

Handheld Ultrasonic Pneumatic Drill UHD-PA

- Max. ultrasonic amplitude: 6μm; Frequency: **15-30kHz**
- Extended tool life and improved hole quality with ultrasonic machining
- Mitigated delamination | reduced tearing | improved hole roundness and perpendicularity | reduced hole wall roughness
- Reduced cutting force, lower labor intensity and improved machining efficiency
- Simplified operations and enhanced productivity



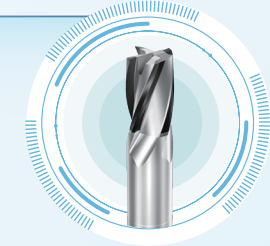
Ultrasonic Cutting System

- Optimal solution for high-efficiency, high-quality and eco-friendly machining of carbon fiber prepreg and honeycomb core
- Efficient small chamfer angle (<**18°**) machining and complex 3D contouring for Nomex honeycomb
- Smooth and burr-free surface finish with significant dust reduction
- Flat surface without indentation



Solid PCD Helical Milling Tool

- Helical structure design significantly reduces the cutting forces, minimizes tool vibration, enhances chip evacuation and machining efficiency
- Good wear resistance, low friction coefficient, excellent thermal conductivity of PCD materials, ensuring the dimensional accuracy of workpieces
- Suitable for machining carbon fiber composites, fiberglass composites, AISiC, aircraft-grade aluminium alloy and graphite



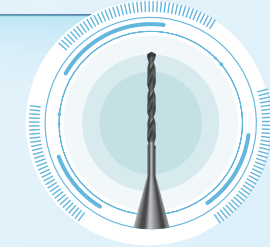
Solid PCD Micro-Edge Cutting Tool

- Edge width ≥ **0.005mm**; No. of cutting edge ≤ **300F**
- Roughness ≤ **5nm**
- Milling instead of grinding with a mirror finish of milling SiC HV2,700



Solid PCD Micro Drill

- Suitable for drilling hard-brittle materials, effectively reducing chipping
- Hole quality up by over **3 times** vs. traditional machining for carbon fiber composites
- Successful breakthrough in ultra-deep micro hole drilling of single-crystal silicon with depth-diameter **ratio of 55:1**



Solid PCD Thread Mill

- Best fit for hard-brittle materials threading together with Solid PCD Drill
- Two-fold tapping efficiency increase; Machining cost per hole reduced by 2/3 vs. traditional thread milling
- Tool life **up by over 50~100 times** vs. traditional thread mills
- Customized specifications of micro-diameter thread mills available



Dual Ultrasonic-Green 5-Axis Gantry Machining Center

- Conprofe proprietary intelligent dual ultrasonic system enabling automatic tool changing between straight-edge cutting blades, cutting discs, assembled cutting tools and milling tools—all within a single spindle
- Max. speed: 24,000rpm
- Max. ultrasonic amplitude: 50μm
- Flexible combination of Ultrasonic Machining, Supercritical CO₂ Cryogenic Cooling and Cryogenic Air Blasting Technologies
- Delivering efficient, high-quality and eco-friendly processing solutions for honeycomb cores, carbon fiber composites, carbon fiber preforms, Kevlar, foam, PBO fiber, fiberglass and other advanced composites



Ultrasonic Vertical 5-Axis Simultaneous Machining Center

- 3-in-1 ultrasonic machine tool:
Ultrasonic | Supercritical CO₂ | MQL
46%↘ cutting force 42%↘ cutting temperature 31%↘ friction coefficient
- Gantry structure design
- 40T-120T chain-type tool magazine
- Repeatability up to 3μm
- Large-load DDR rotary table available



Ultrasonic Engraving and Milling Center

- Conprofe proprietary intelligent ultrasonic machining system
- Labyrinth structure with three-layer protection
- Ultrasonic electric spindle with a max. speed of 40,000rpm



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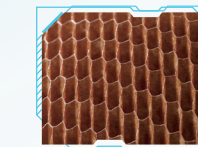


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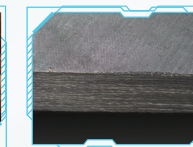


Aviation Industry

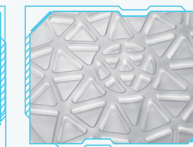
Conprofe Ultrasonic-Green Machining Solutions



Nomex Honeycomb Core



Carbon Fiber Composites



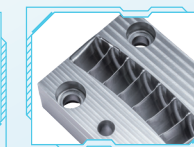
Quartz Glass



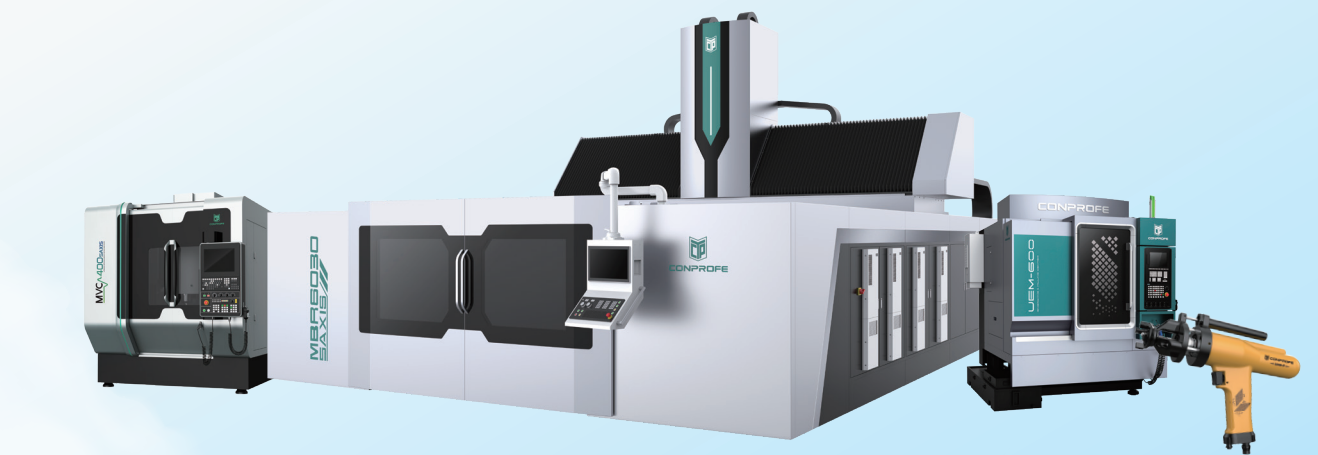
Alumina Ceramic



Superalloy



TiAl Alloy



Vertical 5-Axis Simultaneous Machining Center

Gantry Machining Center

Engraving and Milling Center

Ultrasonic Drill

CONverging of Global Resources, PROfessional as Industry Leader



Ultrasonic Cutting of Nomex Honeycomb



Challenges

- Uneven machined surface, severe burrs and excessive dust
- Vulnerable to workpiece deformation, tearing and collapse due to compression

Conprofe Solution

- **Dual Ultrasonic-Green 5-Axis Gantry Machining Center**
MBR6030-5AXIS
 - + **Ultrasonic** Machining System
 - + **Ultrasonic** Straight-Edge Cutting Blade
 - + **Ultrasonic** Cutting Disc
 - + Cryogenic Air Blasting Technology

Conprofe Benefits

- Efficient small chamfer angle machining and complex 3D contouring
- Smooth and **burr-free** surface finish with significant dust reduction
- Reduced cutting force and mitigated material damage
- **Flat surface** without indentation
- **One-pass cutting** with an arc length of **552mm** and a chamfer angle **< 18°**
- Minimum thickness of **0.75mm**

Material: Nomex Honeycomb Core
Feature: Outer Contour Cutting



VS



-60 °C



Ultrasonic Drilling of CFRP Plate (1mm)

Challenges

- Low hole drilling yield, with a 10% yield for unsupported hole drilling and 25% for supported hole drilling

Conprofe Solution

- **Handheld Ultrasonic Pneumatic Drill UHD-PA60**
- **Ultrasonic Dagger Drill (Diameter 5.1mm)**

Conprofe Benefits

- **100%** yield by unsupported ultrasonic hole drilling

Material: T800 Unidirectional Carbon Fiber Tape of CFRP Plate (1mm)
Feature: Hole Drilling (Diameter 5.1mm)
Dimension: 300x150x1mm (L x W x T)

» Drilling Comparison



10X

» Hole Drilling Yield Comparison (%)

Condition	Traditional	Conprofe
Unsupported	10%	100%
Supported	25%	100%



Alumina Ceramic Blisk Grinding



Challenges

- Short tool life due to high hardness
- Hard to machine with high surface profile accuracy requirement
- Severe ceramic sub-surface damage (SSD), shortening blisk's life
- Low efficiency

Conprofe Solution

- **Ultrasonic Vertical 5-Axis Simultaneous Machining Center**
MVC400-5AXIS
 - + **Ultrasonic** Machining System

Conprofe Benefits

- Longer tool life and higher accuracy of surface profile with ultrasonic machining
- Mitigated SSD, with chipping size reduced by 92%, from 0.246mm to 0.02mm
- Improved surface quality, shortening polishing time

Material: Alumina Ceramic
Feature: Blisk Grinding

» Chipping Size (mm)

Method	Chipping Size (mm)
Traditional	0.246
Conprofe	0.02

92%



Superalloy Blisk Milling



Challenges

- Thin wall with a chord-thickness ratio > 40:1
- Blade displacement
- Uneven blade edge
- Poor surface roughness (Ra 0.93μm) with noticeable chatter marks

Conprofe Solution

- **Ultrasonic Vertical 5-Axis Simultaneous Machining Center**
MVC400-5AXIS
 - + **Ultrasonic** Machining System
 - + Supercritical CO₂ Cryogenic Cooling Technology (**-78°C**)
 - + Minimum Quantity Lubrication (**MQL**)
 - + **Ultrasonic** Through-Coolant Shrink-Fit Tool Holder
 - + Through-Coolant Tapered Ball End Mill with Annular Air Cooling

Conprofe Benefits

- Reduced chatter marks on the blade surface and improved contour accuracy with 3-in-1 technology
- Blade surface roughness down by **56%**, from Ra 0.930μm to **Ra 0.408μm**, shortening subsequent polishing time

Material: Superalloy (GH4169)
Feature: Blisk Blade Milling
Blisk Diameter: 238mm

» Roughness (μm)

Method	Roughness (μm)
Traditional	0.930
Conprofe	0.408

56%



Quartz Glass Telescope Lens Machining



Challenges

- Low efficiency
- High profile requirement for concave aspheric surface (0.02mm)
- Prone to chipping
- Unqualified roughness to Ra 0.8μm

Conprofe Solution

- **Ultrasonic Engraving and Milling Center**
UEM-600
 - + **Ultrasonic** Machining System

Conprofe Benefits

- Chipping size reduced by **88.7%**, from 0.433mm to 0.049mm
- Reduced sub-surface damage (SSD) due to temperature decrease in cutting area
- Improved surface quality with roughness **Ra < 0.6μm**
- Profile tolerance up to **0.015mm**

Material: Quartz Glass
Feature: Cavity Chamfer Grinding
Dimension: D408x20.5mm

» Chipping Size (mm)

Method	Chipping Size (mm)
Traditional	0.433
Conprofe	0.049

88.7%



TiAl Alloy Integrated Blade Ring Milling



Challenges

- Short tool life due to hard-to-cut material of low density and high hardness
- Unstable dimensional accuracy
- High requirement of controlling cutter marks between blade concave and blade convex within 0.02mm by front-back side clamping

Conprofe Solution

- **Ultrasonic Vertical 5-Axis Simultaneous Machining Center**
MVC400-5AXIS
 - + **Ultrasonic** Machining System
 - + **Ultrasonic** Through-Coolant Shrink-Fit Tool Holder

Conprofe Benefits

- Tool life up by **2 times**, from 4 slots to 12 slots
- Improved surface compressive stress with enhanced fatigue strength and corrosion resistance

Material: TiAl Alloy
Feature: Enclosed Blade Concave and Blade Convex Milling
(Profile Tolerance ≤ 0.06mm, Roughness Ra ≤ 0.4μm)

» Tool Life (No. of Slots)

Method	Tool Life (No. of Slots)
Traditional	4
Conprofe	12

2 times

» Compressive Stress (MPa)

Method	Compressive Stress (MPa)
Traditional	686
Conprofe	908

24%