



## Carbon Fiber Composites Drilling & Profile Milling

### Challenges

- Prone to delamination and tearing
- Severe burrs
- Poor roughness
- Short tool life

### Conprofe Solution

- **Ultrasonic Precision Graphite Machining Center**

- UPG-500
- + **Ultrasonic** Machining System
- + Solid PCD Helical Milling Tool
- + Solid PCD Drill

### Conprofe Benefits

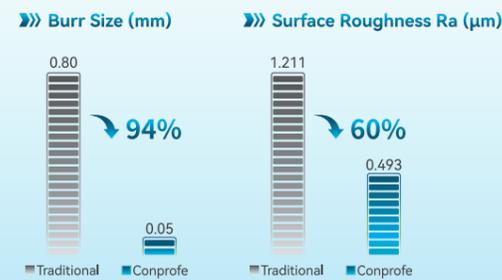
- Clean cut around hole edge and profile without delamination
- Stable and high-precision machining
- Hole edge burr size down by **94%**, from 0.80mm to **0.05mm**
- Surface roughness down by **60%**, from Ra 1.211 $\mu$ m to **Ra 0.493 $\mu$ m**



Solid PCD Helical Milling Tool



Material: CFRP  
Feature: Drilling & Profile Milling



## Ultrasonic Drilling of T800 CFRP Plate (5mm Thickness)

### Challenges

- Delamination and severe burring
- Poor hole positional accuracy
- Difficulty in hole making due to high cutting resistance
- Complicated multi-step hole making procedures

### Conprofe Solution

- **Ultrasonic Pneumatic Advanced Drill**
- UAD-PA45
- + **Dagger Drill** CDP d6.35x100°x36 HM 150xSD6.35-4F

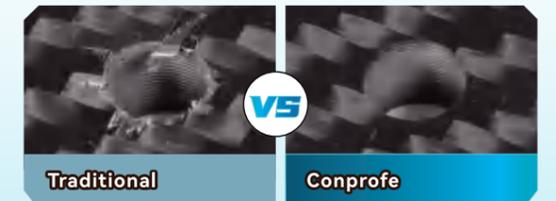
### Conprofe Benefits

- Simplified drilling process, improved efficiency, **reduced cost per hole**
- Ultrasonic vs. Traditional Drilling :  
**+73%** accuracy, **+70%** cylindricity, **+94%** perpendicularity, **-96%** burr tear, **-32%** roughness.



Material: T800 CFRP Plate (5mm Thickness)  
Feature: 6.35 $\pm$ 0.05mm Hole Drilling

### Hole Edge Quality



## Ultrasonic Drilling of T300 CFRP Plate (2.5mm Thickness)

### Challenges

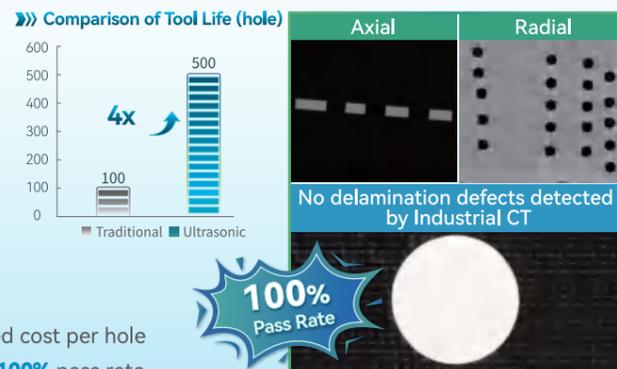
- Material delamination and severe burr
- Poor hole perpendicularity and surface roughness, high cutting resistance, and increased drilling difficulty
- Multiple drilling processes required

### Conprofe Solution

- **Handheld Ultrasonic Pneumatic Drill**
- UHD-PB45
- + **Dagger Drill** CDP d5.09x100°x36 HM 90xSD6-4F

### Conprofe Benefits

- Simplified drilling process, improved efficiency, reduced cost per hole
- 500 holes measured: diameters within 5.09-5.19 mm, **100%** pass rate
- Effective suppression of delamination, reduced fiber tearing



Material: T300 CFRP Plate (2.5mm Thickness)  
Feature: 5.09 $\pm$ 0.12/0mm Hole Drilling

# Conprofe Ultrasonic Machining Solution

- ✓ **Mitigate Subsurface Damage**
- ✓ **Reduce Cutting Force and Heat**
- ✓ **Improve Finish and Accuracy of Workpiece**
- ✓ **Minimize Burrs, Delamination and Adhesion**
- ✓ **Extend Tool Life**
- ✓ **Boost Production Efficiency**



Intelligent Sensor Ultrasonic Generator