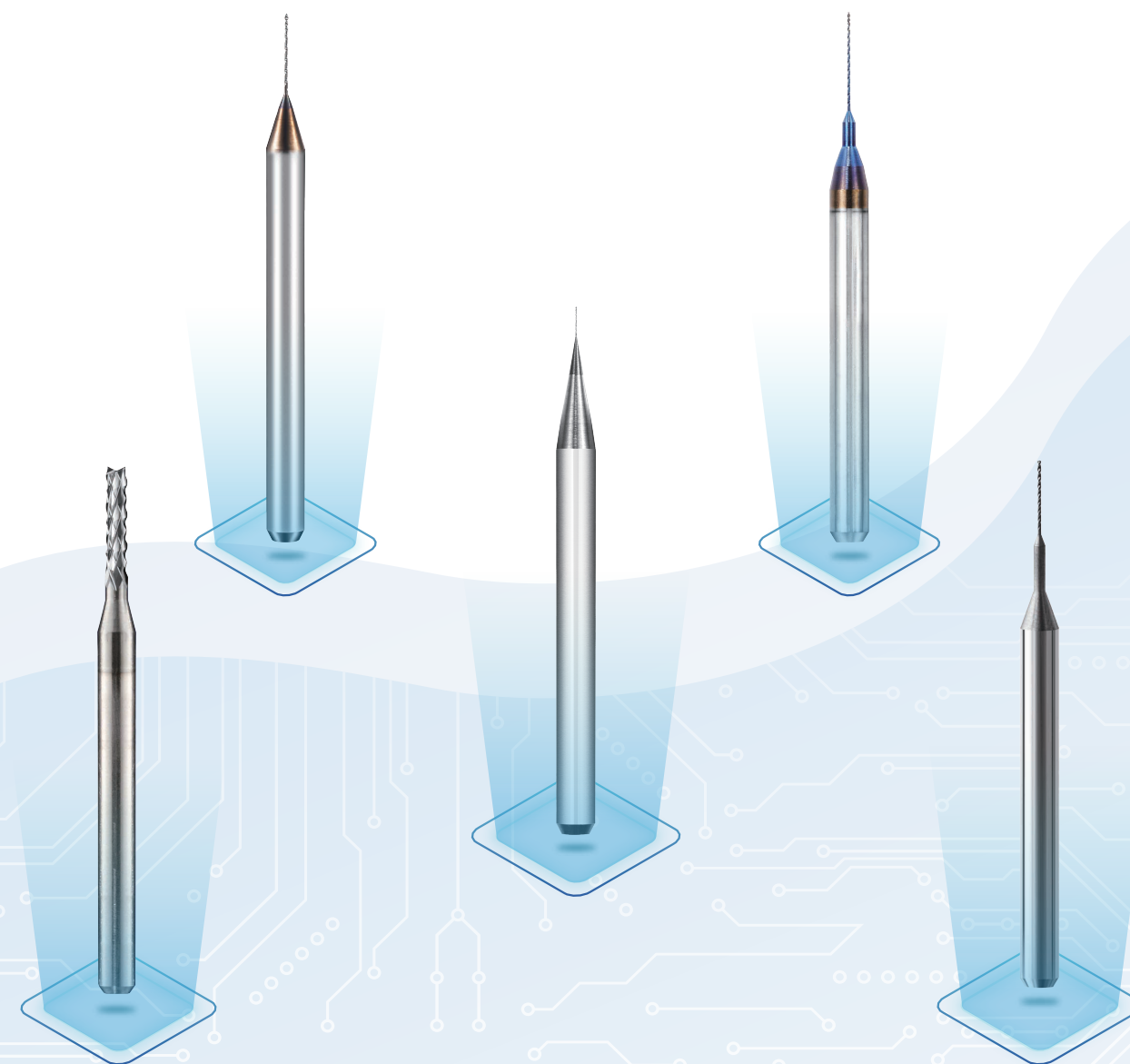




印制电路板用精密工具

PRECISION TOOLS FOR PRINTED CIRCUIT BOARDS



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极小径系列 / 涂层系列 / 加长系列 / 高速系列

深圳市金洲精工科技股份有限公司

COMPANY PROFILE

深圳市金洲精工科技股份有限公司成立于1986年，是全球领先的设计和和生产精密微型工具企业。主产品为印制电路板（PCB）用精密微型刀具，标准钻头尺寸从0.01mm到6.50mm，铣刀从0.10mm到3.175mm，目前量产产品最小直径为0.01mm。

金洲2016年底获评工业和信息化部“制造业单项冠军示范企业（第一批）”，2020年1月荣获“国家科学技术进步二等奖”，2021年1月分别被CCTV1和CCTV2报道。

创新是企业发展的第一动力，金洲注重加强自主研发能力，建立了深圳市级企业技术中心，配备100多名以博士、硕士为主体的研发队伍，至2020年拥有300多项发明及实用新型专利。2017年以有效发明专利44项入选“国家智造百强榜”。金洲作为唯一起草单位，独立制定了国家标准《印制板用硬质合金钻头》（GB/T28248-2012）、CPCA团体标准《印制电路板用硬质合金铣刀通用规范》（T/CPCA 4405-2020）。

金洲30多年专注于电子电路行业，市场占有率行业领先，多年来坚持不懈地研制高品质的产品，服务于世界各地的PCB客户，以可靠的质量和优良的服务赢得市场赞誉。



Founded in 1986, Shenzhen Jinzhou Precision Technology Co., Ltd. is the world's leading precision micro-tool company, the main product is precision micro-tool for printed circuit board (PCB), Our standard drills cover the range from 0.01mm to 6.50mm and routers from 0.10mm to 3.175mm, and the minimum mass production product diameter is up to 0.01mm at present.

Jinzhou was awarded the "Manufacturing Single Champion Demonstration Enterprise (the first batch)" by the Ministry of Industry and Information Technology (MIIT) at the end of 2016, and won the "Second Prize of National Science and Technology Progress" in January 2020. In January 2021, Jinzhou was reported by CCTV1 and CCTV2 respectively.

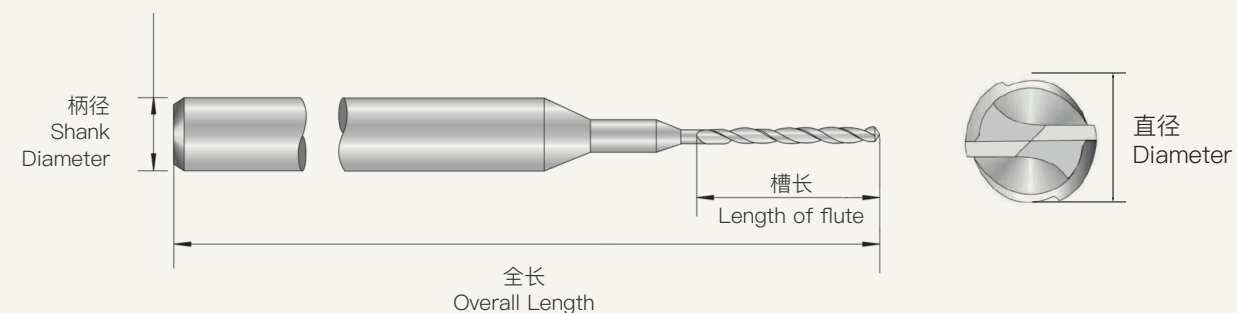
Innovation is the first driving force for enterprise development, Jinzhou focus on strengthening independent R&D capabilities, established Shenzhen-level enterprise technology center, equipped with more than 100 doctors, masters as the main R&D team, with more than 300 inventions and utility model patents by 2020. In 2017, Jinzhou was selected as one of the "Top 100 National Smart Manufacturers" with 44 valid invention patents. And as the only drafter, Jinzhou independently drafted the national standard "Cemented carbide drills for printed boards" (GB/T 28248-2012) and industry standard "General specification of tungsten carbide routers and endmills for printed circuit boards" (T/CPCA 4405-2020).

Jinzhou has focused on the electronic circuit industry for more than 30 years and has the leading market share in the industry. With the continuous insistence of premium quality and excellent service in years to serve global PCB customers, Jinzhou has earned its reputation of being reliable global supplier of precision micro-tool.

钻头结构图

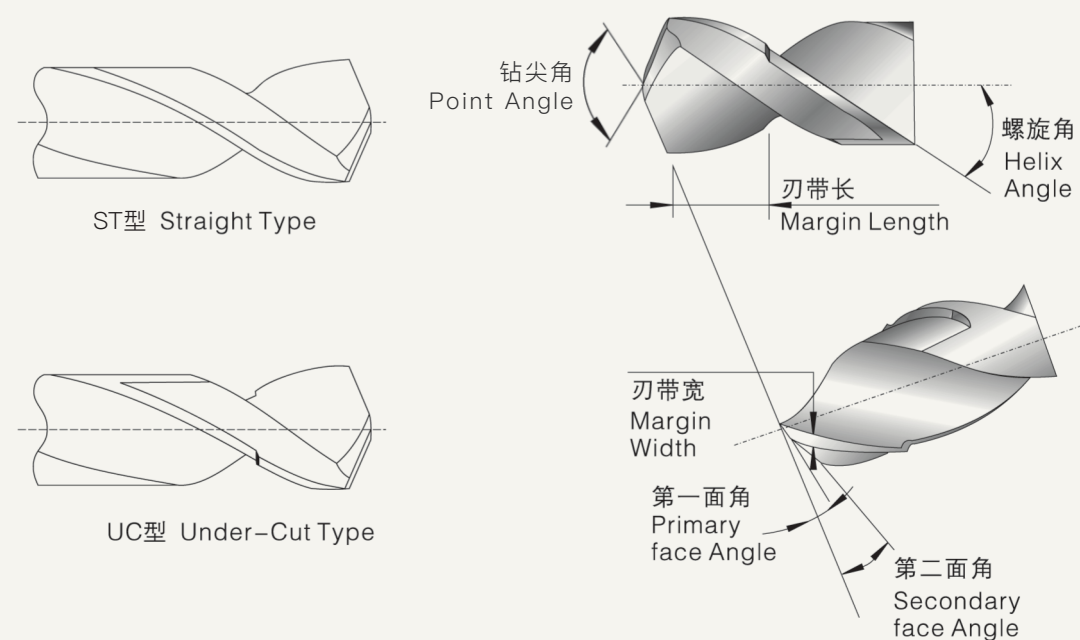
TYPICAL STRUCTURE OF DRILL

DRILL



类型及主要参数

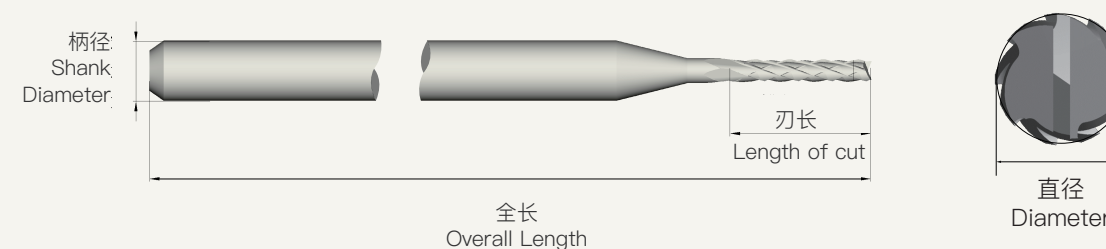
DRILL SHAPE TYPE AND PARAMETERS



ROUTER

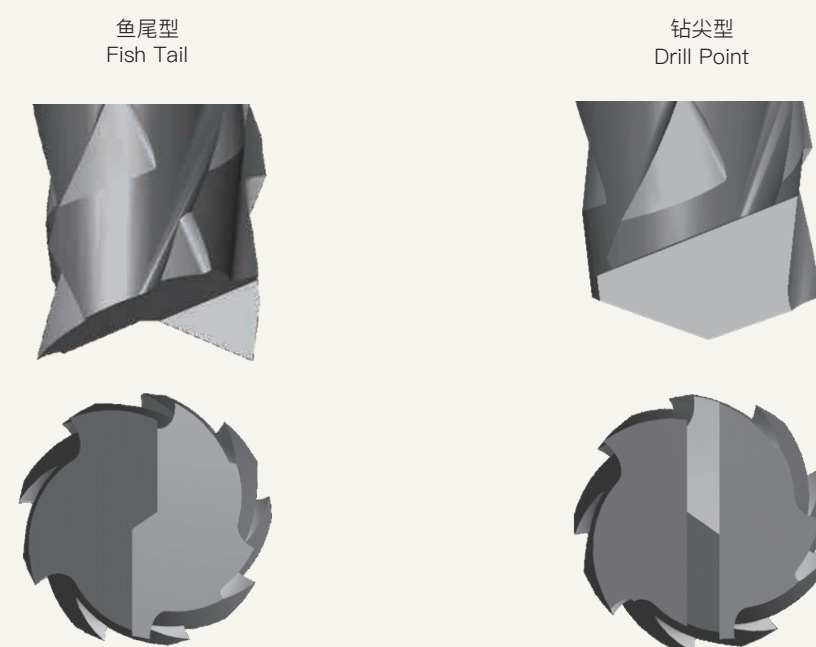
铣刀结构图

TYPICAL STRUCTURE OF ROUTER



铣刀刀尖图

ROUTER END TYPE



产品类型

PRODUCT TYPE

TYPES OF

钻头 DRILL	ST型 Straight Type	A129FP、A129PD、A129BD（A129BDF）、A129QV、G129、G129MB
	UC型 Undercut	USF、A129UCQM、G129UC、UHQ
	ID型 Inverse diameter Drill	131、131CB、131CB-A
	SD型 Slot Drill	125RA、G125UC、G125
	HD型 High-speed Drill	229USF、229UC、231
铣刀 ROUTER ENDMILL	菱齿型 Diamond-Cut	171RN、141HFR、171LU
	断屑型 Chip-Breaker	151R、151RH、C5TR
	螺旋型 Spiral-Endmill	161R、162RA

产品推荐

RECOMMEND

RECOMMEND

应用场合 Applications		推荐产品 Series	推荐涂层 Coating	
钻头 Drilling	通信板 Communication PCBs	通孔 Through hole	USF	SHC
		预钻 Pilot drill	A129PD	SHC
		背钻 Back drill	A129BD/A129BDF	SHC
	封装板 Substrate material	3.175柄 3.175mm Shank	USF	SHC
		2.0柄 2.0mm Shank	H229USF/229UC/231	SHC
	汽车板 Automotive board		USF/UHQ/131CB-A	NB/MAC
	HDI		USF	NB
	挠性板 FPC		A129FP/A129QV	SHC
	金属基板 Metal base board		G129MB	SHC/SHD
	槽孔 Slot drilling		125RA/G125UC	
成形 Contour routing and slitting	通用型 General PCBs		171RN	HCN/SHC
	长寿命型 Long-life type		151RH/C5TR	HCN
	挠性板/特氟龙 FPC/PTFE		161R/111R	SHC
	金属基板 Metal base board		162RA	SHC/SHD
	反转铣刀 Counter-rotation		171LU	
特殊应用 Special applications	沉头孔/锥孔Countersink		141CS/141MD	HCN
	倒角/金手指倒角/V-CUT槽 Chamfering/V-CUT		141CE/141CS/111VC	HCN
	控深孔/平底钻/浅背钻 Depth drilling/Back drilling		143CD/128FD	
	盲槽 Slot routing		162RE/162CE	HCN/NC
	超长寿命刀具/金刚石刀具 Diamond tools		DC	

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USF

DRILL

设计特点

USF钻头是金洲以特殊设计理念开发的产品，获得国家专利。该系列钻头为双刃单槽设计，刚性强，排尘性能优异，能够在保证孔壁品质的基础上大幅提高孔位精度，解决客户孔位要求高的难题，同时具有优异的综合性能。

应用

适用于通信板、封装板、汽车板、HDI等各类板材加工。

Design Advantages

Patented product with high rigidity and good chip evacuation capacity. The drills can improve hole accuracy dramatically on the basis of guaranting hole wall quality and ensure an excellent comprehensive performance.

Application

Suitable for communication PCBs, package substrates, auto-motive boards and HDI.

直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.075	1.20	0.20	3.5	0.40	6.5	0.80	7.0
0.08	1.35		4.0		7.0		9.5
0.09	1.5		4.5		8.3	0.85	7.0
0.105	1.8		5.0	0.45	7.0		9.5
0.11	1.8	0.25	5.5	0.50	8.5	0.90	7.0
	2.2		4.5		7.0		9.5
0.12	1.8		5.0	0.55	8.5	0.95	7.0
	2.2		5.5		7.0		9.5
0.13	2.5		6.2	0.60	8.5	1.00	7.0
	3.0	0.30	5.5		7.0		10.5
	3.5		6.2	0.65	8.5		0.70
0.15	2.5		7.5		7.0		
	3.0		8.3	0.70	8.5		
	3.5	0.35	5.5		7.0		
	4.0		6.5	0.75	8.5		
0.175	3.5		7.5		7.0		
	4.0		8.3		8.5		

NB
coating

SHC
coating

MAC
coating

SHC
coating

DRILL

H229USF

设计特点

高速钻机用2.0mm柄径双刃单槽钻头，适合加工各类封装基板，能保证优异的孔位精度、孔壁粗糙度、以及非常低的断刀率，同时钻孔加工效率高。

应用

适用于封装板加工。

Design Advantages

Single-flute drill with 2.0mm shank diameter for drilling machines with high-speed spindles to ensure excellent hole wall roughness, excellent hole registration accuracy and high efficiency with low broken rate.

Application

Suitable for package substrate.

直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.075	1.2	0.15	2.7
0.09	1.5		3.5
0.105	1.8	0.20	3.0
	2.2		3.5
0.11	1.8	0.25	4.5
	2.2		4.5
0.12	2.0		
	2.2		

229UC

设计特点

高速钻机用2.0mm柄径UC型钻头，能保证优异的孔位精度、孔壁粗糙度等钻孔品质。

应用

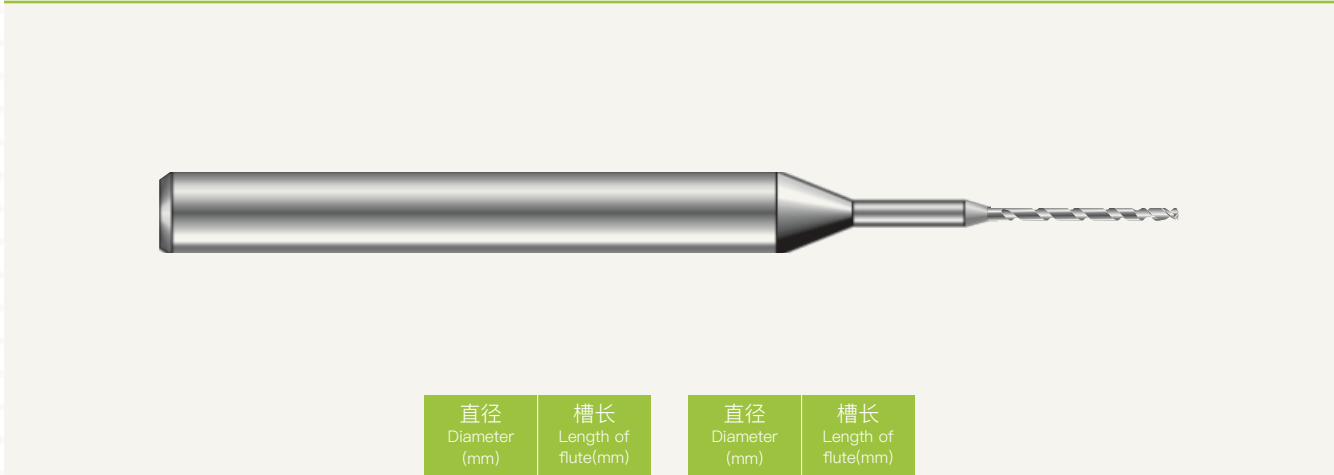
适用于各类板材的加工。

Design Advantages

Undercut drill with 2.0mm shank diameter suitable for drilling machines with high—speed spindles to achieve excellent hole registration accuracy and hole wall roughness.

Application

Suitable for various kinds of boards.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.40	5.5	1.30	5.5
0.50		1.40	
0.60		1.50	
0.70		1.55	
0.80		1.60	8.0
0.90	5.5	1.80	
1.00		1.90	
1.20		2.00	

231

设计特点

高速钻机用2.0mm柄径钻头，该系列钻头钻径大于柄径产品。最大直径为3.175mm 。

应用

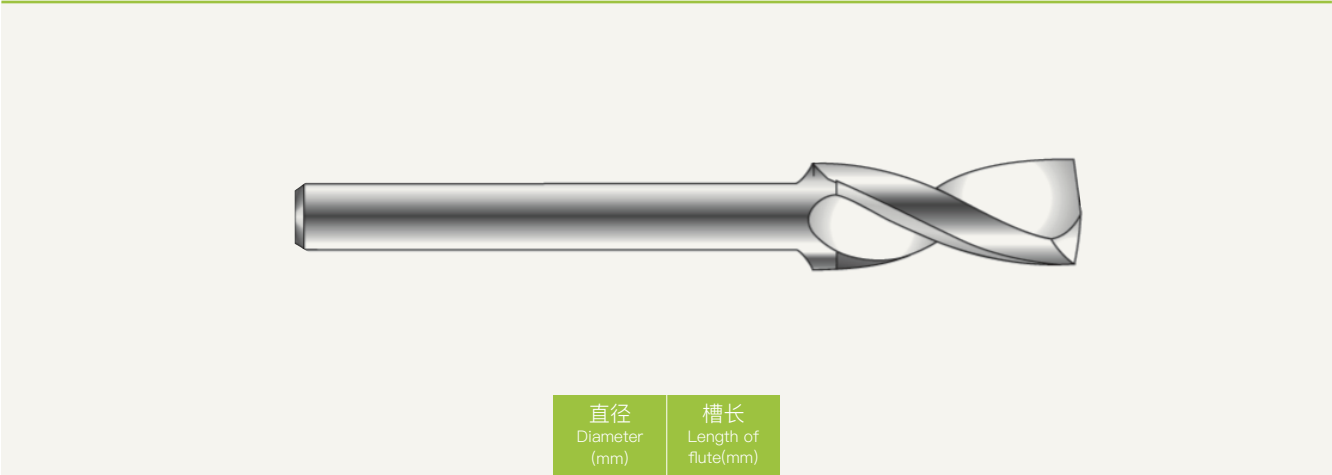
适用于各类板材的加工。

Design Advantages

Inverse drill with 2.0mm shank diameter suitable for drilling machines with high—speed spindles. The maximum drilling diameter of this series is 3.175mm.

Application

Suitable for various kinds of boards.



直径 Diameter (mm)	槽长 Length of flute(mm)
2.05	8.0
2.10	
2.40	
2.50	
3.00	
3.025	
3.05	
3.075	
3.100	
3.125	
3.175	

A129QV

DRILL

设计特点

ST型钻头，较高的刚性，能保证良好的孔位精度，可以使用的研磨次数较多。

应用

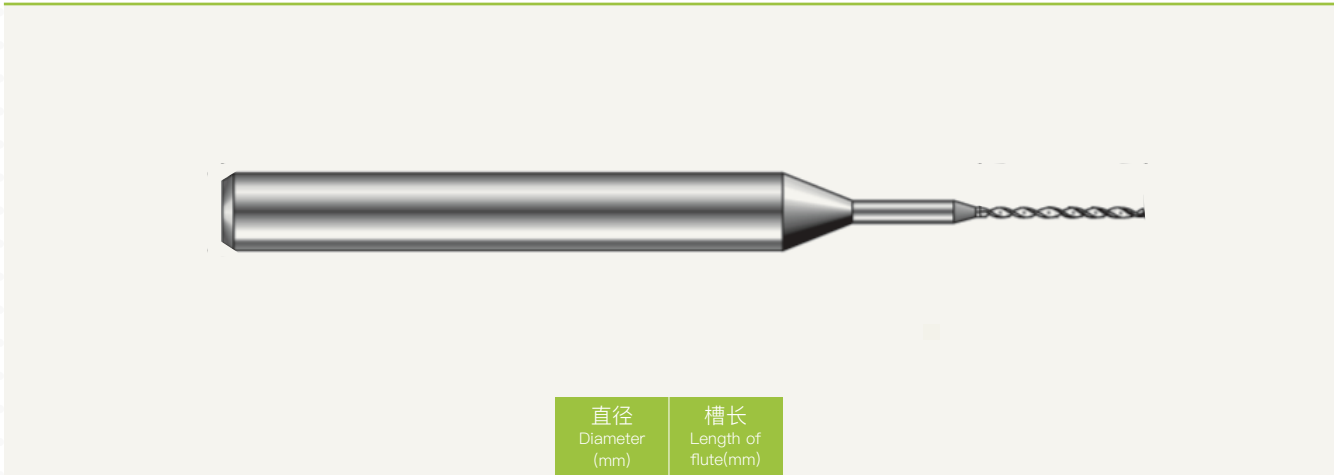
适用于各种普通板材加工。

Design Advantages

Straight type drills with high rigidity to ensure excellent hole registration accuracy and extended repointing as well.

Application

Suitable for general PCB.



直径 Diameter (mm)	槽长 Length of flute(mm)
0.40	7.0
0.45	7.0
	8.5
0.50	8.5
0.55	8.5
0.60	9.5
0.65	9.5
0.70	9.5
0.75	9.5
0.80	9.5
0.85	9.5
0.90	9.5
0.95	9.5
1.00	10.5

DRILL

设计特点

该系列钻头为双刃双槽ST型设计，芯轻薄，切割锋利，排屑空间大，能够有效抑制FPC加工过程中毛刺和钻污的产生，具有良好的加工品质和孔位精度。

应用

适用于双面软板、多层软板、软硬结合板等各类软性材料加工。

Design Advantages

The drills are specifically designed for FPC featuring reduced burr and smear generation of FPC process. With thin web thickness, sharp cutting edges and large chip pocket, this drill can ensure excellent hole registration and hole wall quality.

Application

Suitable for double-sided FPC, multi-layer FPC, rigid-flex boards and other flex materials.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.10	1.5	0.15	2.5
0.105	1.8	0.18	2.5
0.11	1.8	0.20	3.5
0.12	1.8	0.25	4.0
	2.0	0.30	5.5
		0.35	5.5

SHC
coating

A129UCQM

设计特点

排尘性能优秀，能保证优良的孔壁品质。

应用

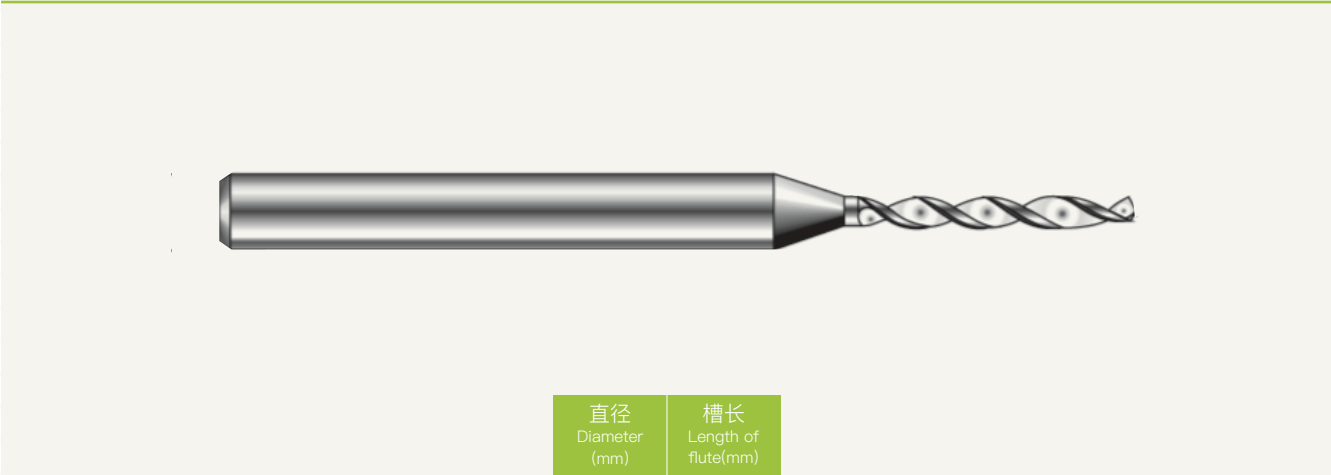
适用于各类板材的加工。

Design Advantages

Undercut drill with good chip evacuation to ensure excellent hole wall quality.

Application

Suitable for various kinds of boards.



直径 Diameter (mm)	槽长 Length of flute(mm)
0.50	7.0
	8.5
0.55	7.0
	8.5
0.60	9.5
0.65	9.5
0.70	9.5
0.75	9.5
0.80	9.5
0.85	9.5
0.90	9.5
0.95	9.5
1.00	10.5

SHC
coating

MAC
coating

DRILL

DRILL

A129PD

设计特点

预钻专用钻头，刃长短、刚性强，定位精度优异。

应用

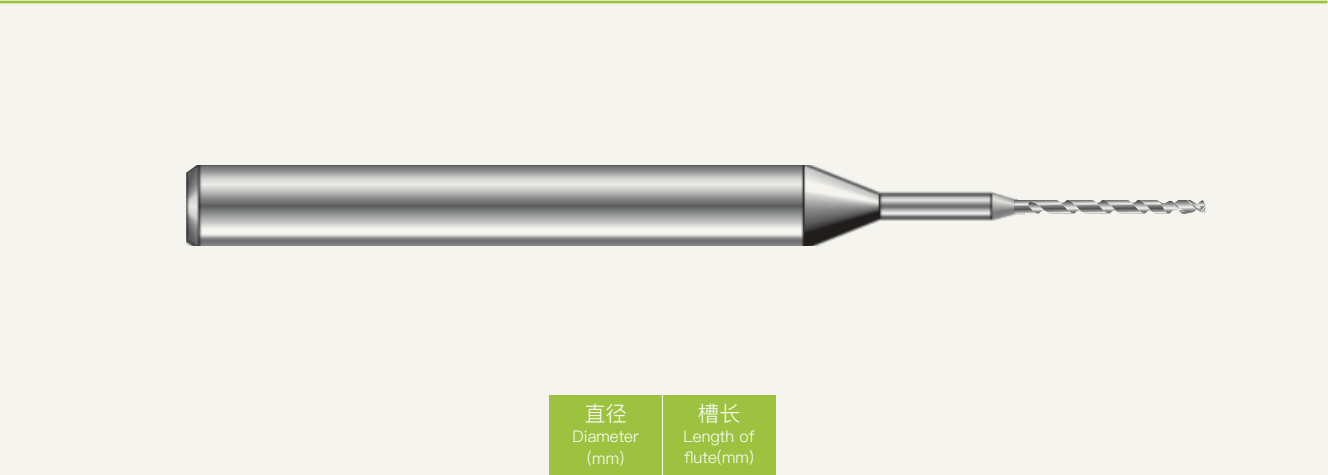
适用于通信厚板等的预钻孔加工。

Design Advantages

The drills are specifically designed for pilot drilling With short flute length and high rigidity, featuring excellent hole registration.

Application

Suitable for pilot drilling process of communication PCBs.



直径 Diameter (mm)	槽长 Length of flute(mm)
0.105	1.2
0.11	1.0
0.13	1.3
0.15	1.8
0.175	1.8
0.20	1.8
0.25	1.8
0.30	1.8
	3.5
0.35	1.8
	3.5
0.40	2.5
0.45	2.5
0.50	2.5

A129BD

DRILL

设计特点

背钻孔加工专用钻头，排屑性能优异，能有效解决背钻加工堵孔及孔偏问题。

应用

适用于背钻及PTFE板材的钻孔加工。

Design Advantages

Specifically designed for back drilling. With excellent chip evacuation and plugged hole and dislocation prevention capacity.

Application

Suitable for back drilling process and PTFE material.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.20	4.3	0.60	5.5
0.25	4.5	0.65	7.0
0.30	4.5	0.70	7.0
	5.0	0.75	7.0
0.35	3.0	0.80	7.0
	5.0	0.85	7.0
0.40	5.0	0.90	7.0
0.425	5.0	0.95	7.0
0.45	5.0	1.00	7.0
0.50	5.0		
0.55	5.5		
0.575	5.5		

SHC
coating

DRILL



A129BDF

设计特点

背钻孔加工专用钻头，综合性能优异，能有效解决背钻加工堵孔、孔偏及孔型问题。

应用

适用于背钻尤其是极小径深孔背钻的加工。

Design Advantages

Specifically designed for back drilling. With excellent comprehensive performance, plugged hole, dislocation prevention capacity and hole shape.

Application

Suitable for back drilling process, especially the ultra micro back drilling with deep depth.



直径 Diameter (mm)	槽长 Length of flute(mm)
0.20	4.3
0.25	4.5
0.30	4.5
0.325	5.0
0.35	5.0
0.375	5.0
0.40	5.0
0.45	5.0
0.50	5.0
0.55	5.5
0.60	5.5

SHC
coating

G129

设计特点

标准ST型钻头，综合性能优异。

应用

适用于各类板材的加工。

Design Advantages

Straight type drill with excellent comprehensive performance.

Application

Suitable for various kinds of boards.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
1.05	10.5	1.95	10.5	2.85	10.5
1.10		2.00		2.90	
1.15		2.05		2.95	
1.20		2.10		3.00	
1.25		2.15		3.05	
1.30		2.20		3.10	
1.35		2.25		3.15	
1.40		2.30		3.175	
1.45		2.35			
1.50		2.40			
1.55	10.5	2.45	10.5		10.5
1.60		2.50			
1.65		2.55			
1.70		2.60			
1.75		2.65			
1.80		2.70			
1.85		2.75			
1.90		2.80			

SHC
coating

MAC
coating

G129UC

设计特点

UC型钻头，可减小钻头与孔壁摩擦，能保证良好的孔壁品质。

应用

适用于各类板材的加工。

Design Advantages

Undercut drill with good hole wall quality.

Application

Suitable for various kinds of boards.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
1.05	10.5	1.95	10.5	2.85	10.5
1.10		2.00		2.90	
1.15		2.05		2.95	
1.20		2.10		3.00	
1.25		2.15		3.05	
1.30		2.20		3.10	
1.35		2.25		3.15	
1.40		2.30		3.175	
1.45		2.35			
1.50		2.40			
1.55	10.5	2.45	10.5		10.5
1.60		2.50			
1.65		2.55			
1.70		2.60			
1.75		2.65			
1.80		2.70			
1.85		2.75			
1.90		2.80			

SHC
coating

MAC
coating

■ 注：Φ2.50mm以上顶角为165°

131

DRILL

131CB/131CB-A

设计特点

该系列钻头的钻径部分大于柄径（3.175mm）。

应用

适用于各类板材的加工。

Design Advantages

Drill diameter is larger than the shank diameter(3.175mm).

Application

Suitable for various kinds of boards.

									
直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
3.20	13.0	4.05	13.0	4.90	13.0	5.75	13.0	6.60	13.0
3.25		4.10		4.95		5.80		6.65	
3.30		4.15		5.00		5.85		6.70	
3.35		4.20		5.05		5.90		6.75	
3.40		4.25		5.10		5.95		6.80	
3.45		4.30		5.15		6.00		6.85	
3.50		4.35		5.20		6.05		6.90	
3.55		4.40		5.25		6.10		6.95	
3.60		4.45		5.30		6.15		7.00	
3.65		4.50		5.35		6.20		7.25	7.0
3.70		4.55		5.40		6.25		7.50	
3.75		4.60		5.45		6.30		8.0	
3.80		4.65		5.50		6.35		8.25	
3.85		4.70		5.55		6.40		8.50	
3.90		4.75		5.60		6.45		9.00	
3.95		4.80		5.65		6.50		10.0	
4.00		4.85		5.70		6.55			

SHC
coating

MAC
coating

SHD
coating

注：整体式131系列直径为3.20~6.50mm；钢柄焊接系列直径为3.20~4.00mm；
合金焊接系列直径为4.00~6.50mm

设计特点

该系列钻头的钻径部分大于柄径（3.175mm），能减小切削轴向力，有利于断屑，提升排屑能力。

应用

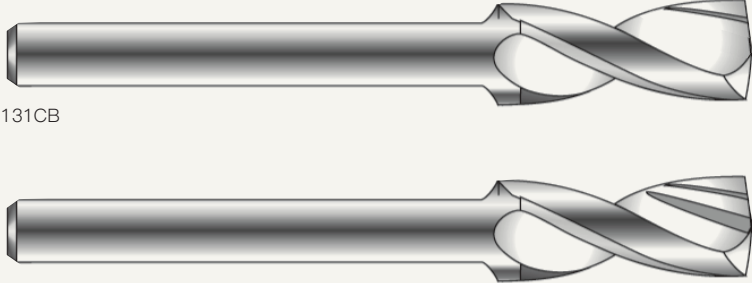
适用于改善排屑和钻孔质量的场合。

Design Advantages

Drill diameter is larger than the shank diameter(3.175mm). Unique design to reduce the axial drilling force, which helps improve chip removal condition.

Application

Suitable for various kinds of boards with excellent debris evacuation and hole wall quality.

									
131CB									
131CB-A									
直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
3.20	13.0	4.05	13.0	4.90	13.0	5.75	13.0	6.60	13.0
3.25		4.10		4.95		5.80		6.65	
3.30		4.15		5.00		5.85		6.70	
3.35		4.20		5.05		5.90		6.75	
3.40		4.25		5.10		5.95		6.80	
3.45		4.30		5.15		6.00		6.85	
3.50		4.35		5.20		6.05		6.90	
3.55		4.40		5.25		6.10		6.95	
3.60		4.45		5.30		6.15		7.00	
3.65		4.50		5.35		6.20		7.25	7.0
3.70		4.55		5.40		6.25		7.50	
3.75		4.60		5.45		6.30		8.0	
3.80		4.65		5.50		6.35		8.25	
3.85		4.70		5.55		6.40		8.50	
3.90		4.75		5.60		6.45		9.00	
3.95		4.80		5.65		6.50		10.0	
4.00		4.85		5.70		6.55			

■ 整体式131CB/131CB-A系列直径为3.20~6.50mm；钢柄焊接系列直径为3.20~4.00mm；
合金焊接系列直径为4.00~6.50mm

SHC
coating

MAC
coating

UHQ



DRILL

DRILL

G125

设计特点

UHQ钻头是我司专为解决中大钻孔粗问题而开发的产品，获得国家专利。该系列钻头具有独特的槽型结构设计，切削锋利，刚性强，孔壁质量优秀。

应用

适用于孔壁质量要求高的板材。

Design Advantages

Patented design to solve the wall roughness problems of medium & large size drilling. The drill has sharp cutting edges and high rigidity to offer excellent hole wall quality.

Application

Suitable for the boards with high quality of hole wall roughness.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.70	9.0	1.55	9.0	2.40	10.5
0.75		1.60		2.45	
0.80		1.65		2.50	
0.85		1.70		2.55	
0.90		1.75		2.60	
0.95		1.80		2.65	
1.00		1.85		2.70	
1.05		1.90		2.75	
1.10	10.5	1.95	10.5	2.80	
1.15		2.00		2.85	
1.20		2.05		2.90	
1.25		2.10		2.95	
1.30		2.15		3.00	
1.35		2.20		3.05	
1.40		2.25		3.10	
1.45		2.30		3.15	
1.50		2.35		3.175	

MAC
coating

设计特点

ST型槽钻，高刚性设计。

应用

适用于加工长槽。

Design Advantages

Most commonly used straight slot drills with maximize rigidity design.

Application

Suitable for long slotted hole drilling.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.40	5.0	0.80	6.0	1.35	8.5
	5.0	0.80	8.5	1.40	
0.45	5.0	0.85	6.7	1.45	
	5.0	0.85	8.5	1.50	
	5.0	0.90	6.7	1.55	
0.50	5.0	0.90	8.5	1.60	
0.55	5.0	0.95	8.5	1.65	
0.60	6.0	1.00		1.70	
	7.0	1.05		1.75	
0.65	6.0	1.10		1.80	
	7.0	1.15		1.85	
0.70	6.0	1.20		1.90	
	8.5	1.25		1.95	
0.75	6.0	1.30		2.00	
	8.5				

G125UC



设计特点

UC型槽钻，高刚性设计，槽型好、孔壁质量优秀、无毛刺。

应用

适用于长短槽加工且对孔壁质量要求高的板材。

Design Advantages

Undercut slot drill with special design to maximize rigidity to ensure excellent flute shape and achieve outstanding hole wall quality and burr free drilling.

Application

Suitable for short/long slotted hole drilling with excellent hole wall roughness.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.40	5.0	1.30	6.7
0.45	5.0	1.35	
0.50	5.0	1.40	
0.55	5.0	1.45	
0.60	6.7	1.50	
0.65		1.55	
0.70		1.60	
0.75		1.65	
0.80		1.70	
0.85		1.75	
0.90		1.80	
0.95		1.85	
1.00		1.90	
1.05		1.95	
1.10		2.00	
1.15			
1.20			
1.25			



125RA



设计特点

ST型槽钻，独特的槽型结构设计，切削锋利，加工短槽槽型好、孔壁质量优秀、无毛刺。

应用

适用于短槽加工且对孔壁质量要求高的板材。

Design Advantages

Straight drill with unique flute design to achieve sharp cutting edges to ensure excellent slot shape and hole wall quality with no burrs.

Application

Suitable for short slotted holes with excellent hole wall quality.



直径 Diameter (mm)	槽长 Length of flute(mm)	直径 Diameter (mm)	槽长 Length of flute(mm)
0.30	3.0	0.80	5.5
0.35	3.5		6.7
0.40	4.0	0.85	5.5
0.45	4.5		6.7
0.50	5.0	0.90	5.5
0.55	5.5		6.7
0.60		0.95	5.5
0.65			6.7
0.70		1.00	5.5
0.75			6.7

171RN

ROUTER

设计特点

菱齿型铣刀，独特齿型设计，刚性和排尘性能兼顾，通用型铣刀。

应用

适用于各类板材加工，兼顾板边质量和使用寿命。

Design Advantages

Diamond-cut router with unique design of cutting edges. High rigidity while increasing the cutting performance. Routers for general purpose.

Application

Suitable for routing various PCB, especially for routing with high precision and long tool life requirements.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.50	3.5	1.50	8.5
0.60	4.0	1.60	8.5
0.70	5.0	1.70	8.5
0.80	6.0	1.80	8.5
0.90	7.0	1.90	8.5
1.00	7.0	2.00	10.5
1.00	8.0	2.10	10.5
1.10	7.0	2.20	10.5
1.20	7.0	2.30	10.5
1.30	7.0	2.40	10.5
1.40	7.0	2.50	10.5

141HFR

设计特点

菱齿型铣刀，小螺旋角设计，切削锋利，板边优异。

应用

适用于封装基板，软硬结合板材加工。

Design Advantages

Diamond-cut router,low helix angle design with sharp cutting edges, which offers better cutting performance.

Application

Suitable for package substrates and flex-rigid PCB.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.80	5.0	1.70	8.5
0.90	5.0	1.80	8.5
1.00	6.0	1.90	8.5
1.10	6.0	2.00	10.5
1.20	6.0	2.10	10.5
1.30	6.0	2.20	10.5
1.40	6.0	2.30	10.5
1.50	8.5	2.40	10.5
1.60	8.5	2.50	10.5

HCN
coating

注：合金焊接系列直径≤1.80mm。 ■

HCN
coating

151RH

ROUTER

设计特点

断屑槽型铣刀，刚性优化设计，排尘性能好，使用寿命长。

应用

适用于各种类型板材，尤其适合高Tg、环保板等硬度较高板材的加工。

Design Advantages

Chip-breaker router. Rigidity optimization design for long tool life and good debris evacuation capability.

Application

Suitable for routing various PCB, especially for HTG or halogen-free boards.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.50	3.5	1.50	8.5
0.60	4.0	1.60	8.5
0.70	5.0	1.70	8.5
0.80	5.0	1.80	8.5
0.80	6.0	1.90	8.5
0.90	6.0	2.00	10.5
1.00	7.0	2.10	10.5
1.10	7.0	2.20	10.5
1.20	7.0	2.30	10.5
1.30	7.0	2.40	10.5
1.40	7.0	2.50	10.5

HCN
coating

注：合金焊接系列直径≤1.80mm。 ■

ROUTER

151R

设计特点

断屑槽型铣刀，切削锋利，板边质量优异。

应用

适用于板边要求高的加工，尤其适用于表面覆有铜箔的板材加工，能有效抑制表面铜皮毛刺。

Design Advantages

Chip-breaker router with sharp cutting edges design, which offers high cutting performance.

Application

Suitable for peripheral routing with high precision requirement. Especially for PCB with copper foil, can restrain the burrs effectively.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.50	3.5	1.50	8.5	2.50	10.5
0.60	4.0	1.60	8.5	2.60	10.5
0.70	5.0	1.70	8.5	2.70	10.5
0.80	5.0	1.80	8.5	2.80	10.5
0.90	5.0	1.90	8.5	2.90	10.5
1.00	6.0	2.00	10.5	3.00	10.5
1.10	6.0	2.10	10.5	3.10	10.5
1.20	6.0	2.20	10.5	3.175	10.5
1.30	6.0	2.30	10.5		
1.40	6.0	2.40	10.5		

HCN
coating

C5TR

ROUTER

ENDMILL

161R

设计特点

断屑槽型铣刀，加长型铣刀系列，具有独特槽型设计，使用寿命长，尺寸精度高。

应用

适用于各类板材加工，尤其适用于增层提效加工。

Design Advantages

Chip-breaker router with extended flute length. Unique flute design ensures the long tool life and high dimensional accuracy of PCB.

Application

Suitable for routing various PCB, especially for high-stacks routing.

					
直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.50	3.5	1.20	7.0	1.60	10.5
0.60	4.0	1.20	8.0	1.70	8.5
0.70	5.0	1.30	7.0	1.70	10.5
0.80	5.0	1.30	8.5	1.80	8.5
0.90	5.0	1.40	7.0	1.80	10.5
1.00	7.0	1.40	8.5	1.90	8.5
1.00	8.0	1.50	8.5	1.90	10.5
1.10	7.0	1.50	10.5	2.00	10.5
1.10	8.0	1.60	8.5		

HCN
coating

设计特点

螺旋型铣刀，双刃设计，排尘空间大，切削锋利，可有效解决铣削毛刺问题。

应用

适用于PTFE、软板、软硬结合等软性材料。

Design Advantages

Spiral-endmill, double-flute design, large chip pocket and sharp cutting edges to restrain the burrs effectively.

Application

Suitable for soft material like PTFE board, FPC and flex-rigid boards.

					
直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.30	1.0	1.40	5.0	2.50	10.0
0.40	1.5	1.50	5.0	2.60	10.0
0.50	3.0	1.60	6.0	2.70	10.0
0.60	3.0	1.70	6.0	2.80	10.0
0.70	3.0	1.80	6.0	2.90	10.0
0.80	4.0	1.90	6.0	3.00	10.0
0.90	4.0	2.00	9.0	3.10	12.0
1.00	5.0	2.10	9.0	3.175	12.0
1.10	5.0	2.20	9.0		
1.20	5.0	2.30	9.0		
1.30	5.0	2.40	10.0		

162RA

ENDMILL

ROUTER

171LU

设计特点

螺旋型铣刀，双刃设计，独特的钻铣一体的设计，排尘空间大，切削锋利。

应用

适用于金属基板加工。

Design Advantages

Spiral-endmill, double-flute design. Unique groove design with large chip pocket and sharp cutting edges. Can be used for routing and drilling.

Application

Suitable for metal-base boards.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.80	3.0	2.20	9.0
0.90	3.0	2.30	9.0
1.00	4.5	2.40	9.0
1.10	4.5	2.50	9.0
1.20	6.0	2.60	9.0
1.30	6.0	2.70	9.0
1.40	6.0	2.80	9.0
1.50	7.5	2.90	9.0
1.60	7.5	3.00	9.5
1.70	7.5	3.10	9.5
1.80	7.5	3.175	9.5
1.90	7.5		
2.00	9.0		
2.10	9.0		

SHC
coating

设计特点

菱齿型铣刀，左旋上排屑设计，反转铣刀，加工时需要主轴逆时针旋转。

应用

适用于金属化半孔和侧壁镀铜铣削加工，能有效抑制铜毛刺产生。

Design Advantages

Counter-clockwise router with diamond-cut,left handed and up draft design. Spindle rotates counter-clockwise while routing.

Application

Suitable for metalized half hole routing and wall copper foil routing, can restrain the burrs effectively.



直径 Diameter (mm)	刃长 Length of cut(mm)	直径 Diameter (mm)	刃长 Length of cut(mm)
0.50	3.5	1.30	7.0
0.60	4.0	1.40	7.0
0.70	5.0	1.50	8.5
0.80	6.0	1.60	8.5
0.90	7.0	1.70	8.5
1.00	7.0	1.80	8.5
1.10	7.0	1.90	8.5
1.20	7.0	2.00	10.5

162RE

SPECIAL TOOLS

设计特点

标准两刃平底立铣刀。

应用

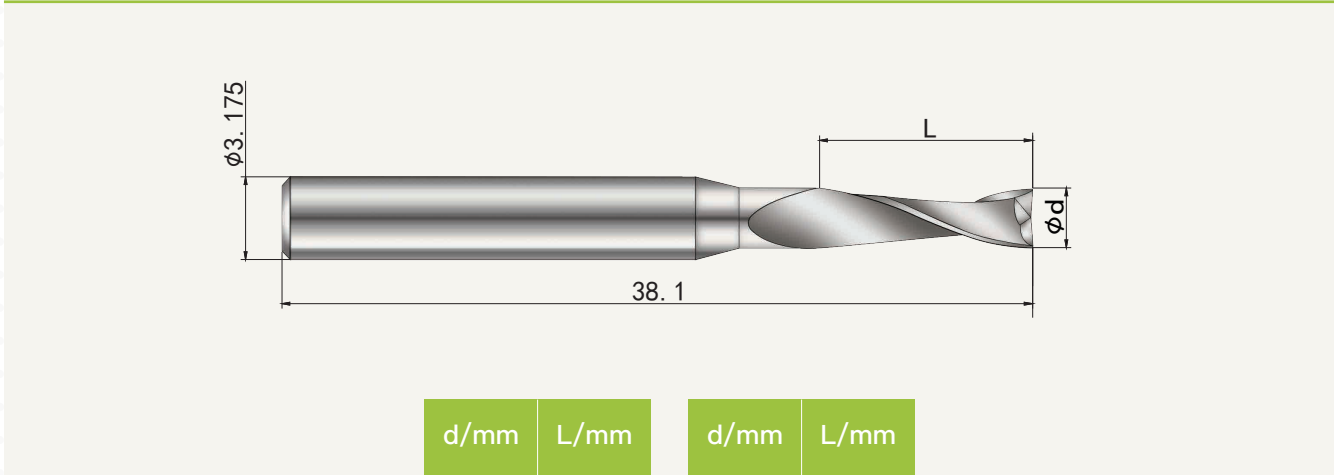
适用于铜基板、铝基板、FR4等PCB板的平底控深铣削加工。

Design Advantages

Standard double-flute endmill.

Application

Suitable for flat depth-control milling like copper substrate, aluminum substrate and general PCB.



d/mm	L/mm	d/mm	L/mm
0.50	3.0	1.60	4.0
0.60	3.0		7.5
0.80	3.0	2.00	4.0
1.00	3.0		9.0
1.20	3.0	2.40	5.0
1.50	3.0		9.0
	7.5	3.175	9.5

111R

SPECIAL TOOLS

设计特点

单刃铣刀，切削刃锋利，排屑性能好。

应用

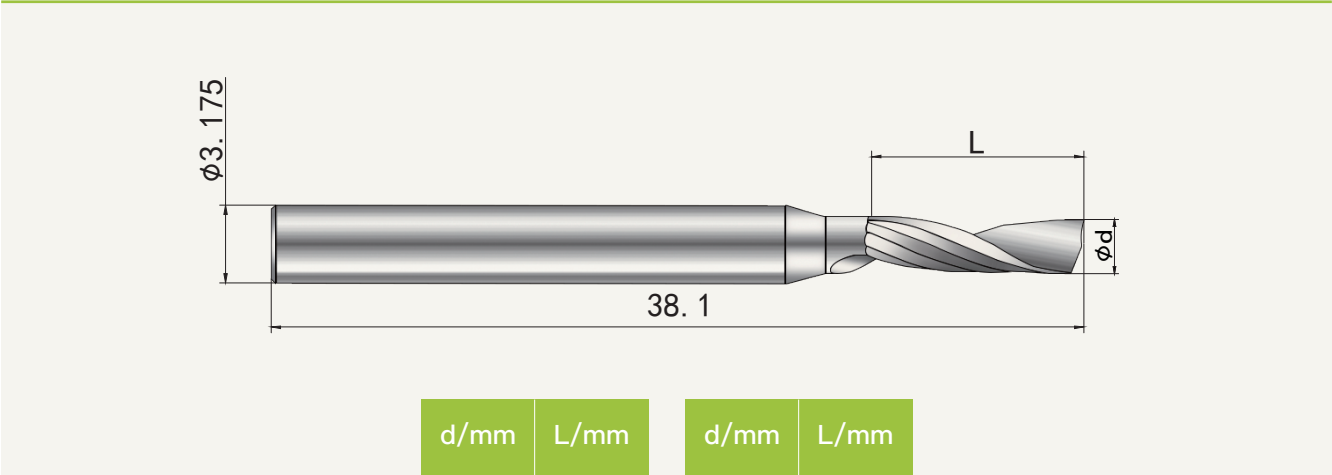
PTFE、特氟龙等材料专用铣刀，抑制毛刺效果明显。

Design Advantages

Single-flute endmill with sharp cutting edge and large chip pocket.

Application

Specially suitable for materials like PTFE materials featuring burr prevention.



d/mm	L/mm	d/mm	L/mm
0.50	2.5	1.60	6.0
0.80	4.5		7.5
1.00	5.0	2.00	6.0
1.20	5.0		9.0
1.50	5.0	2.40	9.0
	7.5	3.175	12.0

111VC SPECIAL TOOLS

设计特点

单刃直槽倒角刀，尺寸精度高。

应用

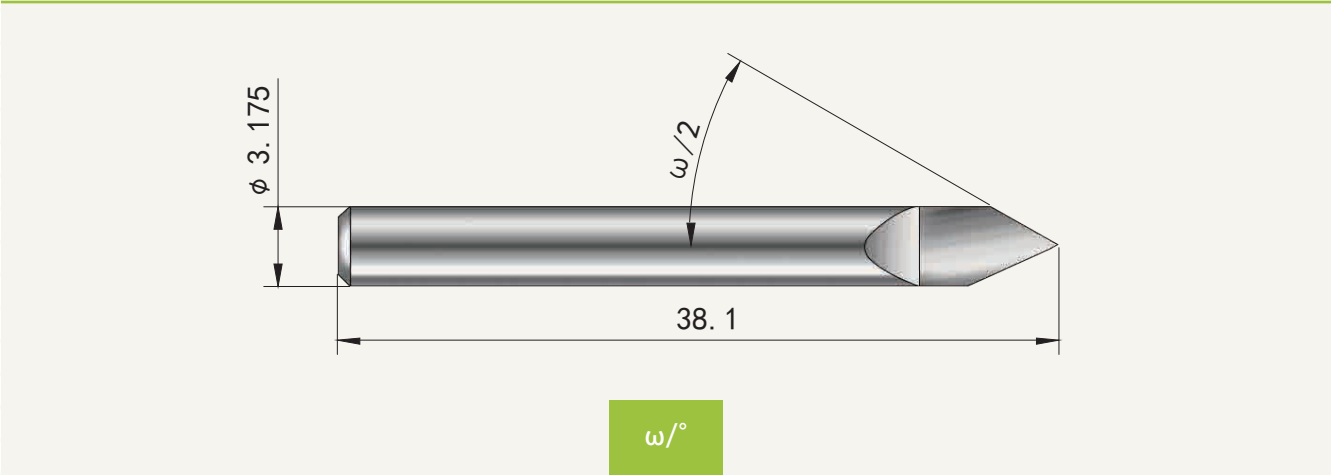
适合于V-cut加工、铣床上金手指斜边加工。

Design Advantages

Straight-single flute tool for chamfering with high dimension accuracy.

Application

Suitable for V-cutting and gold finger chamfering.



ω/°
30
45
60
90
120
140

141CS SPECIAL TOOLS

设计特点

多刃倒角刀，耐磨性能好。

应用

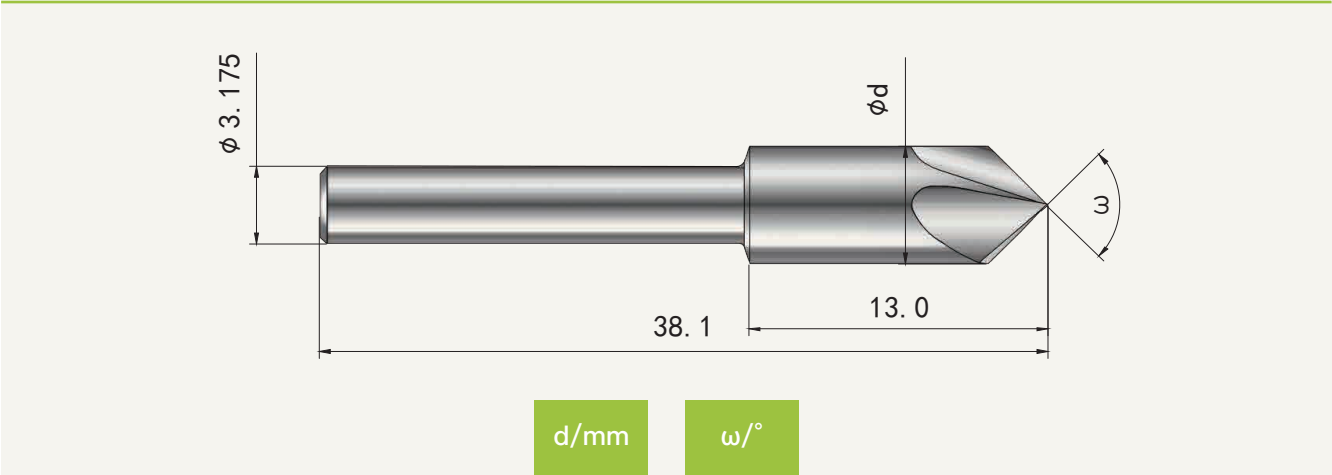
适合于沉头孔加工，也可用于金手指斜边加工。

Design Advantages

Countersink tools with good wear-resisting property.

Application

Suitable for countersink processing and gold finger chamfering.



d/mm	ω/°
3.175	60
4.0	82
5.0	90
6.0	100
6.35	120
6.5	140



128FD

SPECIAL TOOLS

SPECIAL TOOLS

141CE

设计特点

多刃铣刀，耐磨性能好。

应用

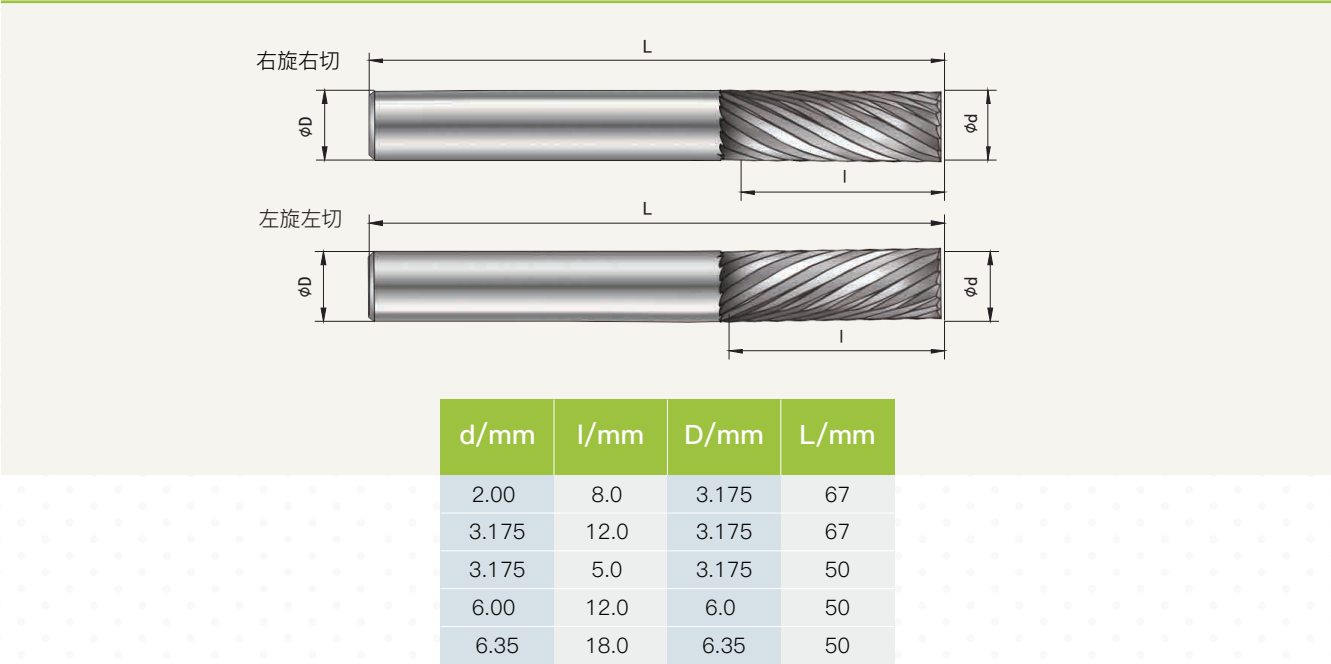
专用于金手指斜边机上斜边加工。

Design Advantages

Multiple-flute router with good wear-resisting property.

Application

Suitable for gold finger chamfering.



设计特点

平底钻头，顶角180°。

应用

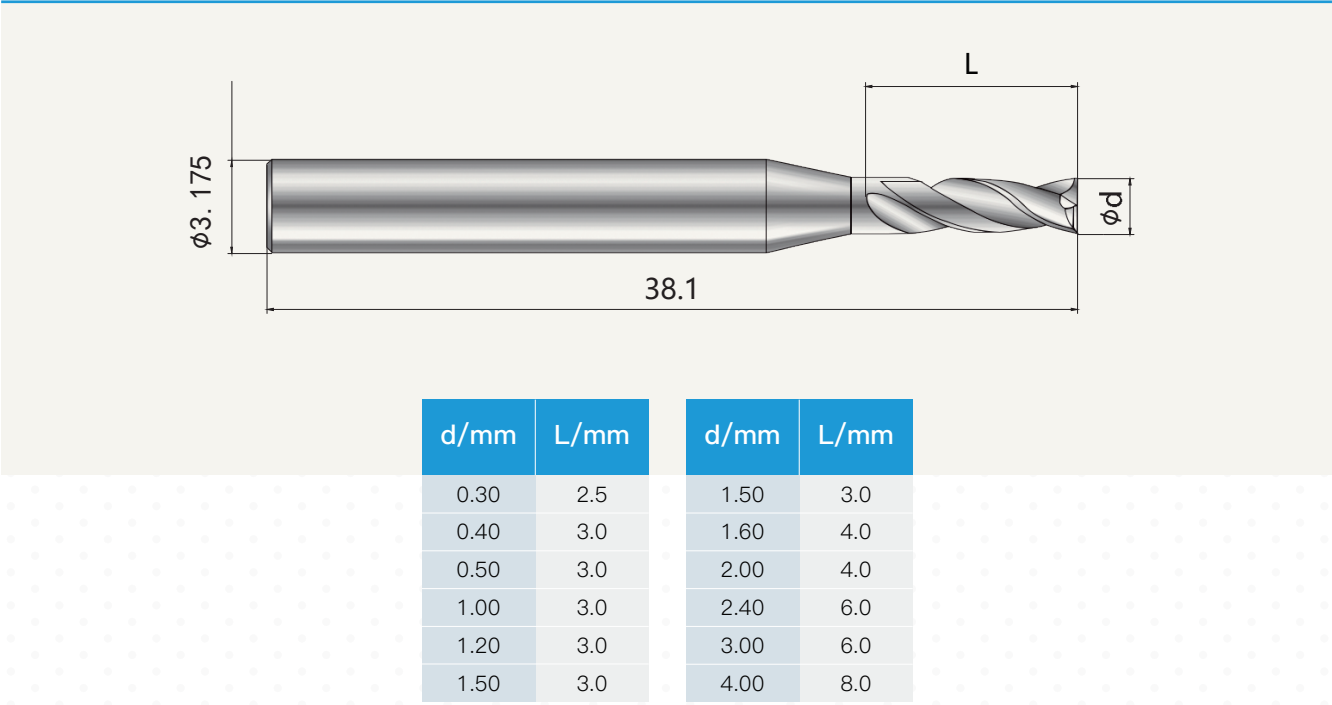
专用于平底盲孔、平底背钻孔加工。

Design Advantages

Flat-end drill with 180° point angle.

Application

Suitable for blind hole with flat bottom and back drilling.



143CD



SPECIAL TOOLS

设计特点

锥形钻头，短刃长，稳定性好。

应用

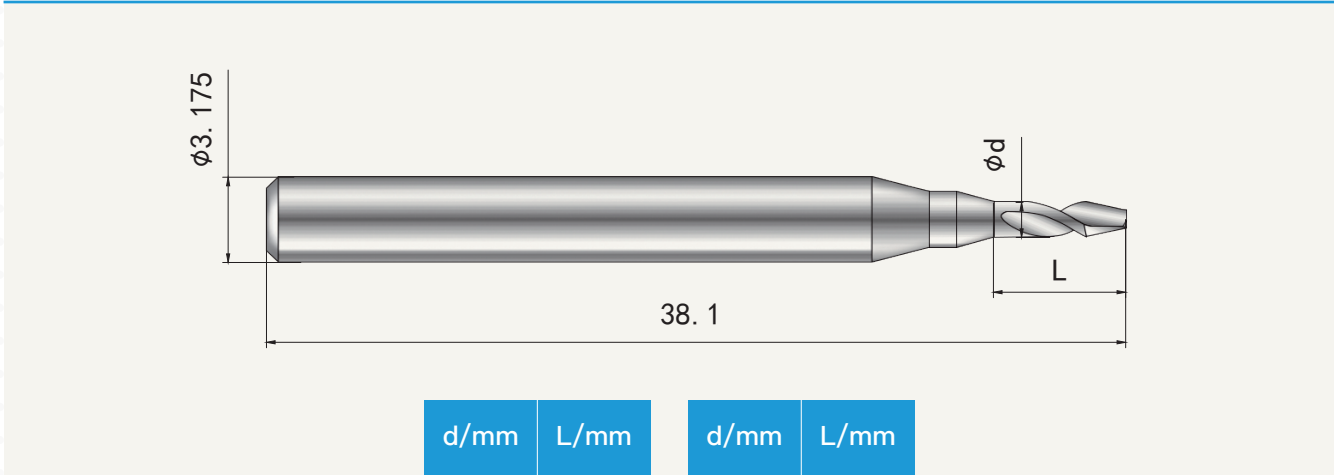
专用于梯形孔控深加工，应用于电镀埋孔等。

Design Advantages

Taper drill, with short flute length.

Application

Suitable for depth drilling.



d/mm	L/mm	d/mm	L/mm
0.15	2.5	0.50	2.5
0.20	3.0	0.55	2.5
0.30	3.0	0.65	2.5
0.40	3.0	0.75	3.0

SPECIAL TOOLS

162CE

设计特点

特殊两刃平底立铣刀，具有45°倒角切削刃。

应用

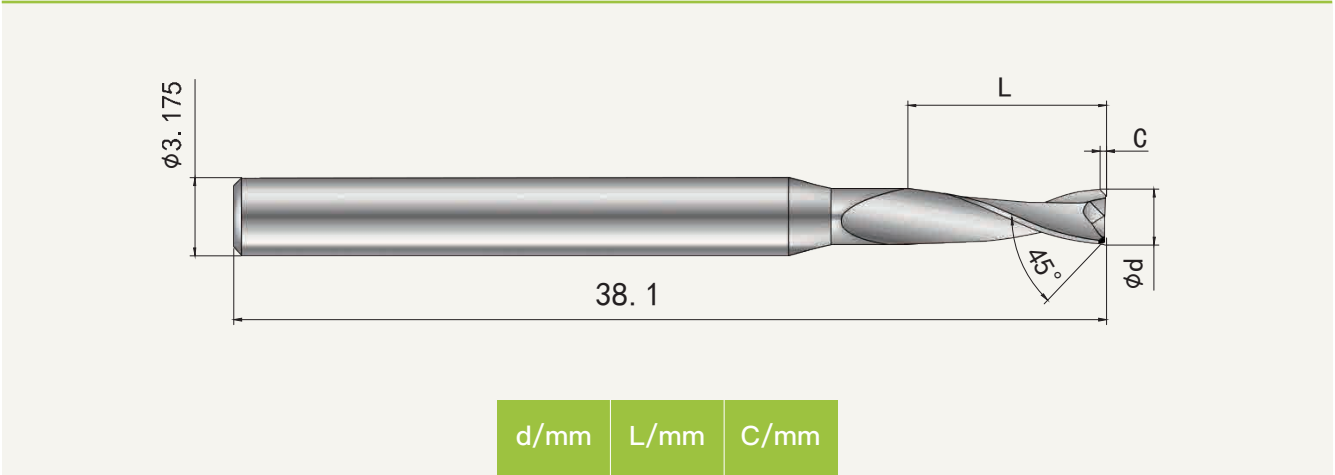
专用于平底控深铣削加工，减少铣削部位的应力集中，如汽车板等避免裂纹场合专用。

Design Advantages

Special double flute endmill with 45° chamfer cutting edge.

Application

Suitable for automotive boards and can reduce stress concentration of the routing part.



d/mm	L/mm	C/mm
0.80	3.0	0.15
1.00	3.0	0.15
1.20	3.0	0.20
1.60	4.0	0.30
2.00	4.0	0.40
3.00	6.0	0.50

设计特点

类似麻花钻结构的两刃倒角刀，刃口锋利，排屑好。

应用

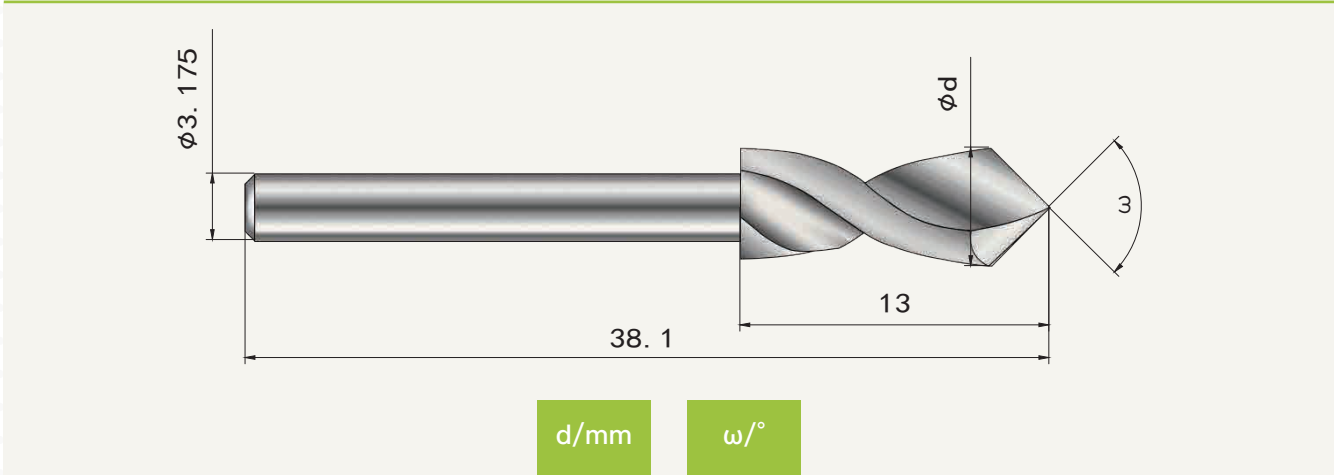
专用于沉头孔、板边斜边加工，更适应于软板，铝基板等金属基板加工。

Design Advantages

2-flute countersink tool with sharp cutting edge and good chip removal property.

Application

Suitable for countersink processing and beveling of metal base boards and general PCB.



d/mm	ω/°
3.175	60°
4.0	82°
5.0	90°
6.0	100°
6.35	120°
6.5	140°

设计特点

以聚晶金刚石（PCD）作为切削刃的倒角刀系列，拥有超长寿命。

应用

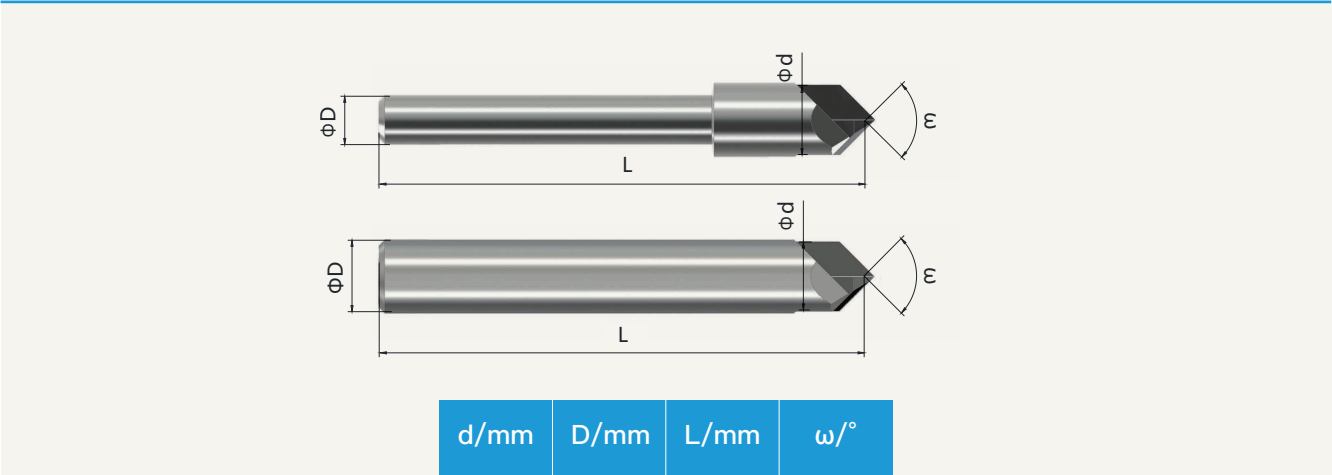
专用于金手指倒角加工、沉头孔加工，寿命是普通刀具的50~100倍。

Design Advantages

With Diamond material as cutting edge, provide extra long life.

Application

Suitable for chamfering on gold fingers, processing life is 50~100 times longer than carbide tools.



d/mm	D/mm	L/mm	ω/°
3.175	3.175	38.1	90°
4.0	3.175	38.1	120°
6.0	3.175	38.1	140°
6.0	6.0	35	90°
			120°
			140°

涂层特点

CHARACTERISTICS OF COATINGS

涂层名称 Name	MAC	HCN	NB	SHC	SHD
涂层成分 Composition	以铝为主的多元复合涂层 Multivariate composite coating based on aluminum			以碳为主的复合涂层 Multivariate composite coating based on carbon	碳 Carbon
涂层厚度 Thickness	2.0±1µm	2.0±1µm	4.5±1.5µm	0.20±0.10µm	6~20µm
硬度 Hardness	35±5GPa	35±5GPa	35±5GPa	40~80GPa	80~100GPa
摩擦系数 Coefficient of Friction	0.3	0.4	0.3	< 0.1	0.1~0.2
涂层特点 Characteristics	红硬性好、抗氧化温度高、韧性好、低摩擦系数 Excellent red hardness, high oxidation resistance, good toughness, low coefficient of friction		硬度高、涂层厚度较厚，低摩擦系数 High hardness, with thickness, low coefficient of Friction	超高硬度，超低摩擦系数 Ultra-high hardness, ultra-low coefficient of Friction	极高硬度、极耐腐蚀 Extremely high hardness, ultra-high corrosion resistance
加工对象 Working materials	PCB板材（普通FR-4、中高Tg FR-4、无卤素板材等）；厚铜板和铜基板；纯铜和铜合金；不锈钢、高速钢等钢铁类材料 PCBs (ordinary FR-4, medium and high TG FR-4, halogen-free board, etc.); Thick copper foil and copper substrate laminate; Pure copper and copper alloys; Stainless steel, high speed steel and other steel materials		PCB板材（普通FR-4、中高Tg FR-4、无卤素板材等） PCBs (ordinary FR-4, medium and high TG FR-4, halogen-free board, etc.)	FPC软板、封装板、有色金属基板、纯铝和铝合金、纯铜和铜合金 FPC; Packaging board; Non-ferrous metal substrate, etc.; Pure aluminum and aluminum alloys; Pure copper and copper alloys	陶瓷PCB板、普通PCB板、铝基板、陶瓷铝基板、石墨、氧化锆陶瓷、碳纤维、AlSi合金、硬质合金等难加工材料 Ceramic-filled PCBs, common PCBs, aluminum substrate board, ceramic filled aluminum substrate, graphite, zirconia ceramic, carbon fiber reinforced composites, AlSi alloys, cemented carbide and other difficult-to-machine materials

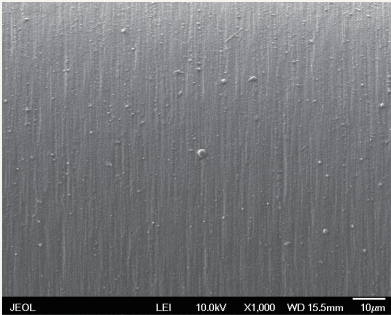
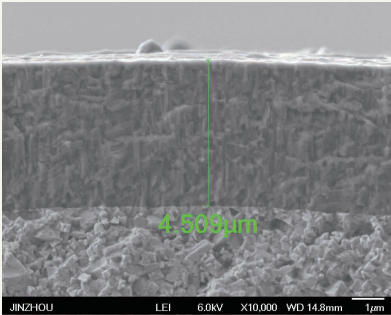
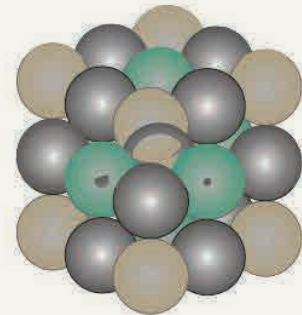
NB COATED

NB涂层

涂层特征/Features

立方晶体结构，硬度高达35GPa
cubic crystal structure with a hardness up to 35GPa

结构致密，表面颗粒少
Dense structure and less droplets



产品优势/Advantage

侧刃磨损小
low wear rate of the side cutting edge

加工寿命高
long life

加工品质及效率很高
High processing quality and efficiency

应用推荐/Application

普通FR-4板材
General FR-4 board

中高Tg FR-4板材
Medium and high Tg FR-4

无卤素板材
Halogen-free board

钻头/Drill

铣刀/Router

特殊刀具/Special tools

涂层/Coating

NB涂层刀具加工案例

Machining case of NB coated tools

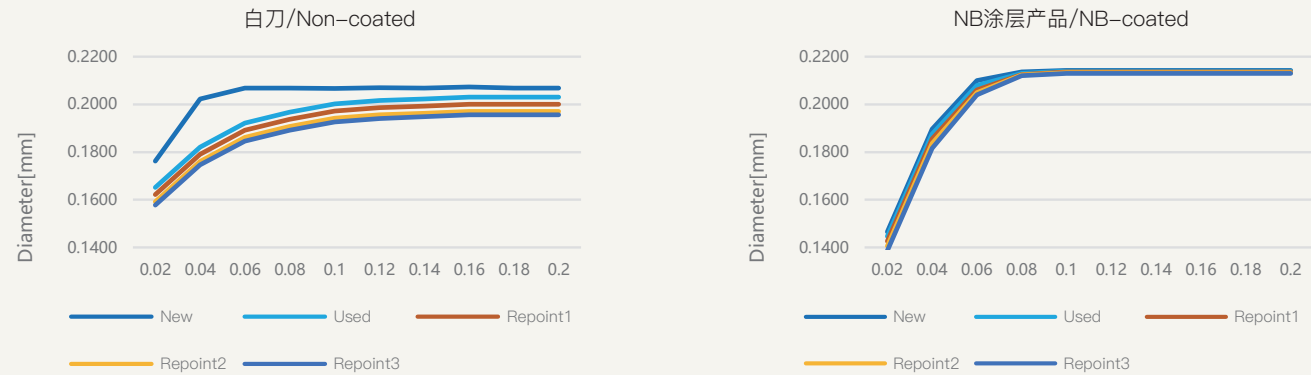
加工条件

刀具规格: $\Phi 0.20-4.0$
加工板材: S1150G T1.0 $\times$ 2pnl
加工参数: S199krpm F45mm/s

Working condition

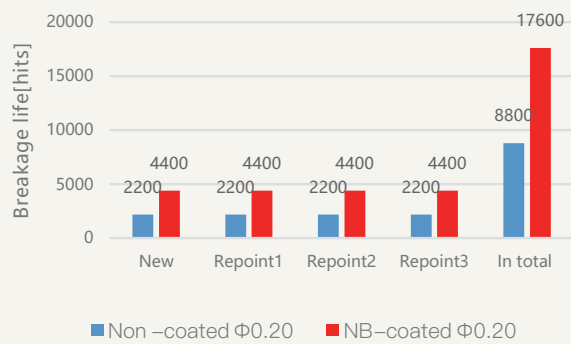
Specification: $\Phi 0.20-4.0$
Working material: S1150G T1.0 $\times$ 2pnl
Cutting parameters: S199krpm F45mm/s

磨损/Wear



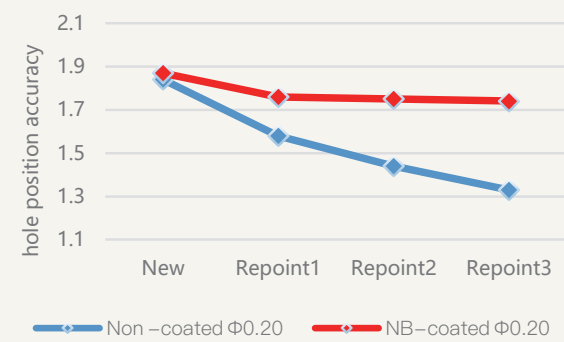
优秀的涂层硬度能很好的保护侧刃，NB涂层钻头外径几乎没有磨损
Excellent coating hardness can prevent the side edge from being worn, in which the diameter of NB-coated tools almost keep the same.
keep the same.

加工寿命/Breakage life



NB涂层钻头加工寿命是白刀的2倍
The breakage life of NB-coated drills is twice as long as that of non-coated ones

孔位精度/Hole registration accuracy



NB涂层钻头不同研次孔位精度基本保持不变
The hole registration accuracy of NB-coated drills is almost constant at different repoint times

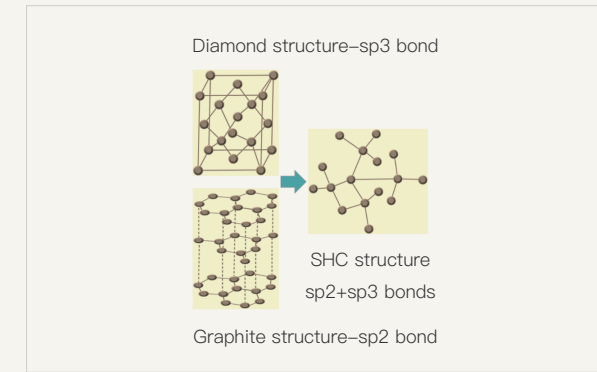
NB涂层钻头耐磨性突出，加工寿命长，品质稳定，效率很高
NB-coated drills exhibit excellent wear resistance, long service life, stable processing quality and high efficiency.

SHC COATED

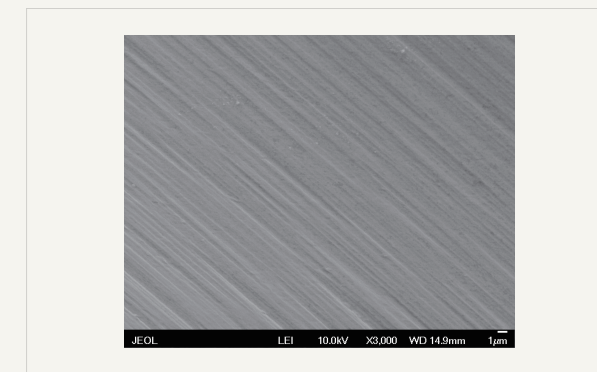
涂层特征/Features

金刚石与石墨双相复合结构
Composite structure of diamond and graphite
摩擦系数低
Low friction coefficient

硬度高
High hardness
化学性质稳定
Stable chemical properties

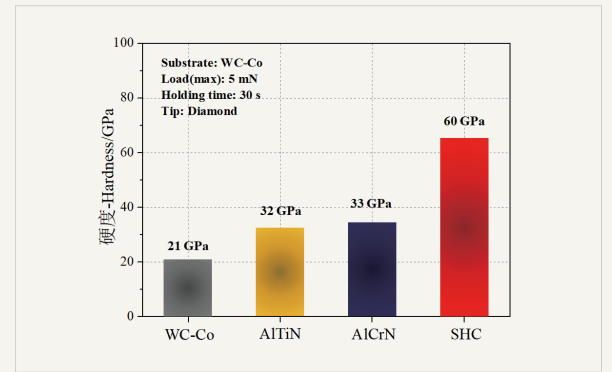


金刚石、石墨复合结构
Composite structure of diamond and graphite

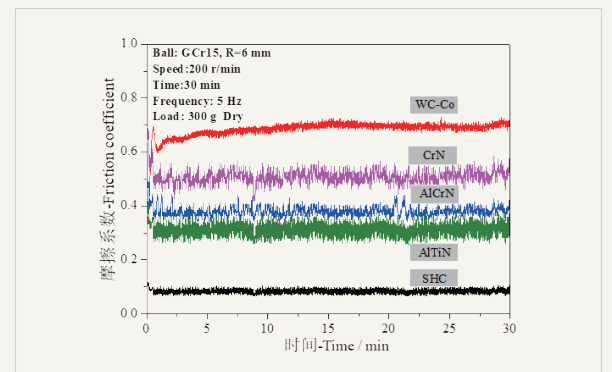


产品优势/ Advantage

排尘性好
Excellent chips evacuation property
加工效率高
High processing efficiency
断刀率低
Low breakage rate
加工品质好
Excellent processing quality



不同涂层硬度
Hardness of different coatings



不同涂层的摩擦系数
The friction coefficient of different coatings

应用推荐/ Application

软板
Flexible Printed Circuit
5G通讯板、高速板等
Communication Board
非金属材料
Nonferrous metal
封装基板
BGA/ CSP substrate
铝基板
Aluminum substrate

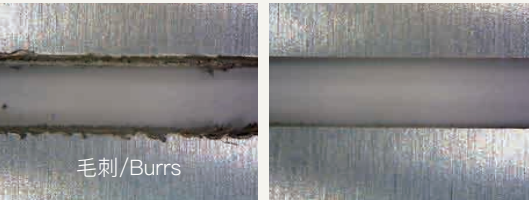
SHC涂层刀具加工案例

Machining case of SHC coated tools

加工条件

刀具规格：163R Φ1.8–8.0
加工板材：5052铝基板，T1.15x3pnl
加工参数：S28krpm F8mm/s
加工距离：2m

铝基板/Aluminum panel



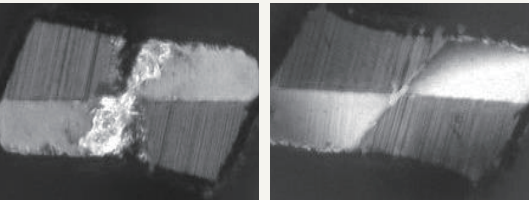
未涂层 Non-coated 涂层 SHC Coated

SHC涂层可避免切屑粘刀，显著提升刀具加工品质
Machining aluminum substrate with SHC coating can avoid sticking on the tools, which will dramatically improve processing quality.

加工条件

刀具规格：A129FPΦ0.15–2.5 mm
加工板材：双面软板，T0.036×20 pnl
测试参数：S160krpm F22mm/s
加工孔数：H3000（未涂层），H6000（涂层）

后刀面/Flank face



未涂层 Non-coated 涂层 SHC Coated

SHC涂层表面无粘Cu现象；加工2倍于白刀的孔数其孔壁质量仍优于白刀
There's no Cu sticking on the surface of SHC coated tools. The hole wall quality of SHC coated tools are still higher when machining twice as many holes as the uncoated tools.

SHC COATED

Working condition

Tools: 163R Φ1.8–8.0
Working materials: 5052 Al,T1.15x3pnl
Working parameters: S28krpm F8mm/s
Distance: 2m

切削刃/Cutting edge



未涂层 Non-coated 涂层 SHC Coated

Working condition

Tools: A129FP Φ0.15–2.5 mm
Working materials: Double-sided flexible board,T0.036×20 pnl
Working parameters: S160krpm F22mm/s
Holes: H3000(Non-coated tools) , H6000(Coated tools)

孔壁质量/Hole wall quality

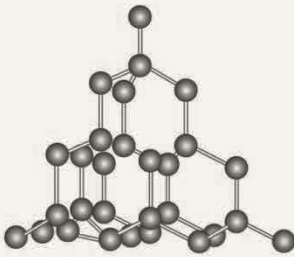


未涂层 Non-coated 涂层 SHC Coated

SHD COATED

涂层特征/ Features

SHD是由碳元素组成的，由于具有C–C共价键结构，导致了其具有80GPa以上的极高硬度。
SHD coating is composed of carbon elements, the C–C covalent bond structure resulting in its extremely high hardness as high as 80GPa.



产品优势/ Advantages

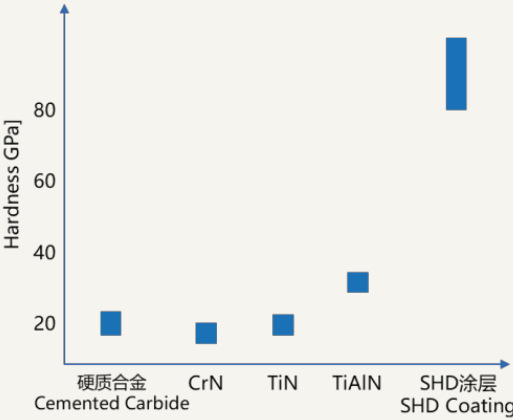
耐磨性能极其优异，超长加工寿命	/	Excellent wear resistance and ultra long life
加工产品尺寸稳定，加工品质很高	/	Stable size of processed products and high processing quality
换刀次数少，加工效率高	/	Less tool-change times and high processing efficiency

应用推荐/Application

普通和陶瓷填充PCB板	/	Conventional and ceramic-filled PCB boards
铝基板和陶瓷填充铝基板	/	Aluminum substrate and ceramic filled aluminum substrate
石墨	/	Graphite
碳纤维	/	Carbon fiber reinforced composites
氧化锆陶瓷	/	Zirconia ceramic
铝硅合金(20%Si)	/	AlSi-alloys(20%Si)
硬质合金	/	Cemented carbide

SHD涂层

SHD涂层与其他切削材料的硬度对比
Hardness comparison of SHD coatings with other cutting materials



SHD涂层刀具加工案例

Machining case of SHD coated tools

加工条件

刀具规格：φ0.30–4.0
加工板材：S7135D T0.53×3pnl
加工参数：S130krpm F20mm/s

孔壁粗糙度/Hole wall roughness

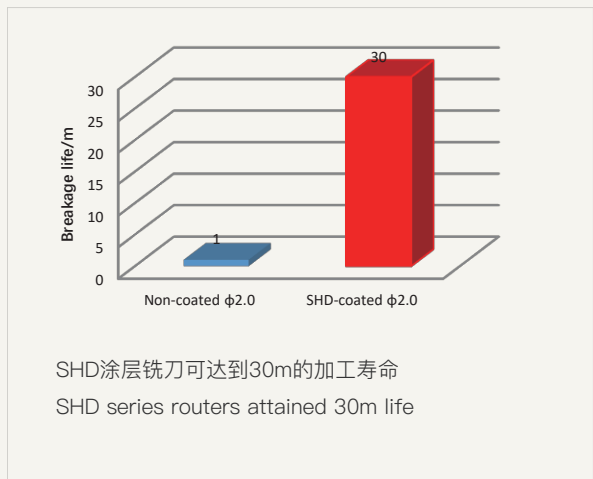


SHD涂层钻头加工到10,000孔的寿命，孔壁质量远好于白刀200孔的情况
SHD series drill bits attained much better hole wall quality even after 10,000 holes than non-coated ones with 200 holes.

加工条件

刀具规格：φ2.00–8.5
加工板材：S7135D T0.53×5pnl
加工参数：S28krpm F12mm/s

加工寿命/Life



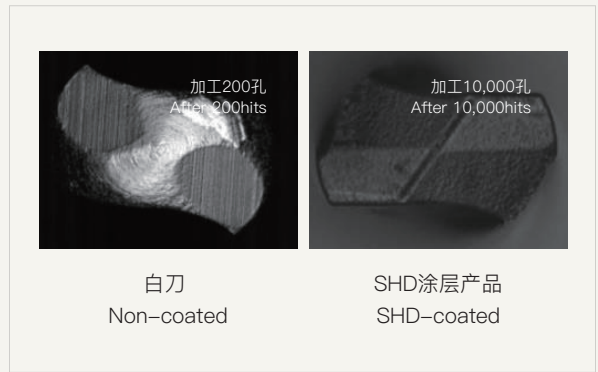
SHD涂层铣刀可达到30m的加工寿命
SHD series routers attained 30m life
Due to extremely high hardness, SHD coated tools have excellent wear resistance and ultra long life.

SHD COATED

Working condition

Specification: φ0.30–4.0
Working material: S7135D T0.53×3pnl
Working parameters: S130krpm F20mm/s

磨损/Wear

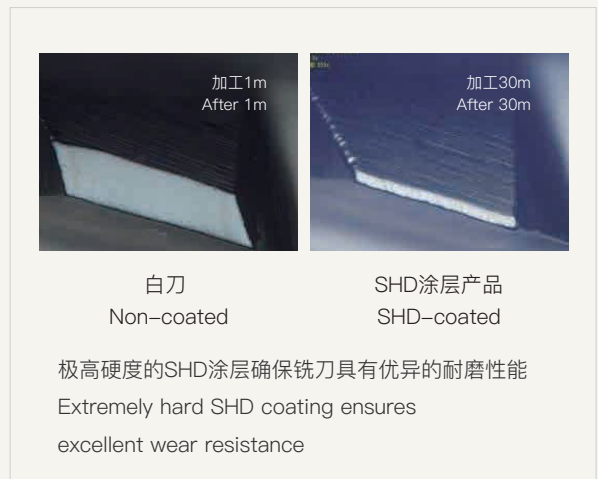


极高硬度的SHD涂层确保钻头具有优异的耐磨性能
Extremely hard SHD coating ensures excellent wear resistance

Working condition

Specification: φ2.00–8.5
Working material: S7135D T0.53×5pnl
Cutting parameter: S28krpm F12mm/s

磨损/Wear



极高硬度的SHD涂层确保铣刀具有优异的耐磨性能
Extremely hard SHD coating ensures excellent wear resistance

切削参数计算公式

MACHINING PARAMETER CALCULATION FORMULA

FORMULA

切削速度cutting speed V_s :
 $V_s=(n*D*\pi)/1000$

V_s =切削速度cutting speed[m/min]
 n =转速spindle speed[rpm]
 D =直径diameter[mm]

进给量chip load f :
(每转进给量feed per revolution)
 $f=(F*1000)/n$

f =进给量chip load[mm/rev]
 F =落速feed rate[m/min]
 n =转速spindle speed[rpm]

公式转化conversion formula:
落速Feed rate F : $F=(f*n)/1000$

转速spindle speed n : $n=V_s/(D*\pi) * 1000$

举例Example:

给出数据Given date: 落速cutting speed V_s :130m/min
进给量chip load f :0.05mm/rev
直径diameter D :0.7mm

转速spindle speed $n=130/(0.7 * 3.14)*1000=59144$ rpm
选择转速chosen spindle speed: $n=59000$ rpm

落速feed rate $F=(0.05*59000)/1000=2.95$ m/min
选择落速chosen feed rate: $F=2.95$ m/min

钻头(3.175mm柄径)使用参数推荐表

DRILL BITS(3.175MM SHANK DIAMETER) CUTTING PARAMETERS

		双面板~4层板 double side~4layers				6~10层板 6~10layers			
直径 Diameter	转速 Spindle speed	进给量 Chip Load		落速 Infeed Rate		进给量 Chip Load		落速 Infeed Rate	
mm	krpm	µm/rev	mil/rev	mm/s	ipm	µm/rev	mil/rev	mm/s	ipm
0.11	160	10	0.39	27	63	8	0.31	21	50
	200	10	0.39	33	79	8	0.31	27	63
	300	8	0.31	40	94	8	0.31	40	94
0.12	160	12	0.47	32	76	10	0.39	27	63
	200	12	0.47	40	94	10	0.39	33	79
0.15	160	14	0.55	37	88	12	0.47	32	76
	200	14	0.55	47	110	12	0.47	40	94
0.20	125	15	0.59	31	74	12	0.47	25	59
	160	15	0.59	40	94	12	0.47	32	76
	200	13	0.51	43	102	12	0.47	40	94
0.25	125	16	0.63	33	79	14	0.55	29	69
	155	16	0.63	41	98	14	0.55	36	85
	180	15	0.59	45	106	14	0.55	42	99
0.30	110	18	0.71	33	78	16	0.63	29	69
	145	18	0.71	44	103	16	0.63	39	91
	170	18	0.71	51	120	15	0.59	43	100
0.35	105	20	0.79	35	83	20	0.79	35	83
	140	20	0.79	47	110	20	0.79	47	110
	160	20	0.79	53	126	20	0.79	53	126
0.40	100	24	0.94	40	94	20	0.79	33	79
	130	22	0.87	48	113	20	0.79	43	102
	160	22	0.87	59	139	20	0.79	53	126
0.45	95	24	0.94	38	90	22	0.87	35	82
	125	24	0.94	50	118	22	0.87	46	108
	160	23	0.91	61	145	20	0.79	53	126
0.50	90	28	1.10	42	99	25	0.98	38	89
0.55	85	31	1.22	44	104	28	1.10	40	94
0.60	80	34	1.34	45	107	33	1.30	44	104
0.65	75	38	1.50	48	112	37	1.46	46	109
0.70	70	41	1.61	48	113	40	1.57	47	110
0.75	70	43	1.69	50	119	42	1.65	49	116
0.80	65	46	1.81	50	118	44	1.73	48	113
0.85	65	48	1.89	52	123	46	1.81	50	118
0.90	60	52	2.05	52	122	48	1.89	48	113
0.95	60	55	2.17	55	129	50	1.97	50	118
1.00	55	58	2.28	53	126	52	2.05	48	113
1.05	50	62	2.44	52	122	54	2.13	45	106
1.10	50	62	2.44	52	122	56	2.20	47	110
1.15	48	65	2.56	52	123	58	2.28	46	110
1.20	45	69	2.72	52	122	60	2.36	45	106
1.25	45	69	2.72	52	122	62	2.44	47	110
1.30	42	73	2.87	51	121	64	2.52	45	106
1.35	42	73	2.87	51	121	66	2.60	46	109
1.40	40	76	2.99	51	120	68	2.68	45	107
1.45	40	76	2.99	51	120	70	2.76	47	110
1.50	38	80	3.15	51	120	70	2.76	44	105

■ 备注：10层以上板材、厚铜板、金属基板以及其他特殊板材可联系金洲咨询加工方案。

钻头(3.175mm柄径)使用参数推荐表

DRILL BITS(3.175MM SHANK DIAMETER) CUTTING PARAMETERS

		双面板~4层板 double side~4layers				6~10层板 6~10layers			
直径 Diameter	转速 Spindle speed	进给量 Chip Load		落速 Infeed Rate		进给量 Chip Load		落速 Infeed Rate	
mm	krpm	µm/rev	mil/rev	mm/s	ipm	µm/rev	mil/rev	mm/s	ipm
1.55	38	80	3.15	51	120	72	2.83	46	108
1.60	36	84	3.31	50	119	72	2.83	43	102
1.65	36	84	3.31	50	119	74	2.91	44	105
1.70	35	85	3.35	50	117	74	2.91	43	102
1.75	35	85	3.35	50	117	75	2.95	44	103
1.80	33	88	3.46	48	114	75	2.95	41	97
1.85	33	89	3.50	49	116	74	2.91	41	96
1.90	32	89	3.50	47	112	74	2.91	39	93
1.95	32	86	3.39	46	108	72	2.83	38	91
2.00	30	86	3.39	43	102	72	2.83	36	85
2.05	30	84	3.31	42	99	70	2.76	35	83
2.10	28	84	3.31	39	93	70	2.76	33	77
2.15	28	82	3.23	38	90	68	2.68	32	75
2.20	26	82	3.23	36	84	68	2.68	29	70
2.25	26	79	3.11	34	81	66	2.60	29	68
2.30	24	79	3.11	32	75	66	2.60	26	62
2.35	24	77	3.03	31	73	64	2.52	26	60
2.40	24	77	3.03	31	73	64	2.52	26	60
2.45	24	74	2.91	30	70	62	2.44	25	59
2.50	22	74	2.91	27	64	62	2.44	23	54
2.55	22	72	2.83	26	62	60	2.36	22	52
2.60	22	72	2.83	26	62	60	2.36	22	52
2.65	22	70	2.76	26	61	58	2.28	21	50
2.70	20	70	2.76	23	55	58	2.28	19	46
2.75	20	67	2.64	22	53	56	2.20	19	44
2.80	20	67	2.64	22	53	56	2.20	19	44
2.85	20	66	2.60	22	52	55	2.17	18	43
2.90	20	66	2.60	22	52	55	2.17	18	43
2.95	20	62	2.44	21	49	52	2.05	17	41
3.00	20	62	2.44	21	49	52	2.05	17	41
3.05~3.15	20	60	2.36	20	47	50	1.97	17	39
3.20~3.55	20	60	2.36	20	47	50	1.97	17	39
3.60~3.85	20	58	2.28	19	46	48	1.89	16	38
3.90~4.15	20	55	2.17	18	43	46	1.81	15	36
4.20~4.35	20	54	2.13	18	43	45	1.77	15	35
4.40~4.55	20	46	1.81	15	36	38	1.50	13	30
4.60~4.70	20	43	1.69	14	34	36	1.42	12	28
4.75~4.90	20	40	1.57	13	31	33	1.30	11	26
4.95~5.05	20	37	1.46	12	29	31	1.22	10	24
5.10~5.20	20	35	1.38	12	28	29	1.14	10	23
5.25~5.40	20	32	1.26	11	25	27	1.06	9	21
5.45~5.55	20	29	1.14	10	23	24	0.94	8	19
5.60~5.75	20	28	1.10	9	22	23	0.91	8	18
5.80~5.95	20	24	0.94	8	19	20	0.79	7	16
6.00~6.30	20	22	0.87	7	17	18	0.71	6	14
6.35~6.50	20	18	0.71	6	14	15	0.59	5	12

■ 备注：10层以上板材、厚铜板、金属基板以及其他特殊板材可联系金洲咨询加工方案。

钻头(2.00mm柄径)使用参数推荐表

DRILL BITS(2.00MM SHANK DIAMETER) CUTTING PARAMETERS

直径 Diameter	转速 Spindle speed	进给量 Chip Load		落速 Infeed Rate	
mm	krpm	μm/rev	mil/rev	mm/s	ipm
0.05	300	6	0.24	30	71
0.08	300	6	0.24	30	71
0.11	300	8	0.31	40	94
0.12	300	8	0.31	40	94
0.15	300	9	0.35	45	106
0.20	250	10	0.39	42	98
0.25	250	11	0.43	46	108
0.30	150	16	0.63	40	94
0.35	140	18	0.71	42	99
0.40	120	20	0.79	40	94
0.45	100	22	0.87	37	87
0.50	90	25	0.98	38	89
0.55	80	25	0.98	33	79
0.60	75	25	0.98	31	74
0.65	70	25	0.98	29	69
0.70	65	25	0.98	27	64
0.75	60	25	0.98	25	59
0.80	60	25	0.98	25	59
0.85	55	25	0.98	23	54
0.90	55	25	0.98	23	54
0.95	50	25	0.98	21	49
1.00	48	25	0.98	20	47
1.05	45	25	0.98	19	44
1.10	45	25	0.98	19	44
1.15	45	25	0.98	19	44
1.20	40	25	0.98	17	39
1.25	40	25	0.98	17	39
1.30	40	25	0.98	17	39
1.35	40	25	0.98	17	39
1.40	38	25	0.98	16	37
1.45	38	25	0.98	16	37
1.50	38	25	0.98	16	37
1.55	38	25	0.98	16	37
1.60	36	25	0.98	15	35
1.65	36	25	0.98	15	35
1.70	36	25	0.98	15	35
1.75	36	25	0.98	15	35
1.80	35	25	0.98	15	34
1.85	35	25	0.98	15	34
1.90	35	25	0.98	15	34
1.95	35	25	0.98	15	34
2.00	35	25	0.98	15	34

DRILL

SLOT DRILL

槽钻使用参数推荐表

SLOT DRILL BITS CUTTING PARAMETERS

直径 Diameter	转速 Spindle speed	L < 2d				L > 2d			
		进给量 Chip Load		落速 Infeed Rate		进给量 Chip Load		落速 Infeed Rate	
mm	krpm	μm/rev	mil/rev	mm/s	ipm	μm/rev	mil/rev	mm/s	ipm
0.40	100	7	0.26	11	26	13	0.52	22	52
0.45	96	8	0.30	12	28	15	0.59	24	57
0.50	92	8	0.33	13	31	17	0.67	26	61
0.55	88	10	0.38	14	33	19	0.75	28	66
0.60	84	11	0.42	15	35	21	0.84	30	71
0.65	77	12	0.49	16	38	25	0.98	32	76
0.70	73	14	0.55	17	40	28	1.10	34	80
0.75	70	15	0.61	18	43	31	1.21	36	85
0.80	67	16	0.63	18	43	32	1.27	36	85
0.85	65	18	0.69	19	45	32	1.26	35	82
0.90	62	18	0.72	19	45	33	1.30	34	81
0.95	60	20	0.79	20	47	34	1.34	34	80
1.00	58	21	0.81	20	47	35	1.38	34	80
1.10	56	20	0.80	19	45	35	1.36	32	76
1.20	52	22	0.86	19	45	37	1.47	32	76
1.30	48	24	0.94	19	45	40	1.59	32	76
1.40	46	23	0.92	18	43	40	1.57	31	72
1.60	42	26	1.01	18	43	44	1.72	31	72
1.80	38	27	1.06	17	40	46	1.80	29	68
2.00	34	28	1.11	16	38	48	1.89	27	64

ROUTER ENDMILL

铣刀使用参数推荐表

ROUTER BITS CUTTING PARAMETERS

	刚性板材/Rigid PCB			金属基板/Non-ferrous Metal			柔性板材/Flexible PCB					
直径 Diameter	转速 Spindle speed	进给速度 Table Feed Rate		转速 Spindle speed	进给速度 Table Feed Rate		转速 Spindle speed	进给速度 Table Feed Rate				
mm	krpm	mm/s	ipm	krpm	mm/s	ipm	krpm	mm/s	ipm			
0.50	50	3	7	25~30	1~4	2~9	40~50	1~3	4~6			
0.60		4	9					2~5	6~12			
0.70		5	12									
0.80	45	8	19				35~40	3~6	8~16			
0.90		8	19									
1.00		10	24									
1.10	40	10	24							30~35	6~10	14~25
1.20		12	28									
1.30		12	28									
1.40	35	14	33		5~10	12~24	25~30	6~14	16~32			
1.50		14	33									
1.60		16	38									
1.80	30	16	38									
2.00		18	43									
2.20		18	43									
2.40	25	18	43	15~20	9~14	21~32						
2.50		18	43									
3.00		18	43									
3.10		18	43									
3.175		18	43									



金洲常规套环标准

JINZHOU’S RING SETTING STANDARD

RING STANDARD



	SIZE	INCH	MM
		0.0039	0.10
		0.0051	0.13
	#97	0.0059	0.15
	#96	0.0063	
	#95	0.0067	
	#94	0.0071	
	#93	0.0075	
	#92	0.0079	0.20
	#91	0.0083	
	#90	0.0087	
	#89	0.0091	
	#88	0.0095	
		0.0098	0.25
	#87	0.0100	
	#86	0.0105	
	#85	0.0110	
	#84	0.0115	
		0.0118	0.30
	#83	0.0120	
	#82	0.0125	
	#81	0.0130	
	#80	0.0135	
		0.0138	0.35
	#79	0.0145	
	1/64”	0.0156	
		0.0157	0.40
	#78	0.0160	
		0.0177	0.45
	#77	0.0180	
		0.0197	0.50
	#76	0.0200	
	#75	0.0210	
		0.0217	0.55
	#74	0.0225	
		0.0236	0.60
	#73	0.0240	
	#72	0.0250	
		0.0256	0.65
	#71	0.0260	
		0.0276	0.70

	SIZE	INCH	MM
	#70	0.0280	
	#69	0.0292	
		0.0295	0.75
	#68	0.0310	
	1/32”	0.0312	
		0.0315	0.80
	#67	0.0320	
	#66	0.0330	
		0.0335	0.85
	#65	0.0350	
		0.0354	0.90
	#64	0.0360	
	#63	0.0370	
		0.0374	0.95
	#62	0.0380	
	#61	0.0390	
		0.0394	1.00
	#60	0.0400	
	#59	0.0410	
		0.0413	1.05
	#58	0.0420	
	#57	0.0430	
		0.0433	1.10
		0.0453	1.15
	#56	0.0465	
	3/64”	0.0469	
		0.0472	1.20
		0.0492	1.25
		0.0512	1.30
	#55	0.0520	
		0.0531	1.35
	#54	0.0550	
		0.0551	1.40
		0.0571	1.45
		0.0591	1.50
	#53	0.0595	
		0.0610	1.55
	1/16”	0.0625	
		0.0630	1.60
	#52	0.0635	

	SIZE	INCH	MM
		0.0650	1.65
		0.0669	1.70
	#51	0.0670	
		0.0689	1.75
	#50	0.0700	
		0.0709	1.80
		0.0728	1.85
	#49	0.0730	
		0.0748	1.90
	#48	0.0760	
		0.0768	1.95
	5/64”	0.0781	
	#47	0.0785	
		0.0787	2.00
		0.0807	2.05
	#46	0.0810	
	#45	0.0820	
		0.0827	2.10
		0.0846	2.15
	#44	0.0860	
		0.0866	2.20
		0.0886	2.25
	#43	0.0890	
		0.0906	2.30
		0.0925	2.35
	#42	0.0935	
	3/32”	0.0938	
		0.0945	2.40
	#41	0.0960	
		0.0965	2.45
	#40	0.0980	
		0.0984	2.50
	#39	0.0995	
		0.1004	2.55
	#38	0.1015	
		0.1024	2.60
	#37	0.1040	
		0.1043	2.65
		0.1063	2.70
	#36	0.1065	

	SIZE	INCH	MM
		0.1083	2.75
	7/64”	0.1094	
	#35	0.1100	
		0.1102	2.80
	#34	0.1110	
		0.1122	2.85
	#33	0.1130	
		0.1142	2.90
	#32	0.1160	
		0.1161	2.95
		0.1181	3.00
	#31	0.1200	
		0.1201	3.05
		0.1220	3.10
		0.1240	3.15
	1/8”	0.1250	
		0.1260	3.20
		0.1280	3.25
	#30	0.1285	
		0.1299	3.30
		0.1319	3.35
		0.1339	3.40
		0.1358	3.45
	#29	0.1360	
		0.1378	3.50
		0.1398	3.55
	#28	0.1405	
	9/64”	0.1406	
		0.1417	3.60
		0.1437	3.65
	#27	0.1440	
		0.1457	3.70
	#26	0.1470	
		0.1476	3.75
	#25	0.1495	
		0.1496	3.80
		0.1516	3.85
	#24	0.1520	
		0.1535	3.90
	#23	0.1540	

	SIZE	INCH	MM
		0.1555	3.95
	5/32”	0.1562	
	#22	0.1570	
		0.1575	4.00
	#21	0.1590	
		0.1594	4.05
		0.1610	
	#20	0.1614	4.10
		0.1634	4.15
		0.1654	4.20
	#19	0.1660	
		0.1673	4.25
		0.1693	4.30
	#18	0.1695	
		0.1713	4.35
	11/64”	0.1719	
	#17	0.1730	
		0.1732	4.40
		0.1752	4.45
	#16	0.1770	
		0.1772	4.50
		0.1791	4.55
	#15	0.1800	
		0.1811	4.60
	#14	0.1820	
		0.1831	4.65
	#13	0.1850	4.70
		0.1870	4.75
	3/16”	0.1875	
	#12	0.1890	4.80
		0.1909	4.85
	#11	0.1910	
		0.1929	4.90
	#10	0.1935	
		0.1949	4.95
	#9	0.1960	
		0.1968	5.00
		0.1988	5.05
	#8	0.1990	
		0.2008	5.10

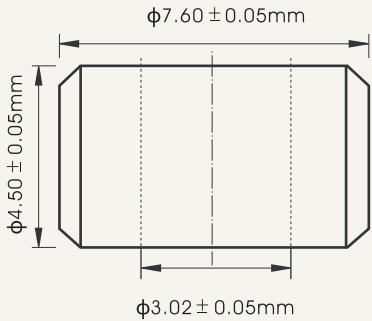
	SIZE	INCH	MM
	#7	0.2010	
		0.2028	5.15
	13/64”	0.2031	
	#6	0.2040	
		0.2047	5.20
	#5	0.2055	
		0.2067	5.25
		0.2087	5.30
	#4	0.2090	
		0.2106	5.35
		0.2126	5.40
	#3	0.2130	
		0.2146	5.45
		0.2165	5.50
		0.2185	5.55
	7/32”	0.2188	
		0.2205	5.60
	#2	0.2210	
		0.2224	5.65
		0.2244	5.70
		0.2264	5.75
	#1	0.2280	
		0.2283	5.80
		0.2302	5.85
		0.2323	5.90
	A	0.2340	
		0.2343	5.95
	15/64”	0.2344	
		0.2362	6.00
	B	0.2380	
		0.2382	6.05
		0.2402	6.10
	C	0.2420	
		0.2421	6.15
		0.2441	6.20
	D	0.2460	
		0.2461	6.25
		0.2480	6.30
	Eor 1/4”	0.2500	6.35
		0.2520	6.40

颜色说明/Color list

颜色/Color	灰色/Grey	深蓝色/Dark blue	10G	酱红色/Red	白色/White
示例/Example					
颜色/Color	柑红色/Orange	墨绿色/Dark green	苹果绿/Light green	紫色/Purple	冻黄色/Yellow
示例/Example					

套环/Ring

说明：套环后，外径最大会膨胀到7.70mm。



套环尺寸标准/Ring setting specification

