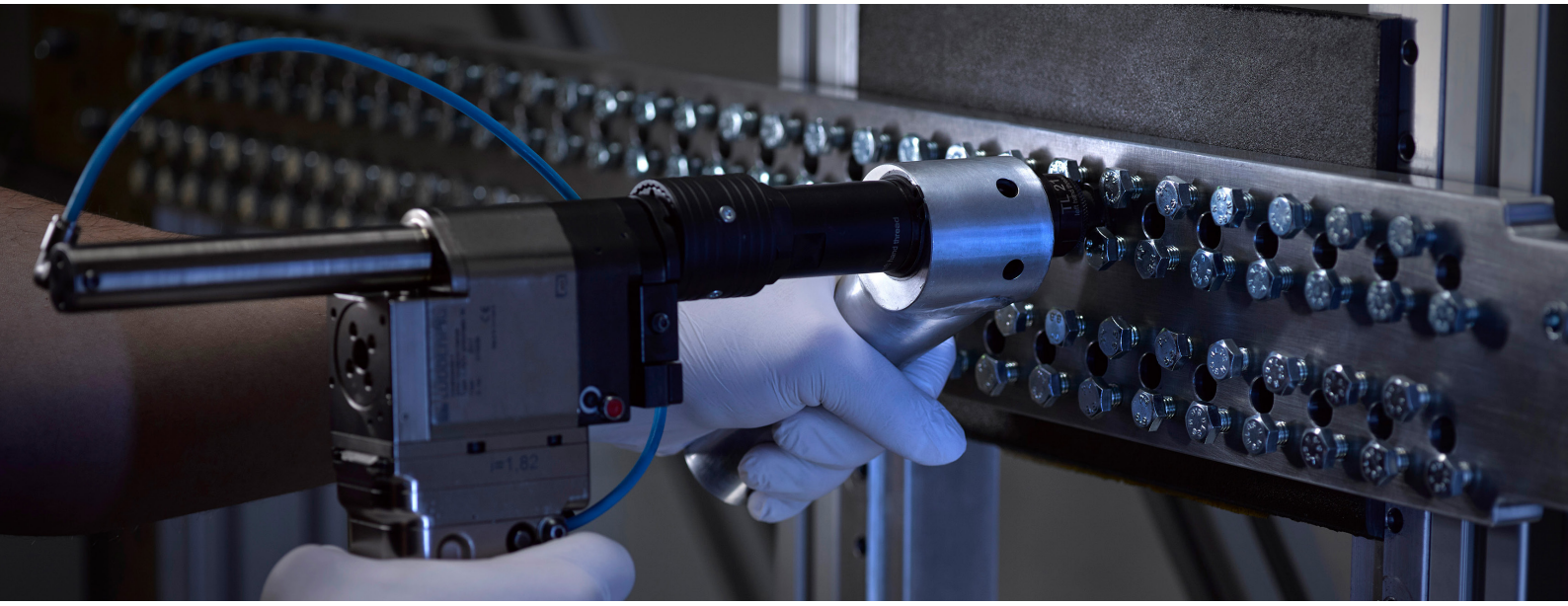
oerlikon

TruStory



130% longer tool life: How Scheinecker and Oerlikon Balzers set new standards in composite drilling

Through precise tool design and the CVD diamond coating BALDIA® COMPOSITE DC, a high-performance drill was developed in record time – exceeding the expectations of an aircraft manufacturer.

Drilling thousands of rivet holes with consistent precision in CFRP-aluminum composites for aircraft components requires solid carbide drills of the highest quality. The Austrian precision tool manufacturer Scheinecker, a leading name in high-performance cutting tools for over 50 years, once again demonstrated its expertise: in a recent project, the company increased the tool life of a special drill by 130 percent – far beyond customer expectations. A key factor in this success was the CVD diamond coating BALDIA® COMPOSITE DC from Oerlikon Balzers.

The challenge of composite drilling

Carbon-fiber-reinforced plastics (CFRP) are prized in aircraft construction for their light weight and strength – but they pose major challenges in machining. As a drill penetrates the composite stack, it alternately encounters extremely hard carbon fibers, soft epoxy resin, and, in hybrid stacks, layers of aluminum or titanium with entirely different cutting characteristics. The goal is to avoid delamination and ensure dimensional accuracy and surface quality for the thousands of rivet holes that secure the aircraft structure.

Experience and precision in every detail

Scheinecker draws on more than 35 years of experience in the aerospace sector. “We analyze every application in detail directly at the customer’s site before we start the design,” explains Dino Lirk, Technical Director at Scheinecker.

FACTBOX

Scheinecker GmbH
www.scheinecker.info

Leading Austrian manufacturer of high-performance cutting tools with over 50 years of experience

Application/Challenge:
Drilling CFRP-aluminium composites for aerospace components with highest precision

Solution:
BALDIA® COMPOSITE DC – CVD diamond coating

Key Benefits

- Rapid implementation: concept to high-performance drill in just four weeks
- Close collaboration for customized coating and fast testing
- Tool life increased by 130 %
- Highest bore hole quality and consistent process reliability
- Protection against abrasive wear, thermal stress, and material adhesion

When an international aircraft manufacturer required a drill capable of handling modified composite materials more efficiently, Scheinecker engineered a solid carbide (VHM) drill in which substrate, geometry, micro-edge structure, and coating were perfectly matched. The design focused on optimized chip flow, controlled chip breaking, stability, and maximum run-out accuracy and surface finish.

BALDIA® COMPOSITE DC:
Coating for maximum performance
To achieve outstanding wear resistance and precision, Scheinecker chose BALDIA® COMPOSITE DC, a nano-crystalline CVD diamond coating developed specifically for machining composite materials. The coating provides reliable protection against abrasive wear, thermal stress, and aluminum adhesion. Its micrometer-precise deposition ensures extremely tight diameter tolerances and consistent bore quality. A dedicated pre-treatment process preserves the sharp cutting edges and guarantees stable, repeatable machining performance.

From concept to high-performance drill in just four weeks
The new tool was used for the first time in a semi-automatic drilling feed unit (ADU) – a process previously performed manually. From the first analysis to the finished drill, the entire project took only four weeks, while the industry average exceeds ten.

In initial trials, the tool achieved 600 holes, and now exceeds 1,000 holes—an improvement of 130 percent compared to the target. “By further optimizing coating thickness and geometries, we expect up to 30 percent higher tool life,” says Lirk.

Partnership that drives innovation
“Thanks to the close collaboration with Oerlikon Balzers, we were able to implement the project extremely quickly and successfully,” emphasizes Lirk. Dirk Schmidt, Product & Key Account Manager Diamond at Oerlikon Balzers, highlights the effective teamwork: “Scheinecker provides us with all the relevant information early on, allowing us to adapt the coating precisely and deliver quickly.”

“For these reasons, we work exclusively with Oerlikon Balzers as our coating partner,” adds Ulrike Scheinecker-Graul, Managing Director of Scheinecker. The result speaks for itself: according to the customer, the cost per hole achieved was the best outcome ever reached in such a project.

About Scheinecker GmbH
Founded in 1975, Scheinecker is a family-owned company based in Steinhaus near Wels, Austria. It specializes in the development and production of productivity-enhancing solid carbide cutting tools for industries including mechanical engineering, mold and die making, medical technology and plastics injection molding. For over 35 years, the company has focused on innovative solutions for machining materials such as carbon, GFRPs/CFRPs, aluminum and titanium in the aerospace sector. Through tool reconditioning, advanced technologies and heat recovery systems, Scheinecker actively contributes to sustainability and climate protection.

About Oerlikon
Oerlikon (SIX: OERL) is a global leader in surface technologies and advanced materials. With a unique portfolio spanning surface engineering, high-performance materials, coating equipment and components, we make products better by enhancing performance, efficiency and sustainability. Oerlikon serves a wide range of industries, including aerospace, automotive, defense, energy, medical, luxury and semiconductors.

Headquartered in Pfaeffikon, Switzerland, Oerlikon together with its subsidiary Barmag operates in 38 countries with more than 12,000 employees across 199 locations, achieving sales of CHF 2.4 billion in 2024.

Oerlikon Surface Solutions AG | Iramali 18 | LI-9496 Balzers, Liechtenstein | +423 388 7500 | www.oerlikon.com/balzers