



# Special Solid Carbide Drilling Tools and Assembly for the Aerospace Industry

CERATIZIT Group has been a global player in the carbide industry for over 100 years and develops and produces highly specialized cutting tools. CERATIZIT's full range product portfolio includes Team Cutting Tools that encompasses four brands.



- ▲ Indexable Turning & Milling Tools
- ▲ Multifunction Tools
- ▲ Parting & Grooving Tools
- ▲ Tools made from ultra-hard cutting materials



- ▲ HSS Drilling & Milling
- ▲ Solid Carbide Drilling & Milling
- ▲ Taps and Thread Formers
- ▲ Circular and Thread Milling
- ▲ Thread Turning
- ▲ Miniature Turning Tools
- ▲ Adapters & Workpiece Clamping



- ▲ Indexable Drilling
- ▲ Reaming & Countersinking
- ▲ Boring
- ▲ Actuating Tools

## KLENK



KLENK focuses on special solid carbide drilling tools and solutions for the aerospace assembly industry



KLENK offers custom tooling solutions for manual drilling, semi-automatic drilling, and automatic drilling

TEAM CUTTING TOOLS



KOMET



klenk

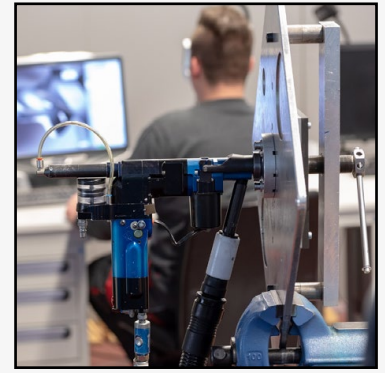
CERATIZIT is a high-tech engineering group specializing in cutting tools and hard material solutions.

**Tooling the Future**

[ceratizit.com](http://ceratizit.com)

## Manual Drilling

- ▲ SPECIAL manual drill bits for multi-stack drilling – one drill for all material combinations
  - CFRP-CFRP, CFRP-Aluminum, and Aluminum-CFRP
- ▲ ONE-SHOT drilling even for manual drilling operations down to a hole tolerance of 40  $\mu\text{m}$  in various stack-ups
- ▲ COST REDUCTION through defined regrinding processes
  - Performance new drill = Performance reground drill



## Semi-automatic Drilling

- ▲ Diameter range  $\varnothing$  .098"-1.18"
- ▲ Different stack-ups combinations such as CFRP-Al / Al-CFRP, CFRP-Ti / Ti-CFRP, Al-Ti and stacks with Inconel and stainless steel
- ▲ Applications with different types of PFDs, including
  - Concentric Collet, C-Clamp, 1/4-turn, etc.
- ▲ Single pass drilling down to 25  $\mu\text{m}$  incl. CSK operation in various material combinations
- ▲ Well-known as supplier of DRY DRILLING cutting tools for all applications with aluminum and CFRP
- ▲ All technical equipment available to support pre-testing and cutting tool qualification



## Automatic Drilling

- ▲ Diameter range  $\varnothing$  .118"-.984"
- ▲ Different stack-ups combinations such as CFRP-Al,
- ▲ CFRP-Ti, and CFRP-CFRP
- ▲ Experience in tools for
  - Robot applications
  - Large CNC machines like C-Frame, portal or ring machine
- ▲ Highspeed drilling (e.g. CFRP  $\varnothing$  .188" with CSK: 18000 rpm @ 0,2 mm/rev)



## Working with CERATIZIT

- ▲ Superior product management from design to implementation
- ▲ Direct end-customer relation by experienced aerospace drilling experts
- ▲ Global network of engineers and full access to R&D lab and test equipment at CERATIZIT Balzheim, Germany
- ▲ Proven process to streamline qualification and implementation
  - Process definition, cutting tool design with quote and drawings
  - Tool production, testing and pre-qualification including measurement report
  - On-site support for process qualification and production implementation
- ▲ Decades of experience in aerospace drilling



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