



PCD MICRO DRILL

Semiconductor industry National defense field Aerospace

Chip&Communication electronics Automotive electronics

High-end medical equipment field

Super-Precision Maching $\phi 0.2$ - $\phi 2$ mm



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WORLDIA

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ABOUT US



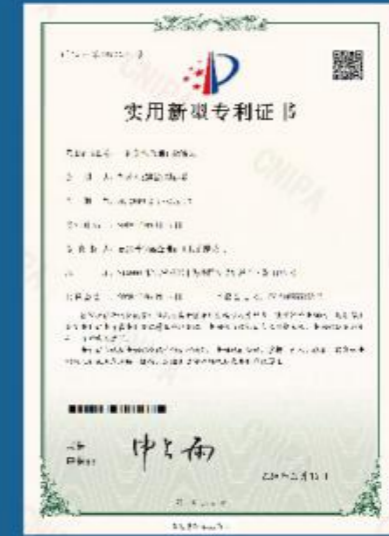
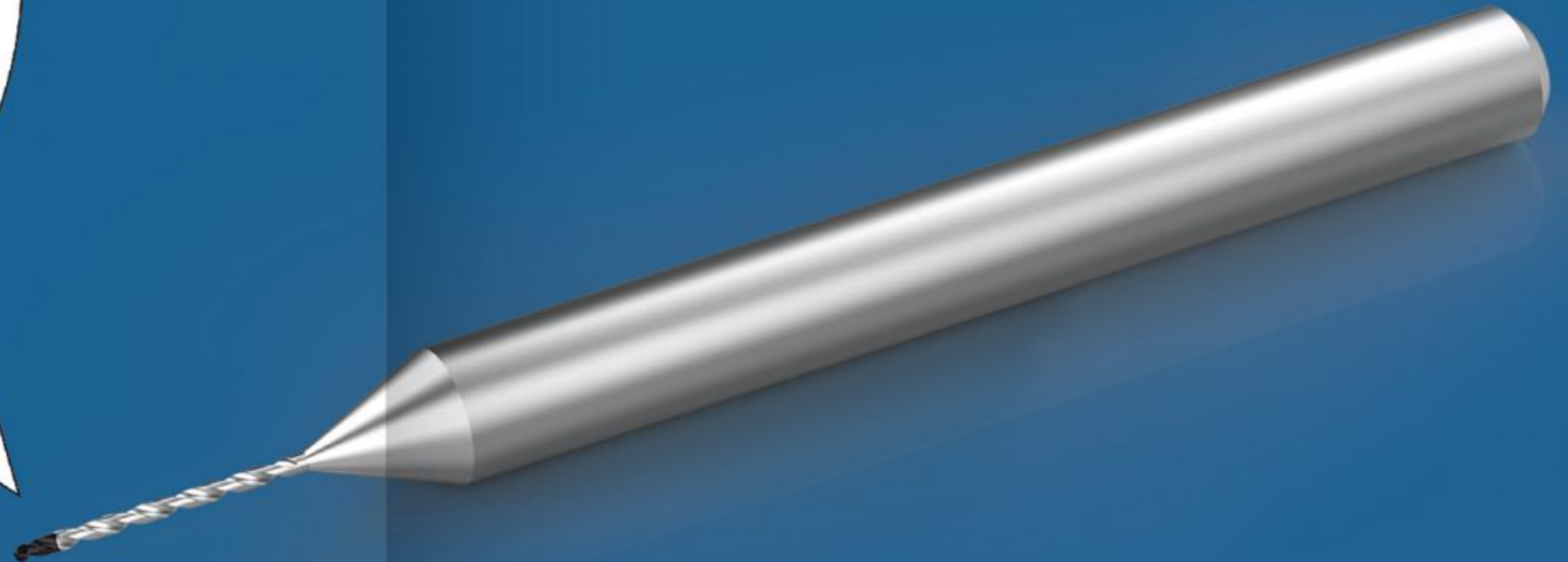
COMPANY PROFILE

- Beijing Worldia Diamond Tools Co., Ltd. was founded in 2006 in Beijing Zhongguancun Science and Technology Park;
- The Worldia Group currently has one branch and several wholly-owned subsidiaries. Among them, the two largest subsidiaries are Jiaxing Worldia Diamond Tools Co., Ltd. and Langfang Supower Diamond Technology Co., Ltd.;

- The company is a high-tech enterprise mainly engaged in the research and development, production and sales of superhard cutting tools and superhard material products;
- Our products are involved in many well-known enterprises in the fields of optoelectronic display industry, aerospace, nuclear industry, photovoltaic, wind power, semiconductor and equipment, and we have formed long-term and stable cooperative relations with customers in these fields;
- On July 22, 2019, worldia was officially listed on the STAR Market in Shanghai Stock Exchange.
(Stock Code: 688028)

PCD MICRO DRILL

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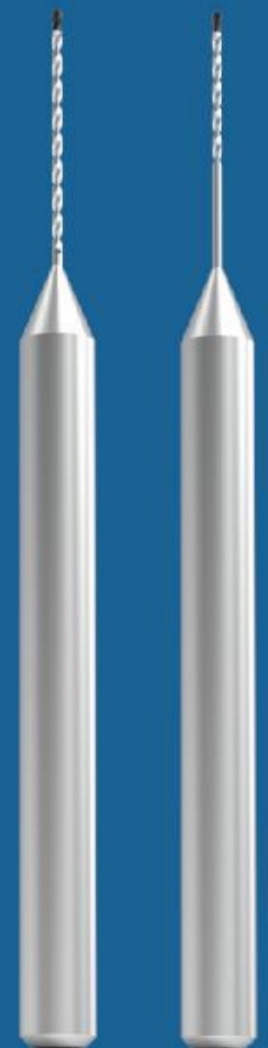


SUPER-PRECISION
φ0.2-φ2 mm
PCD MICRO DRILL

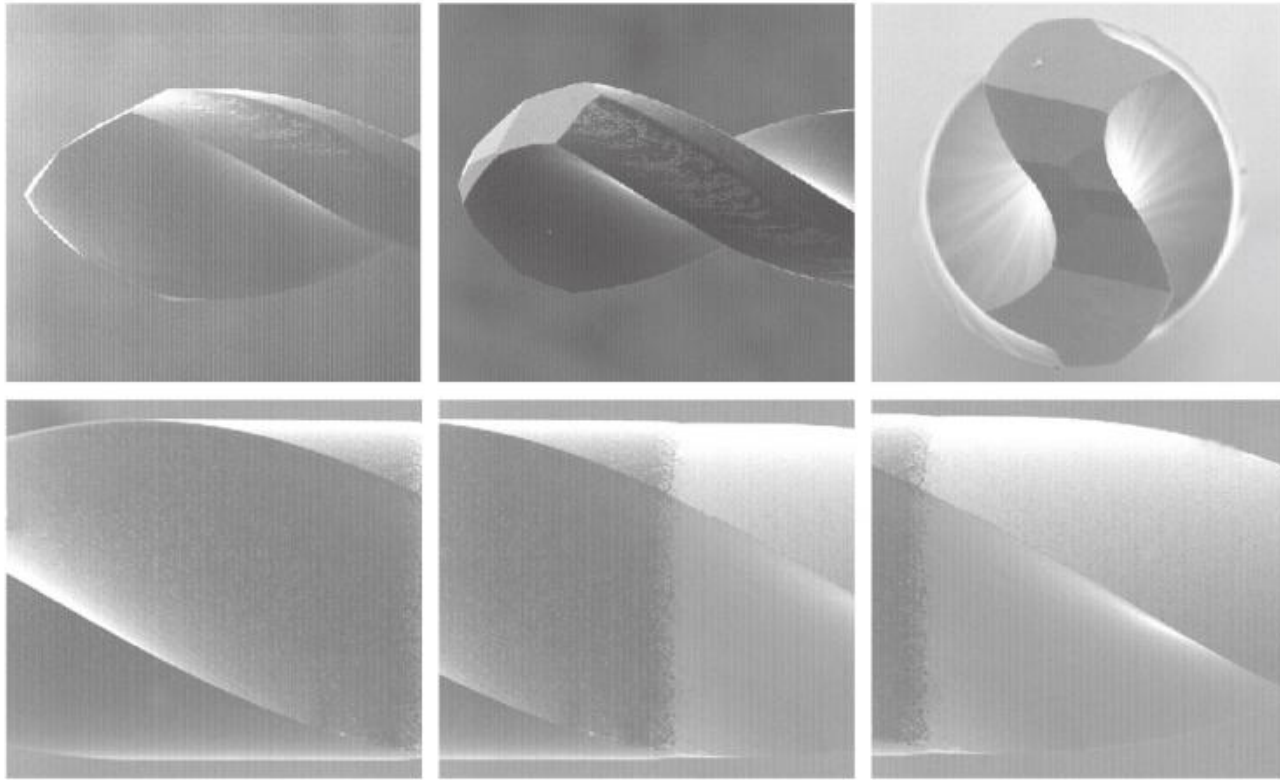
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01 FEATURES



PCD MICRO DRILL SLOT STRUCTURE AND DRILL TIP

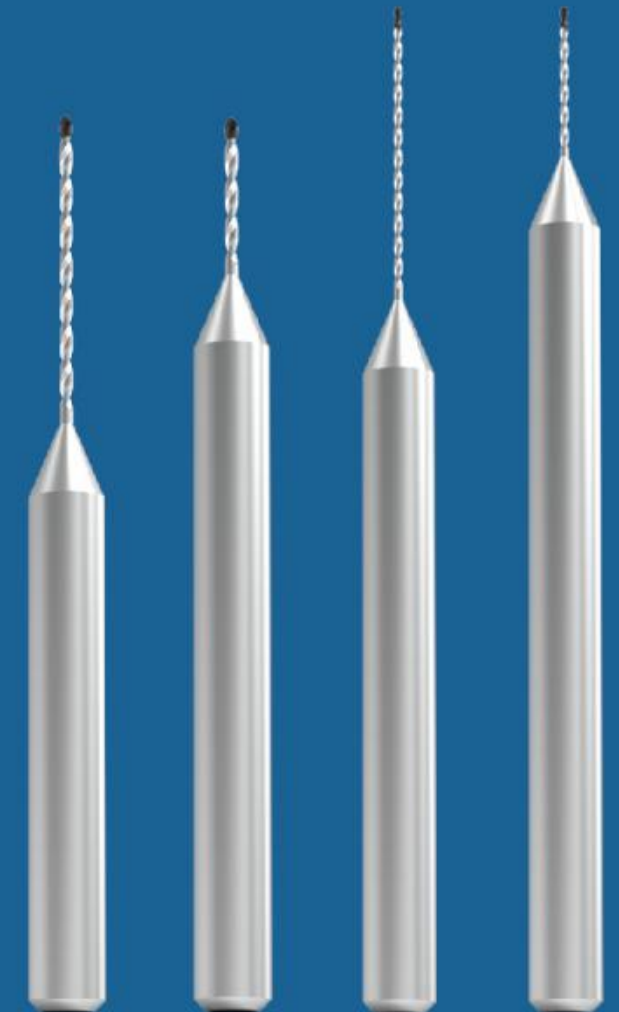


1. The grinding groove is smooth and the chip removal is excellent;
2. The edge surface is polished and the main edge is sharp;
3. The tip rotates stably and the hole position is accurate.

Product Features

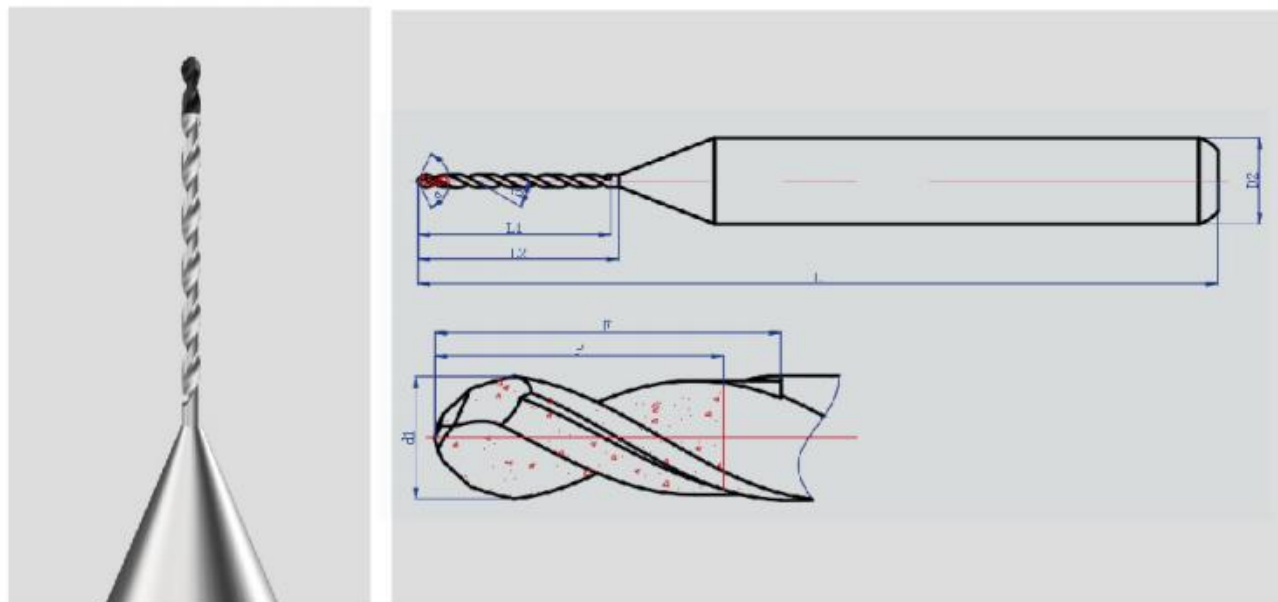
- 1.PCD micro drill has characteristics of high hardness, wear resistance, and relatively long service life compared with traditional alloy microdrill;
- 2.PCD micro drill is widely used in addition to processing metal materials, can also be used for inorganic non-metallic material processing, with high processing precision;
- 3.PCD micro drill, compared with traditional alloy microdrill, can process hole wall with better quality.

02 SPECIFICATION





PRODUCT CATEGORY



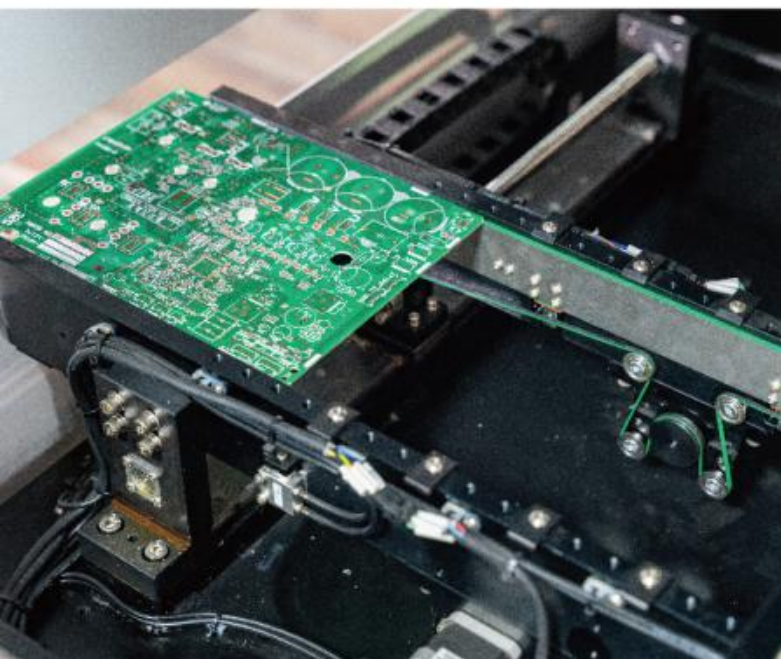
SPECIFICATION SELECTION TABLE

Specification Table								
Series	Specification	d1 (mm)	L2 (mm)	L2/D	D2	L	α	Application
WZ1	$d1 \cdot L2 \cdot SD3.175 \cdot L \cdot \alpha$	0.2~0.4	2~6	32	3.175	38/45	110°-130°	Graphite, polymer wear-resisting material, aluminum alloy and other non-ferrous metals
		0.4~0.8	4~13.5					
		0.8~2.0						
WZ2	$d1 \cdot L2 \cdot SD3.175 \cdot L \cdot \alpha$	0.4~0.8	4~13.5	20	3.175	38/45	110°-130°	Composite ceramic wear resistant material
		0.8~2.0			3.175	38/45	110°-130°	
WZ3	$d1 \cdot L2 \cdot SD3.175 \cdot L \cdot \alpha$	0.2~0.35	2~4	38	3.175	38/45	110°-130°	Monocrystalline silicon, polysilicon
		0.35~0.75	2~7					
			7~13.5					
Remark	Non-standard products can be customized!							

PRODUCT APPLICATION FIELD

Semiconductor industry National defense field Aerospace

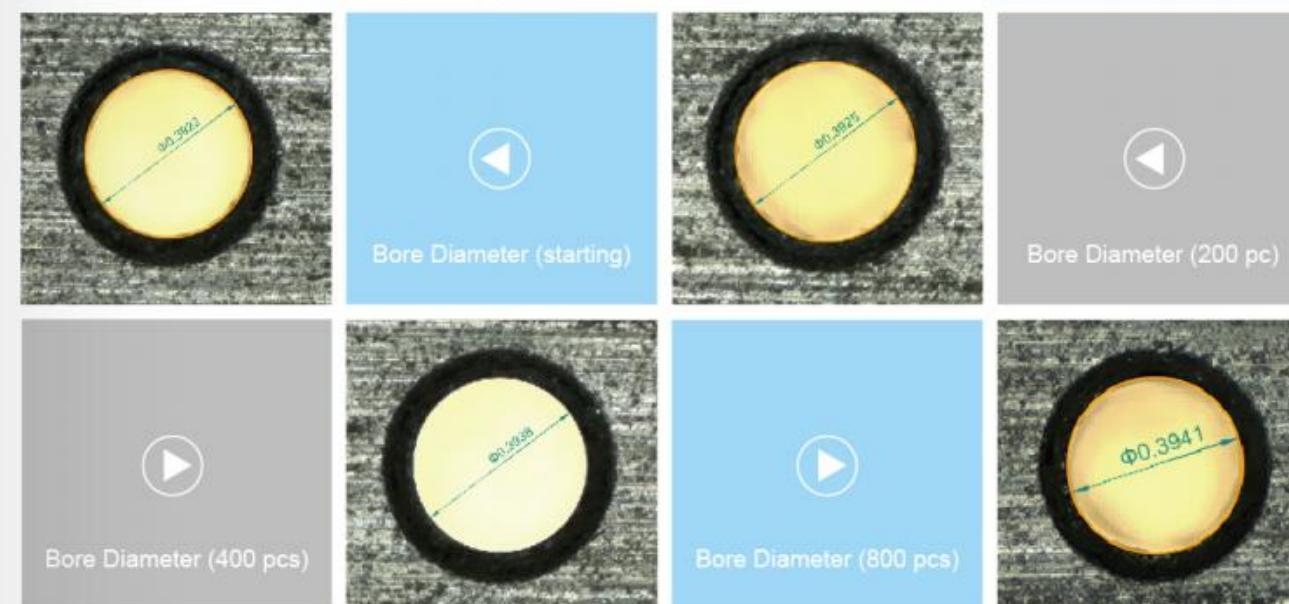
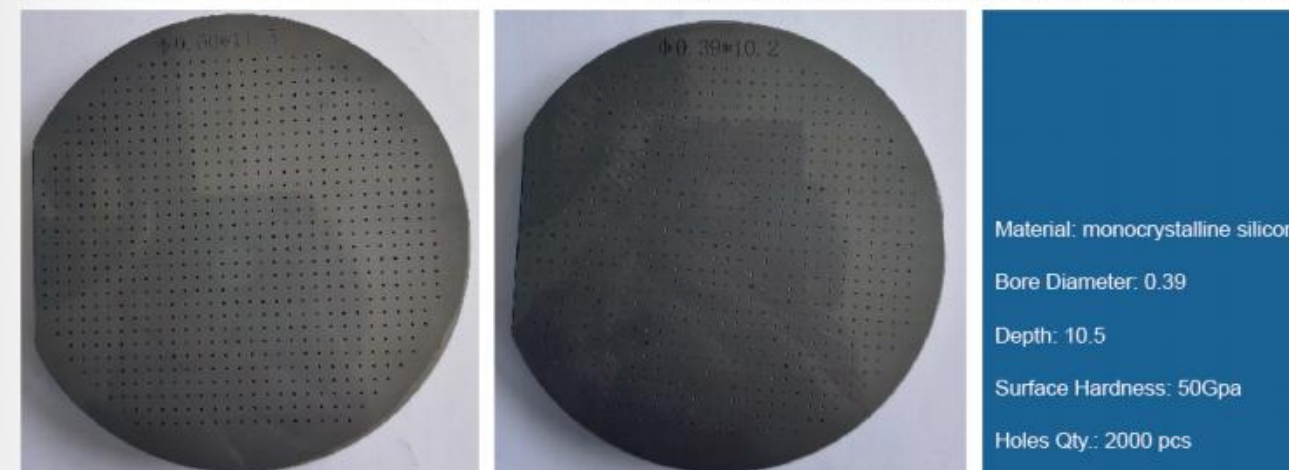
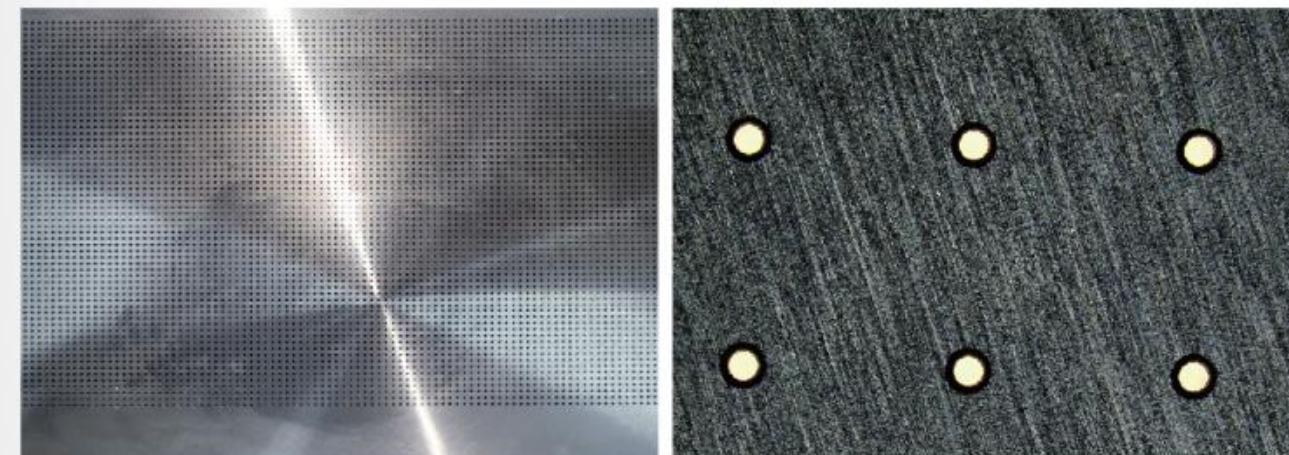
Chip&Communication electronics Automotive electronics High-end medical equipment field





MONOCRYSTALLINE SILICON PROCESSING CASE 1

03 PROCESSING CASE



Remark: selection of WZ3 series PCD microdrill





MONOCRYSTALLINE SILICON PROCESSING CASE 2

*monocrystalline silicon(0.39*10.5)-drilling parameter and quality*

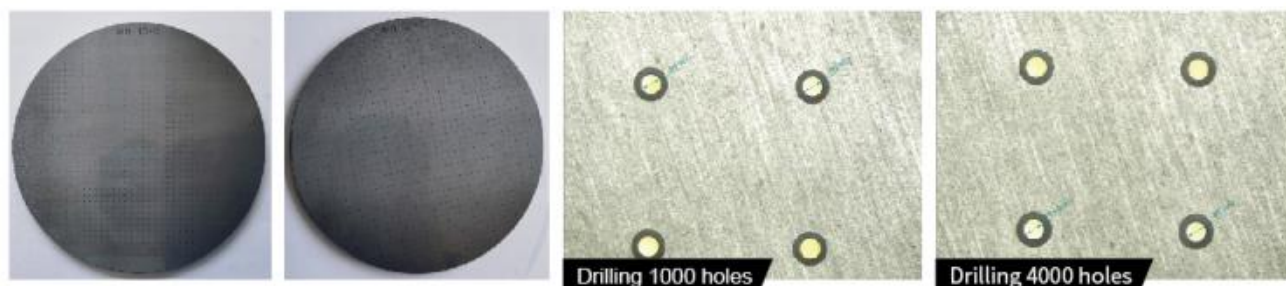
Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	10	0.1	10.5	167	G83
Unit	r/min	mm/min	mm	mm	S	

Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 800 holes	Hole roundness	Chipping
Data	0.391	0.392	0.394	<0.01	<0.005	<0.01
Unit	mm	mm	mm	mm	mm	mm

*monocrystalline silicon(0.5*7)-drilling parameter and quality*

Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	20	0.4	6.5	24	G83
Unit	r/min	mm/min	mm	mm	S	

Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 50 holes	Hole roundness	Chipping
Data	0.497	0.501	0.503	<0.01	<0.005	<0.01
Unit	mm	mm	mm	mm	mm	mm

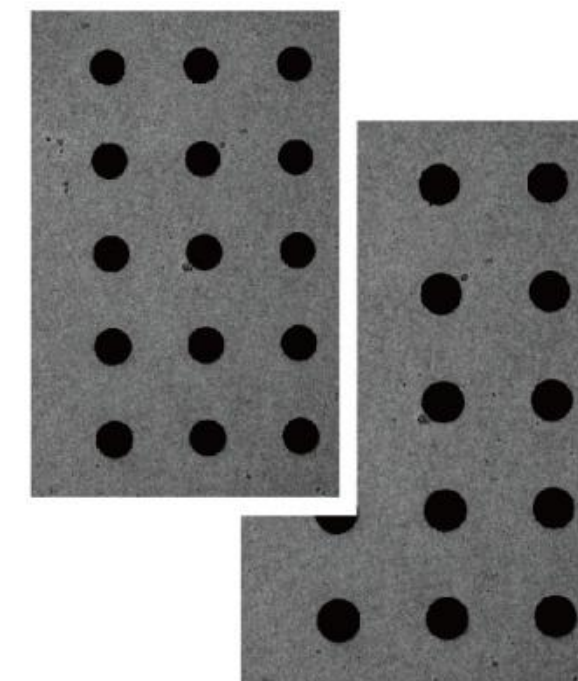


Remark: selection of WZ3 series PCD microdrill

SIC NON-PRESSURE SINTERING CERAMIC PROCESSING CASE - Φ0.45

SIC non-pressure sintering ceramic parameter

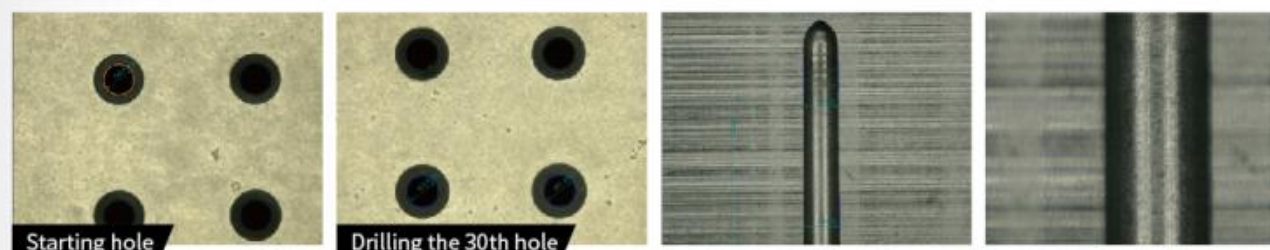
Index	Performance	Unit
Volume Density	>3.12	g/cm ³
Purity	98.50%	%
Bending strength	>400	Mpa
HRC	>93	HBA
Thermal conductivity	148	W/m·k
MOE	415	GPa
Fracture toughness	>4.5	Mpa.m ^{1/2}
Application	Cooling fin, bulletproof plate, mechanical seal sandblasting nozzle	



SIC non-pressure sintering ceramic -drilling parameter and quality

Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	5	0.1	5	145	G83
Unit	r/min	mm/min	mm	mm	S	

Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 30 holes	Hole roundness	Chipping
Data	0.450	0.451	0.455	<0.01	<0.005	<0.01
Unit	mm	mm	mm	mm	mm	mm

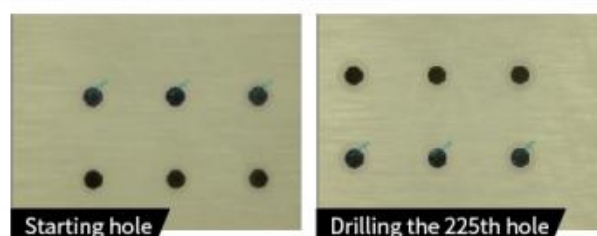
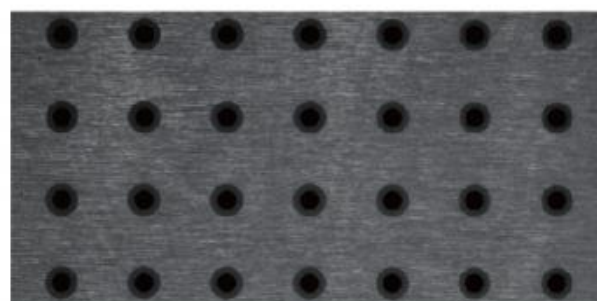


Remark: selection of WZ3 series PCD microdrill



ZIRCONIA PROCESSING CASE—Φ0.451

Zirconia ceramic parameter		
Performance	Unit	Data
Density	g/cm ³	6
Mohs hardness	level	8.5-9
Bending strength	Mpa	1100
Compressive strength	Mpa	2500
Fracture toughness	Mpa.M-3/2	11
Elastic modulus	Gpa	200
Thermal expansion	X10-6°C	10.5
Thermal shock	ΔT°C	300
Operating temperature	°C	500-1000
Application	Radiators, communication hardware, IC electronic devices, new energy electronic equipment	



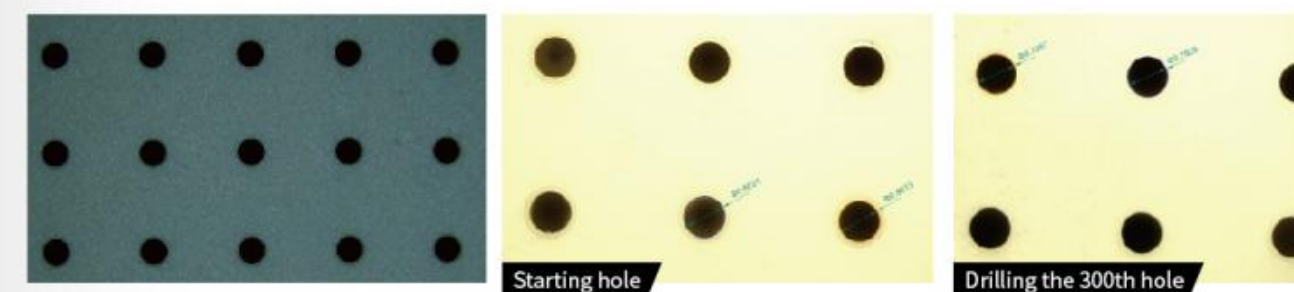
Zirconia ceramic-drilling parameter and quality						
Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	5	0.1	5	145	G83
Unit	r/min	mm/min	mm	mm	S	
Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 225 holes	Hole roundness	
Data	0.451	0.452	0.449	<0.01	<0.005	<0.01
Unit	mm	mm	mm	mm	mm	mm

Remark: selection of WZ2 series PCD microdrill

CERAMIC PROCESSING CASE - Φ0.799

Alumina ceramic parameter							
Performance	Alumina content	Volume density	Hardness	Bending strength	Maximum service temperature	Continuous working temperature	Acid resistance
Unit	wt%	g/cm ³	HRA≥	MPa≥	°C	°C	mg/cm ² ≤
Data	≥96%	≥3.7%	86	300	1600	1100	7
Performance	Alkali resistance	Wear resistance	Compressive strength	Flexural strength	MOE	Poisson's ratio	Thermal conductivity
Unit	mg/cm ² ≤	g/cm ² ≤	mpa≥	mpa≥	G Pa		W/m.K(20°C)
Data	0.2	0.2	2000	200	300	0.2	24

Silicon carbide non-pressure ceramic-drilling parameter and quality						
Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	10	0.15	12.5	158	G83
Unit	r/min	mm/min	mm	mm	S	
Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 300 holes	Hole roundness	
Data	0.799	0.802	0.793	<0.015	<0.005	<0.01
Unit	mm	mm	mm	mm	mm	mm



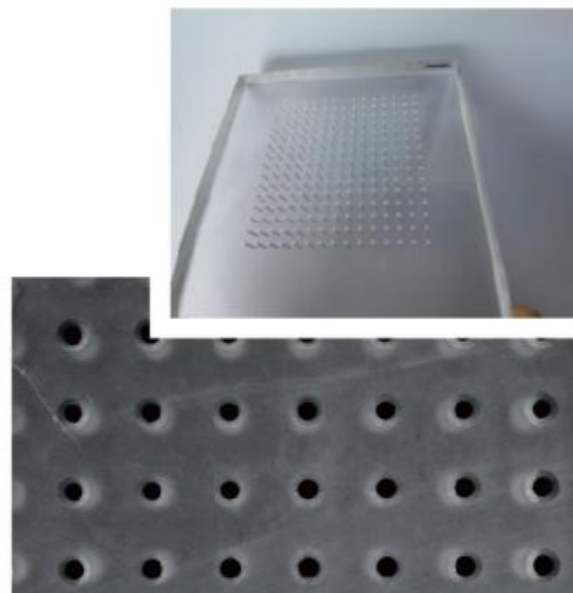
Remark: selection of WZ2 series PCD microdrill



QUARTZ GLASS PROCESSING CASE—Φ0.455

Quartz glass parameter

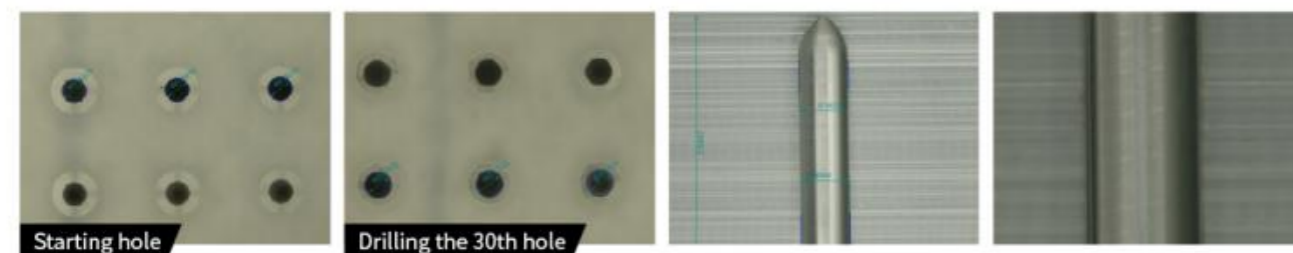
Index	Unit	Performance
softening temperature	°C	1730
Purity	%	99.98
Mohs hardness	level	7
volume density	g/cm ³	>2.23
MOE	GPa	80.9
Bending strength	Mpa	785-1150
Fracture toughness	Mpa.m ^{1/2}	33.4
Application	Wear-resistant equipment, semiconductor, metallurgy	



Quartz glass-drilling parameter and quality

Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	20	0.4	6	24	G83
Unit	r/min	mm/min	mm	mm	S	

Index	Borehole diameter	Starting diameter	Ending diameter	Stability in 300 holes	Hole roundness	Chipping
Data	0.455	0.463	0.48	<0.02	<0.01	<0.015
Unit	mm	mm	mm	mm	mm	mm



Remark: selection of WZ1 series PCD microdrill

GRAPHITE PROCESSING CASE - Φ0.798

Isostatic pressing formed graphite

P/N	LTD-8	
Volume density	G/cm ³	1.9-1.93
Electrical resistivity	UΩM	11-13
Thermal conductivity (100°C)	W/M-K	85
Thermal expansion	10-6°C	5.85
Shore hardness	HSD	70
Flexural strength	MPA	60
Compressive strength	MPA	135
MOE	GPA	12
Air hole rate	%	11
Particle size	μm	8-10
Application	Metallurgy, chemical industry, electric power, light industry, abrasive tools	



Graphite-drilling data and quality

Index	Spindle speed	Feeding speed	Each processing depth	Effective machining depth	Single hole drilling time	Drilling way
Data	20000	40	0.4	11	47	G83
Unit	r/min	mm/min	mm	mm	S	

Index	Borehole diameter	Starting diameter	Diameter of the 2000th hole	Stability in 2000 holes	Hole roundness	Chipping
Data	0.798	0.799	0.801	<0.005	<0.01	<0.01
Unit	mm	mm	mm	mm	mm	mm

Remark: selection of WZ1 series PCD microdrill