_New Technologies in Drilling

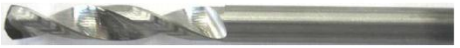
Extended program for **Composite machining:**

PCD-RIVET DRILL

Current product range

→ PCD-Composite drills

- Present product portfolio special tools

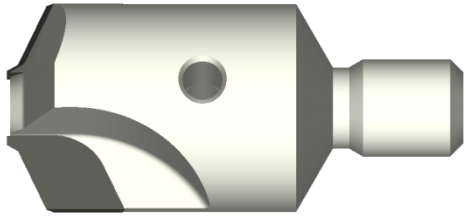
Type:	Technology:	Ø – range:	Current status:	Lead time:
PCD-drills, - Cylindrical - Stepped (uniform shaft diameter)	PIN Type	2.0 mm – 4.1 mm		5 weeks
	VEIN type	4.1 mm – 6.38 mm		5 weeks
	Solid brazed	6.38 mm – 12.7 mm		6 weeks

VEIN type		PIN type		Solid brazed	
D [mm]	L_1 [mm]	D [mm]	L_1 [mm]	D [mm]	L_1 [mm]
6.38 – 5.85	< = 117 (150)	4.10 – 3.45	< = 70 (100)	6.40 – 10.00	< = 125 (170)
5.85 – 5.35	< = 101 (150)	3.45 – 2.75	< = 63 (80)	10.00 – 12.75	< = 175 (170)
5.35 – 4.85	< = 93 (120)	2.75 – 2.05	< = 57	--	--
4.85 – 4.10	< = 86 (120)	2.05 – 1.80	< = 46	--	--

Current product range

→ PCD-Composite drills

- Present product portfolio special tools

Type:	Technology:	Ø – range:	Current status:	Lead time:
PCD-Rivet drill, 2 pcs - Steel body (Ø 10 - 20 mm) - PCD-drill (Ø 2 - 12.7 mm)	PIN type + Sandwich	2.0 mm – 4.1 mm		6 weeks
	VEIN type + Sandwich	4.1 mm – 6.38 mm		
	Solid brazed + Sandwich	6.38 mm – 12.7 mm		
PCD-Chamfer, Steel body - with bore - with guide	Sandwich	10 mm – 19 mm		6 weeks

PCD-Rivet drill

→ as program extension

- New product – PCD-Rivet drill

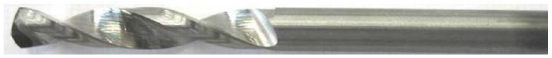
Type:	Technology:	Ø – range:	Current status:	Lead time:
PCD-Rivet drill - Solid carbide body (Ø max. 20 mm)	PIN type + Sandwich	2.0 mm – 4.1 mm		6 weeks
	VEIN type + Sandwich	4.1 mm – 6.38 mm		
	Solid brazed + Sandwich	6.38 mm – 12.7 mm		

Dimensions	
D [mm]	L_1 [mm]
< = 4.1	< = 80
< = 6.38	< = 120
< = 6.38	< = 150
Special lengths upon request	

NEW!

Upcoming activities

- Product range and technologies

Type:	Technology:	Ø – range:	Current status:	Lead time:
PCD-Rivet drill - **Cylindrical** - **Stepped** **(standard shaft)**	**VEIN type**	**3.0 mm – 12.7 mm**	- **Geometry for composite stack material** 	**Q1/2010**
			- **Internal coolant supply** 	**Q1/2010**
			- **Completed dimensional range**	**Q2/2010**

Technical details

→ for Tool recommendation

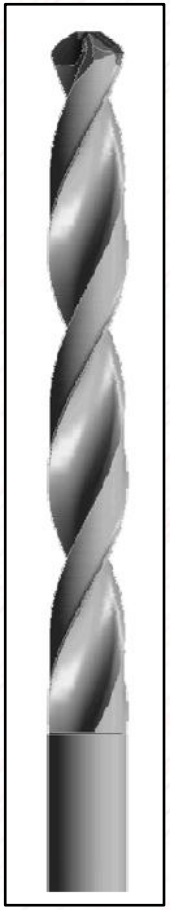
- Technical Details
  - **For tool recommendation**
  - **For tool design**
  - **For quotation process**

- **DEFINITION OF MATERIAL**
  - material type (CFRP, GFRP, Stack, etc.)
  - thickness (drilling-depth)

- **DEFINITION OF DRILL DIMENSIONS**
  - OAL, FL
  - drill diameter with tolerance (alternatively hole diameter)
  - shank diameter, type and tolerance

- **SURROUNDING CONDITIONS**
  - machine tool (CNC, semi-automatic, hand-driven)
  - coolant (airblow, absorber- system etc.)
  - clamping of drill (system)
  - options (bushes, etc.)

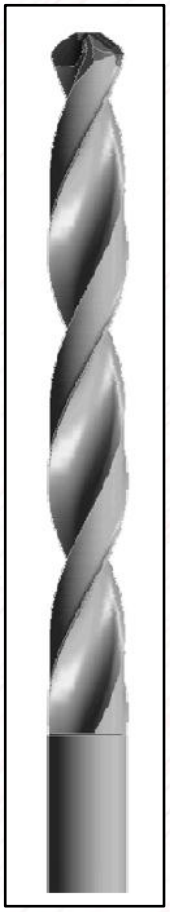
- **EXPECTATION ON HOLE QUALITY**
  - diameter- tolerance and surface roughness
  - customer specification



PCD-Drill Technology

_New Technologies in Drilling

- The Tool
  - **Spiral drill with a helix PCD cutting edge**
  - **Optimized for composite materials**
  - **Special geometry for reducing the cutting force, to avoid delamination**
  - **Multi-regrindable**
- Advantage and Benefit
  - **High tool life particularly with regard to diamond coated tools**
  - **Process stability also at high cutting parameters**
  - **As a result of sintered PCD technology no tool breakdowns because brazing mistakes**
  - **Every diameter from 2,0 mm up to 6,4 mm is available**
  - **Reduction of typical application problems like delamination and fibre overlaps**
  - **Regrinding service for reducing the tool costs**



Tool Technology

- Achievable tool tolerance
  - **Cutting-Ø tolerance 4µ**
- Achievable hole tolerance in CFRP
  - **h8**
- Demo-case
  - **Tool and workpiece sample for demonstration purposes**