Palbit wins new markets thanks to a new generation of coatings

Daniel Figueiredo, Marlene Macedo and Cristina Fernandes (from left) refreshed their knowledge of the CC800® HiPIMS at CemeCon in order to be able to exploit all possibilities in their own production when coating precision tools.

Substrate, geometry and HiPIMS coating fit

“The results we are achieving with the unparalleled PVD coatings on our tools are fantastic and have convinced us so much that we have invested in an additional PVD system.” Jorge Ferreira, CEO at Palbit, is enthusiastic. Whether standard or customized tooling solutions – thanks to the high vertical range of manufacture from powder production to insert pressing and the production of tool bodies and tool holders, Palbit is always developing and manufacturing new high-performance tools for demanding cutting tasks. With the new technology from CemeCon, the Portuguese tool manufacturer has once again been able to significantly increase the performance of its cutting tools.

Tool and mold making, energy and oil industry, automotive, aerospace, medical technology and mechanical engineering – Palbit S.A. in Albergaria-a-Velha, Portugal, creates high-precision tooling solutions for milling, turning, drilling, threading, grooving and parting for a wide range of industries. To meet the demands for lower costs, machinability of new materials and the best surface finishes, Palbit

relies on state-of-the-art technology, such as CemeCon's HiPIMS technology.

„All our tests have clearly shown it. HiPIMS can do more. We are fully CONVINCED OF THE TECHNOLOGY and are sure that we will develop many more HIGH-PERFORMANCE TOOLS with it."

The Palbit Team (from left): Daniel Figueiredo, Executive Board Member; Marlene Macedo, Employee for Coating Responsible; and Cristina Fernandes, R&D Manager.

First-class coating technology has long been an essential part of Palbit's expertise. Daniel Figueiredo, Executive Board Member, R&D, Product Engineering, Quality and Technology Development: "We have been working closely with CemeCon for many years and have always been very satisfied with their technology and service. That is why we have also invested in an additional CC800® HiPIMS coating system, which was installed at our site at the end of 2021."

The advantages of this technology speak for themselves: "The HiPIMS coatings combine a variety of positive properties. They are extremely smooth, very hard and also tough. All this combined with excellent adhesion and dense morphology. Even high coating thicknesses can be achieved without problems thanks to low residual stress and active residual stress management. At the same time, a uniform layer thickness distribution also ensures optimum wear protection. This combination is only possible with HiPIMS," says Christine Hammer, Sales Manager at CemeCon.

Overcome challenges of machining superalloys with HiPIMS

Especially with materials that are difficult to machine, such as titanium or superalloys, HiPIMS technology gives Palbit the decisive edge. "Engine components, turbines or structural aircraft components, orthopedic

screws or bone fasteners – these high-temperature materials can be found in numerous applications. A completely new field of application opens to anyone who can successfully machine them. We offer our customers the appropriate high-performance tools for this purpose. With HiPIMS technology, we have been able to improve the results even further," says Daniel Figueiredo.

A good example are the cutting inserts with new chipbreaker geometry, which Palbit has developed especially for heat-resistant superalloys. In combination with Palbit's new PVD grade PHH, they achieve outstanding performance, for example when turning Inconel® 625 alloy (v_c = 85 m/min, f_n = 0.12 mm/rev, a_p = 0.5 mm, emulsion-cooled). The Palbit cutting inserts reached the maximum wear of 0.4 mm after 20 min of machining. The comparison tool was already worn after about 12 min. The bottom line is that this means 60 percent longer tool life!

Enduring even during high-feed milling

High hardness and oxidation resistance is advantageous for hard machining and super alloys. It also ensures excellent surface qualities and a highly efficient machining of stainless steel. For example, Palbit also uses the PHH PVD coating in its new solution for high-feed milling – TetraFeed 16320 XNKU. The numbers speak for themselves: when milling AlSi316 (v_c = 120 m/min, f_z = 1.0 mm/t, a_p = 0.5 mm, a_e = 24 mm) without cooling lubricant, the new Palbit cutting inserts could be used for 45 min per cutting edge up to maximum wear. The comparison tool with a conventional PVD coating only 32 min per cutting edge. This means 40 percent longer tool life!

„The results we are achieving with the unparalleled PVD COATINGS on our TOOLS are fantastic and have convinced us so much that we have INVESTED in an ADDITIONAL PVD SYSTEM."

Jorge Ferreira, CEO of Palbit

So that users can also benefit from the advantages of HiPIMS technology when doing high-feed milling of alloyed and unalloyed steels, high-speed steel and cast iron, Palbit also offers the TetraFeed 16320 XNKU cutting inserts with a coating tailored to this application. And here, too, the coating has the edge over conventional PVD coatings. Palbit cutting inserts with the new PHP coating achieve a significant increase in productivity: when dry machining tool steel (20CrMnNiMo, 1.2738) with a hardness of 32–36 HRC (v_c = 200 m/min, f_z = 0.65 mm/t, a_p = 1.0 mm, a_e = 24 mm), the maximum possible operating time is extended from 60 min per cutting edge with conventionally coated cutting inserts to 80 min per cutting edge with the Palbit solution. That is a 33 percent increase in tool life!

“All our tests have clearly shown it. HiPIMS can do more. We are fully convinced of the technology and are sure that we will develop many more high-performance tools with it,” says Daniel Figueiredo.

Palbit

Palbit was founded in 1916 and is a producer of carbide and ultra-carbide tools. The company Branca/Albergaria-a-Velha in Portugal is a symbol of high-performance tools. The more than 100 years of experience enable Palbit to be a one-stop shop for complete tooling solutions. The experts offer their customers a comprehensive product portfolio for machining: With state-of-the-art machinery and qualified employees, Palbit creates high-precision carbide and ultra-hard cutting tooling solutions for milling, turning, drilling, threading, grooving and parting of machining operations. Presently selling worldwide through a network of distributors, agents and representation offices, with a team of highly qualified technicians. The modern plant with the latest state-of-art technology allows us to respond to the highest level of client’s requirements.

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Aerospace

Medical technology

PVD

Automotive industry

Titanium

HiPIMS

difficult-to-machine materials

Tool and mould making

Oil indutry

Mechanical Engineering

Superalloys

Turbines

Structural aircraft components