Examples

Wing Tail

- **Workpiece** Composite (CFRP)
- **Cutting conditions** vc (m/min) = 100, fn (mm/rev) = 0.05, ap (mm) = 10, air
- **Tool** MSDP060-5C (ND2100)

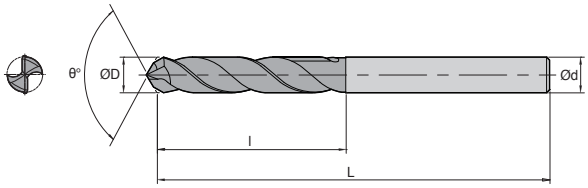






▶ 33% longer tool life compared to the competitor's

MSDP-5C



Specification	C
Grade	ND2100
Tolerance (Drill dia.)	m7
Tolerance (Shank dia.)	h6
Point angle (θ°)	118°
Twist angle	30°
Thinning	X type
Coolant	External

C CFRP

(mm)

Designation		ØD		Ød	5C	
		mm	inch		ℓ	L
MSDP	030-5C	3	-	6	28	66
	040-5C	4	-	6	36	74
	0476-5C	4.76	3/16	6	44	82
	050-5C	5	-	6	44	82
	060-5C	6	-	6	44	82
	0635-5C	6.35	1/4	8	53	91
	070-5C	7	-	8	53	91
	0794-5C	7.94	5/16	8	53	91
	080-5C	8	-	8	53	91
	090-5C	9	-	10	61	103
	0952-5C	9.52	3/8	10	61	103
	100-5C	10	-	10	61	103
	110-5C	11	-	12	71	118
	1111-5C	11.11	7/16	12	71	118
	120-5C	12	-	12	71	118
	127-5C	12.7	1/2	14	77	124

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