

Solid PCD Micro Drill

- Suitable for drilling hard-brittle materials, effectively reducing chipping
- Hole quality **up by 3 times** vs. conventional cutters in machining **CFRP**
- Successful breakthrough in machining ultra-deep micro-hole with Depth-Diameter **Ratio of 55:1** in single crystal silicon workpiece



Solid PCD Thread Mill

- Conprofe Solid PCD Drill – best fit for hard-brittle materials threading
- Thread milling efficiency **up by 100%** vs. traditional thread mills, with machining cost per hole reduced by more than **2 times**
- Tool life **up by 50~100 times** vs. traditional thread mills
- Customized specifications of micro-diameter thread mills available

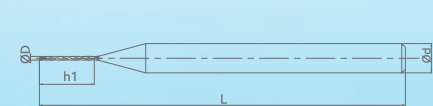


Solid PCD Micro Drill

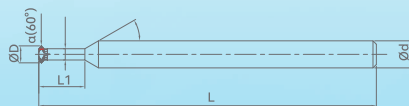
Cutting Edge Diameter (D)	Cutting Edge Length (h1)	Overall Length (L)	Shank Diameter (d)
0.45	7.5	40	4
0.5	7.5	40	4
0.6	9	40	4
0.8	12	40	4
1.0	15	45	4
1.1	16.5	45	4
1.2	18	45	4
1.3	19.5	45	4
1.4	21	50	4
1.5	22.5	50	4
1.8	27	60	4
2.0	30	60	4

Solid PCD Thread Mill

Spec.	Cutting Edge Diameter (D)	Thread Angle (α)	Reference Pitch	Neck Diameter (d2)	Neck Length (L1)	Neck Angle (r)	No. of Cutting Edges	Overall Length (L)	Shank Diameter (d)
M2.5	1.95	60°	0.45	1.28	6.5	15°	4	45	4
M3.0	2.36	60°	0.5	1.63	7.5	15°	4	45	4
M4.0	3.19	60°	0.7	2.15	9.5	15°	4	50	4
M5.0	3.97	60°	0.8	2.86	10	15°	4	50	6
M6.0	4.9	60°	1.0	3.38	15	15°	3	60	6
M8.0	6.0	60°	1.75	4	15	15°	4	50	8
M10	7.95	60°	1.75	5.63	15	15°	4	60	10
M12	9.95	60°	1.75	7.3	15	15°	4	65	10



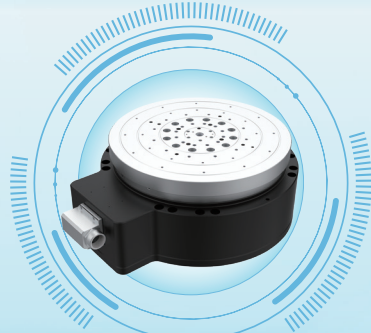
Solid PCD Micro Drill



Solid PCD Thread Mill

Vertical DDR Rotary Table

- **High Speed: Max. 1,500rpm**
- High Precision: **No backlash**, standard 26-bit encoder
- Mill-Turn: for both **milling** and **high-speed turning**
- High Load Capacity: Max. load of **80KG**
- Built-in Air Path: **Built-in positive labyrinth, fixture positive pressure** and **vacuum air paths**, with aesthetic look that avoids tube folding or air holding during high-speed rotation
- Compatible with Fanuc, Siemens, Mitsubishi, Brother and other CNC controllers



Ultrasonic-Green Engraving & Milling Center

- Intelligent **Ultrasonic Machining System** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- Various kinds of screw guide protection available to meet machining needs of hard-brittle materials and metals
- Single tool magazine / extended tool magazine available
- Optional spindle speed with max. speed of 40,000rpm
- Full closed loop control with high-precision linear encoders, positioning accuracy of **5μm**, repeatability of **3μm**
- High precision probe for on-machine measurement function
- With centrifugal filtration, bag and other multi-stage filtration system



Ultrasonic Vertical 5-Axis Machining Center

- Intelligent **Ultrasonic Machining System** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- Bridge gantry structure, low center of gravity, short overhang and super high rigidity for lower thermal strain
- Full closed loop control with linear encoders
- Equipped with high power, torque and speed ultrasonic spindle
- Various chain-type tool magazine capacity options: 24~120 tools
- Automatic fire suppression system configured to reduce the risk of machining flammable and explosive materials
- Siemens 840D sl and SINUMERIK ONE 5-axis simultaneous control systems available



Ultrasonic Graphite Machining Center

- Intelligent **Ultrasonic Machining System** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- Multi-layered protection with labyrinth design, positive pressure sealing and special dust collector design
- Superior performance in vibration damping, accuracy retention, dynamic characteristics and thermal stability due to its high-rigidity bed casting and symmetrical gantry structure
- Full closed loop control with high-precision linear encoders to ensure repeatability accuracy of **2μm**
- Equipped with high-volume, high-power stand-alone filter cartridge dust collector
- Optional handheld vacuum cleaner with mobile operation for more thorough vacuuming



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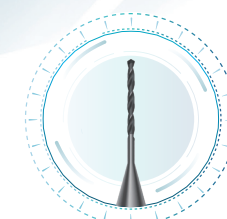
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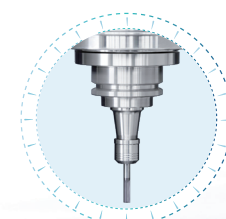


Semiconductor Industry

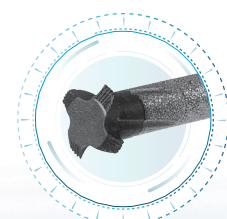
Conprofe Ultrasonic Machining Solutions



Solid PCD Micro Drill



Ultrasonic Machining System



Solid PCD Thread Mill



Converging of Global Resources, Professional as Industry Leader

Quartz Glass Showerhead Drilling

Challenges

- Low machining efficiency
- Prone to hole edge chipping

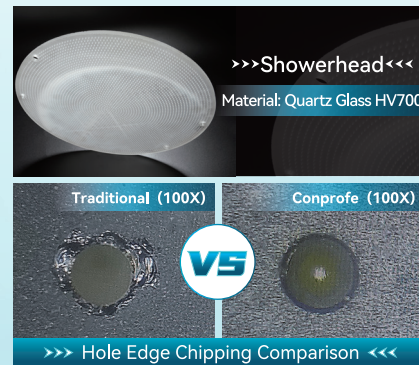
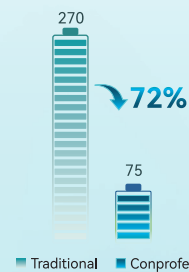
Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-600
- + **Ultrasonic** Machining System
- + **Solid PCD** Drill

Conprofe Benefits

- Continuous drilling of **1,200** holes (D0.5x5mm, Depth-Diameter Ratio 10:1)
- Cycle time reduced by **72%**, from 270s to 75s per hole
- Hole edge chipping decreased by **68%**, from 0.4mm to 0.13mm

»» Cycle Time (s/hole)



CVD-SiC Showerhead Drilling

Challenges

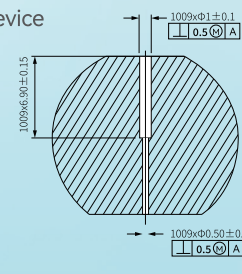
- High material hardness
- Small hole diameter
- Prone to chipping
- High tool breakage risk causing scrap

Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-600 PLUS
- + **Ultrasonic** Machining System + **Ultrasonic** Amplitude Measuring Device
- + High-Speed PCD Drill + **Ultrasonic** Press-Fit Tool Holder

Conprofe Benefits

- Machining efficiency up by **47.8%**, from 11'25" to 5'58" per D1.0/D0.5mm stepped hole
- Tool life up by **160%**, with machining cost down by **50%**
- Edge chipping $\leq 0.02\text{mm}$ at hole entrance (under $\times 50$ magnification)



»» Showerhead ««

Material: CVD-SiC (HV3,150)

Feature: D1.0x6.9mm / D0.5x5.5mm Stepped Holes

Single Crystal Silicon Curved Electrode Hole Drilling

Challenges

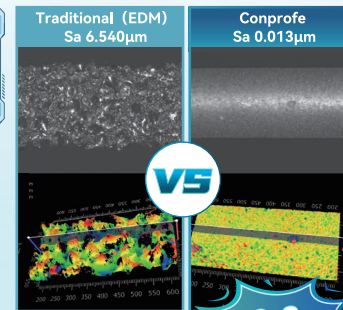
- No established machining solution
- Hard to ensure hole perpendicularity
- Hole wall roughness $\geq \text{Ra } 6.54\mu\text{m}$
- Hole roundness $\geq 0.025\text{mm}$

Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-600
- + **Ultrasonic** Machining System
- + **Solid PCD** Micro Drill

Conprofe Benefits

- Continuous machining of over **1,000** ultra-deep holes (D0.45x24.75mm, Depth-Diameter Ratio 55:1)
- Ultra-deep micro-hole machining shows no visible chipping at the entrance
- Hole roundness **0.003mm**
- Hole wall roughness down by **99.8%**, from Ra 6.540 μm to Ra **0.013 μm**



AlSiC Threaded Hole Machining

Challenges

- Cycle time >180s/hole
- Unstable workpiece quality
- Vulnerable to hole edge chipping
- Low precision
- High cost (Tool life <1 hole)

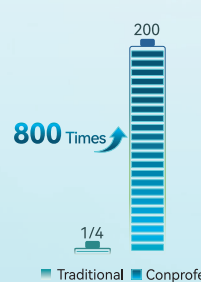
Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-400
- + **Ultrasonic** Machining System
- + **Solid PCD** Drill and Thread Mill

Conprofe Benefits

- M3 threaded holes **without cracking or chipping**
- Tool life improved by **800 times**, from 1/4 hole to 200 holes

»» Tool Life (Hole)



Polysilicon Confinement Ring Machining

Challenges

- Low efficiency
- Recurring cracking issues leading to high scrap rate

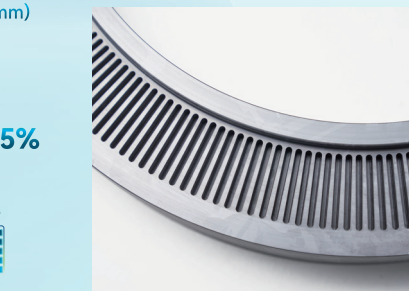
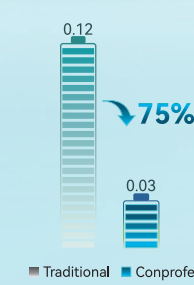
Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-600
- + **Ultrasonic** Machining System
- + Vertical DDR High-Speed Rotary Table

Conprofe Benefits

- Reduced cutting force and improved efficiency with **ultrasonic** machining
- Edge chipping down **by 75%**, from 0.12mm to **0.03mm**
- Cycle time down **by 21%**, from 208h to **165h**
- Lower surface roughness
- Improved hole roundness

»» Chipping (mm)



»» Confinement Ring ««

Alumina Ceramic Disc Grinding

Challenges

- Low efficiency
- Short tool life
- High scrap ratio due to microcracking

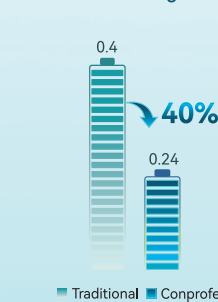
Conprofe Solution

- Ultrasonic-Green Engraving & Milling Center** UEM-800
- + **Ultrasonic** Machining System

Conprofe Benefits

- Better chip evacuation
- Improved machining efficiency
- Reduced microcracking on the surface of hard-brittle material
- Surface roughness reduced by **40%**

»» Surface Roughness (μm)



»» Ceramic Disc ««

Material: Alumina Ceramic