

Technological edge: HiPIMS offers unique advantages

On course for growth: In-house coating from CemeCon pays off

A HiPIMS coating system from technology leader CemeCon makes a major contribution to future viability: the flexibility of the system and the process offers tool manufacturers security and opens up new customer groups in rapidly changing markets. In addition, complete process control remains in one hand with in-house coating—in the company's own.

The machining industry is undergoing radical change—and at a rapid pace. As one of the most important customer industries, the automotive industry in particular is facing a profound transformation. Falling production figures and the shift towards electromobility are fundamentally changing the requirements: fewer components are needed—and these differ significantly from previous ones. At the same time, the range of materials being used is growing, with materials that are difficult to machine increasingly dominating. Additionally, there is a growing demand for perfect surfaces and extremely tight manufacturing tolerances.

The challenges for tool manufacturers are growing

One thing is certain: Economic success can only continue to be secured by those who drive change themselves with suitable tool solutions and targeted investments. This puts them in a position to be a reliable partner to their customers on an equal technological footing and to open up additional areas of performance. It is also a way for European suppliers to withstand the high price pressure and increased predatory competition.

“Standard” is no longer enough under these conditions! In many cases, the key is absolute specialization: “High-quality tools that are precisely tailored to very specific and demanding applications can definitely be marketed successfully,” says Dr.-Ing. Christoph Schiffers, CemeCon Product Manager Technology, summing up many discussions with tool manufacturers. “Our HiPIMS systems provide optimal conditions for this. They enable manufacturers to coat their own tools according to their customers' requirements, while retaining complete control over every stage of the process.”

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HiPIMS expands entrepreneurial horizons

CemeCon's equipment is more than just high-tech: in addition to the latest HiPIMS technology and all peripheral systems for pre-treatment and cleaning, comprehensive know-how transfer is included as well. "Tool manufacturers receive practical training directly on the machine in live operation—this ensures smooth implementation," says Christoph Schiffrers, emphasizing the sustainable added value. Users work with exactly the same process technology and software that CemeCon has been developing, testing and using on a daily basis for over 35 years in its own coating center with around 50 systems. At the same time, the system remains flexible—open for individual in-house developments and customer-specific adaptations. Thanks to HiPIMS, an almost unlimited variety of coating materials, maximum precision and limitless flexibility are possible. This process, an advancement of sputtering, enables the use of almost any chemical element as a coating material. The resulting coating is extremely smooth, dense and fine-grained, offering unprecedented material toughness—an enormous advantage for interrupted cutting with milling tools. The residual stresses can also be finely adjusted, which is crucial for achieving a homogeneous coating on complex cutting edge geometries and micro-tools.

Inspiring old and new markets

HiPIMS' flexibility and universality enable tool manufacturers to keep pace with changes in their core market. Above all, it helps them to shape these changes. One example of this is the future trend towards lightweight chassis components made of high-strength materials or aluminum, which are increasingly replacing traditional components made of carbon steel and standard castings in the automotive industry: HiPIMS users can already access SteelCon® as a tailor-made solution for tools for machining high-strength steels as well as AluCon® for aluminum alloys and other non-ferrous metals today—and entirely without changing technology. Another innovation that CemeCon customers can benefit from directly: CemeCon has recently developed the AlCrN-based HiPIMS coating material MultiCon® especially for milling and drilling steels between 30 and 50 HRC. With a smooth surface without any droplets, which was previously unavailable on the market, it ensures particularly high process stability and wear resistance.

HiPIMS also opens up the potential to broaden the range of services in toolmaking and gradually establish itself in new target markets. Medical technology is one such growth market. However, mini and micro-tools for dental or other medical implants require completely different coatings than cutting tools for the production of combustion engines, for example. Materials such as titanium or cobalt-chrome and tool dimensions in the tenth of a millimeter range quickly push traditional processes to their limits.

HiPIMS enables process-reliable solutions that are unique on the market: extremely smooth, adhesive, dense and homogeneous coatings that precisely reproduce even the most delicate, sharp-edged cutting geometries. "Even the smallest flaws in the coating would have a fatal effect on the tiny geometries," emphasizes Christoph Schiffrers. With HiPIMS, such droplets are ruled out by the process and maximum precision is guaranteed!

Advancing technology, strengthening customer relationships

In-house coating gives tool manufacturers a decisive competitive advantage across all industries: Those who have an in-house HiPIMS coating system can supply their customers much faster and more independently. “This means that even high-quality special tools can be offered in small batches with the shortest delivery times—even overnight if required,” explains Christine Hammer, Head of Sales Europe at CemeCon. “This speed and reliability strengthens customer loyalty and also pays off economically.”

The current challenges in machining require new answers. “By using their own HiPIMS coating system, companies can ensure independence and speed, as well as achieving clear technological differentiation,” Christine Hammer sums up. “Investing today creates the basis for a future-proof market position—despite changing requirements. This opens up business opportunities in new markets and application areas that we may not even know about today.”

Photo 1:

An in-house HiPIMS coating system allows tool manufacturers to benefit from an almost unlimited variety of coating materials, maximum reaction speed and complete flexibility, even for small batches

Photo 2:

Ever smaller and more precise tools have highly complex requirements—homogeneous and smooth HiPIMS coatings are perfect for this

Photo 3:

HiPIMS users can access tailor-made solutions for tools for machining high-strength steels or aluminum alloys and other non-ferrous metals without any change in technology

Photo 4:

HiPIMS coatings such as FerroCon®Quadro enable a dense, homogeneous layer structure of up to 12 µm on cutting tools

About CemeCon AG

CemeCon is the world market leader in diamond coating and technology leader in PVD coating of precision tools for machining. The coating materials required for premium coatings are produced within the coating systems developed by CemeCon.

Customers make use of the company's expertise in both coating services and plant engineering. Renowned tool manufacturers worldwide use the technology and expert knowledge of CemeCon for their own competitive advantage and to open up new business areas.

CemeCon has brought the future technology HiPIMS to market maturity. It combines the advantages of all common PVD coating processes – and that with high economic efficiency. With HiPIMS, maximum performance and a significantly longer tool life are possible even when machining materials that are extremely difficult to machine. Maximum productivity in the machining of innovative materials – such as fibre-reinforced plastics, ceramics or graphite – is guaranteed by the patented multilayer technology in diamond coating developed by CemeCon.

Founded in 1986 by Dr. Toni Leyendecker, CemeCon AG has expanded continuously over three decades. At its headquarters in Würselen, the company operates the world's largest coating center. All important international markets are served from there and from the centers in the USA, China and Japan as well as by our sales partners in the Czech Republic, Denmark, Taiwan, Korea, India and Russia.

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