Boehlerit adds a new, highly innovative and state-of-the-art HiPIMS-PVD coating system to its facilities. (f.l.t.r.) Andreas Haid and Dr. Arno Köpf

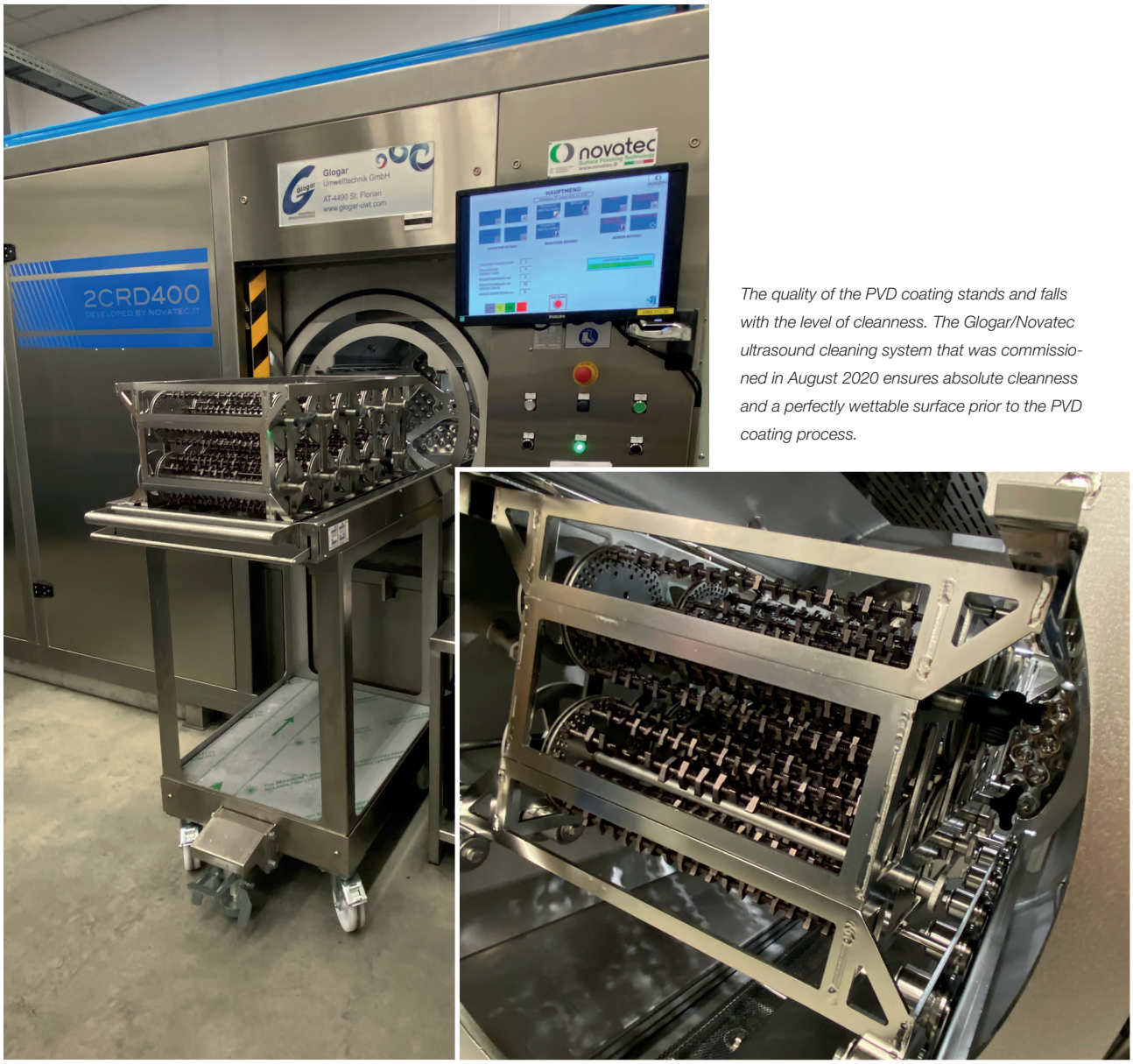
A paradigm shift in coating technology

In expert circles, it was almost unthinkable to use a PVD coating for turning applications. The uncontested dogma was for PVD technology to be used in milling and CVD technology in turning operations.

This was due to technological limitations at the time, as PVD coating could be produced with a maximum thickness of 3 to 4 µm. Thicker PVD coatings contained extremely high inherent stresses, which in turn affected the adhesion of the coating. However, the technological progress made over the last decade largely did away with this shortcoming. Coating thicknesses of up to 12 µm became realistic, and PVD coating actually improved the successful completion of turning operations with lower stresses, such as fine machining. Austrian carbide and tool specialist Boehlerit also invested in a new HiPIMS (High Power Impulse Magnetron Sputtering) PVD system, which opened up a range of new opportunities for the deposition of existing and innovative carbide layers – a major technological advantage!

Why HiPIMS PVD?

Earlier PVD coating machines required a constant, high electric current in the vacuum in order to vaporise the metals from the target into a plasma cloud. To reduce the use of electricity on the one hand and improve ion yield on the other, plant development began to focus increasingly on short, high-energy impulses that produce a lot of ions very quickly. These ions are attracted by the anode (the object to be coated), where they then form the actual coating. The impulse intervals



The quality of the PVD coating stands and falls with the level of cleanness. The Glogar/Novatec ultrasound cleaning system that was commissioned in August 2020 ensures absolute cleanness and a perfectly wettable surface prior to the PVD coating process.

are in the microsecond range and lead to higher growth rates and lower stresses within the layers. They are also easier to control and require less energy. HiPIMS PVD technology thus makes the coating process more efficient and economical. The state-of-the-art design of the system can deal with six metal targets at the same time, thereby offering a high degree of flexibility.

To ensure optimal adherence of the PVD coating, interfering particles or lubricants must be removed from the surfaces of the products beforehand. Boehlerit has also made investments in this field and installed a brand-new, high-tech Glogar/Novatec ultrasound cleaning system at the Kapfenberg site. The system ensures a high level of cleanness and optimally wettable surfaces as a pre-treatment to the PVD coating process.

Boehlerit already successfully uses PVD coatings in milling processes as well as in crankshaft and tube processing, bar peeling and turning of stainless steel materials. New PVD steel milling grades are already being tested. The optimisation potential for long-established coating variants as well as the many new opportunities for innovative layer compositions that have been opened up by HiPIMS PVD technology constitute an enormous field of activity for future coating innovations by Boehlerit. ■

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