# FACTS

CemeCon
The Tool Coating

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## AlCrN goes HiPIMS

MultiCon®—The new all-rounder for steel machining

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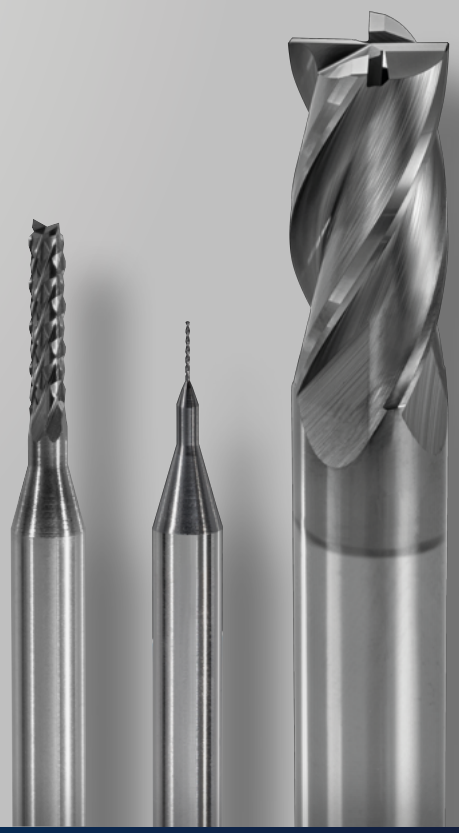

### On course for growth: In-house coating pays off

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*"AlCrN coatings have long been established in steel processing, mostly using the arc process. Despite proven efficiency, performance gains have recently stagnated—until now: HiPIMS technology is providing new impetus. It enables extremely smooth, dense, and adhesive coatings. With MultiCon®, we are presenting the next evolutionary stage of our HiPIMS-based AlCrN coating—significantly more powerful than arc alternatives."*

*Christine Hammer, Head of Sales Europe*

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# In this issue

# Hard diamond coatings build a bridge to the growing dental market

**New teeth within minutes from the CAD/CAM milling unit instead of the laboratory—current developments in dental technology open up innovative opportunities. And they call for superior technologies: Diamond-coated precision tools in the smallest dimensions are indispensable for the production of dentures from zirconium oxide blanks—for example from the leading Taiwanese manufacturer IDI.**

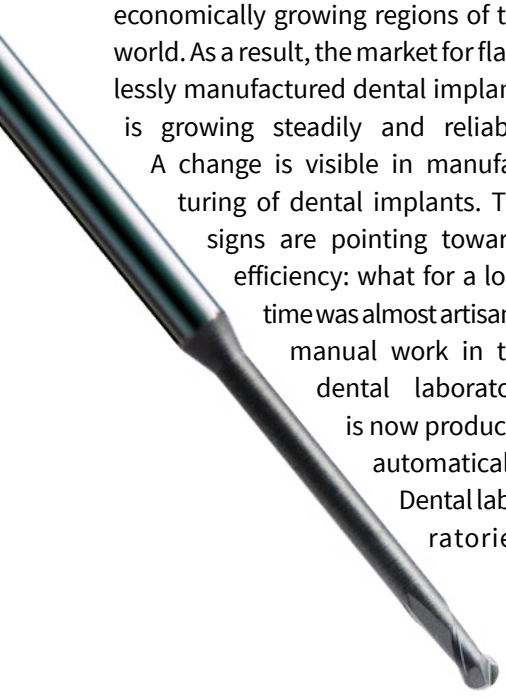
The demand is huge: in Germany alone, around eight million people need dental implants every year; this number will continue to grow as the life expectancy of the population increases. Globally, expectations are equally "future-proof": increasing prosperity is accompanied by the desire for aesthetic teeth in all economically growing regions of the world. As a result, the market for flawlessly manufactured dental implants is growing steadily and reliably. A change is visible in manufacturing of dental implants. The signs are pointing towards efficiency: what for a long time was almost artisanal manual work in the dental laboratory is now produced automatically. Dental laboratories, but above all dental practices themselves are increasingly relying on CAD/CAM milling units to produce crowns, bridges and inlays from zirconium oxide blanks with a precise fit. In a digitized process, the dentition is scanned and the data record is transferred directly into a milling program. The dental implant is then precisely milled from the prefabricated blank—quickly, efficiently and to the highest quality.

The ceramic material zirconium oxide used in this process is durable, provides an aesthetic appearance and is highly compatible with the body. However, it is also very abrasive and therefore highly wear-intensive for the milling tools. Therefore, machining can only be carried out reliably and economically with diamond-coated tools. They are the only technically viable option in this area of application.

## A HEADSTART THANKS TO A STRONG TECHNOLOGY PARTNER

For tool manufacturers who already use diamond coatings for their quality tools for machining graphite, this opens up a major market opportunity in dental technology. This is because they have the expertise of making carbide milling cutters down to a few tens of a millimeter and can transfer this expertise to dental applications.

The demanding dental technology market can also be perfectly served with high-performance coatings. In terms of tool geometries, cutting forces and dimensioning, the requirements of machining graphite and zirconium oxide are comparable. For CemeCon partners, the step into this constantly growing future market is therefore a small one.



Milling zirconium oxide blanks for dental implants:
For its micro-tools, which are up to 0.3 millimeters thin, the leading Taiwanese tool manufacturer IDI Precision Machinery Ltd. relies exclusively on diamond coatings from CemeCon


The transfer of knowledge to the new sector is quick and easy to implement.

## PROVEN IN PRACTICE: DIAMOND COATINGS FOR THE DENTAL MARKET

The example of the successful Taiwanese tool manufacturer IDI Precision Machinery Ltd. shows how rewarding the step into the dental market can be. As one of the leading manufacturers of CAD/CAM milling tools for mold making and dental technology, the company supplies the Asian market as well as the USA in particular. In the dental sector, IDI's product range includes milling tools in diameters from 3 to 0.3 millimeters, each in precisely fitting variants for the milling units of common industry suppliers.

IDI relies entirely on quality from CemeCon for the diamond coating of its high-performance tools. IDI consistently uses the service of the world's largest coating center in Würselen for all tools and thus receives an outstanding coating quality. With perfectly coordinated logistics, the partners master the transportation routes that the tools have to cover from Taichung to Germany. The uniformity and homogeneity of the CemeCon coatings on the micro-tools ensure an otherwise unmatched high milling quality with the lowest possible tolerances. A powerful argument that IDI uses to impress its customers, who in turn convince their customers—dentists and dental technicians with specialist knowledge: Thanks to tools with CemeCon diamond coatings, they can rely on high-quality, geometrically accurate cutting results with maximum reliability and extremely easy handling.

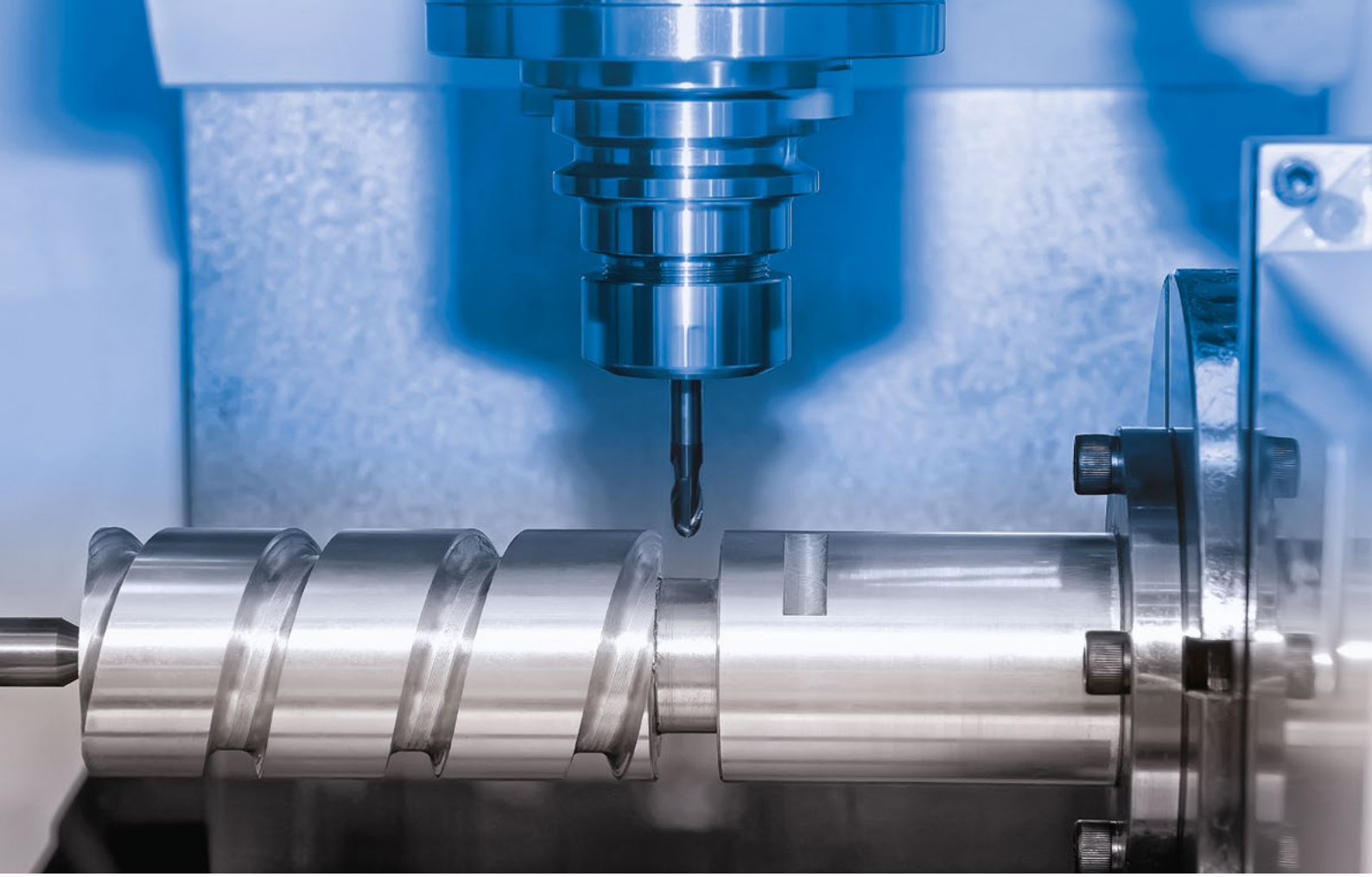
CemeCon even coats tools with a diameter of just 0.2 millimeters for specific applications. This is where the world market leader for diamond coatings can put more than two decades of experience in the development of this technology to good use, even for the most specific requirements.

## DOING BIG BUSINESS WITH MICRO-TOOLS

CemeCon is very proud to be able to help its customers achieve success in new and future-oriented business areas. "The dental sector is much more than a niche market. It is a fast-growing technology driver that combines industrial thinking with medical requirements," summarizes Gerhard Hagedorn, CemeCon Product Management Diamond. "For tool manufacturers with experience in the mini and micro range for graphite processing, this offers the opportunity to transfer their expertise to another high-margin sales market—without reinventing the wheel." CemeCon is also happy to supply "newcomers" with the decisive coating materials for machining the highly abrasive material. In any case, the right tools with the right diamond coating create an excellent starting point for success.

IDI®
IDI Precision Machinery Ltd.

**IDI Tools (IDI Precision Machinery Ltd.)** is a leading high-precision toolmaker based in Taichung, Taiwan. Serving the mold-making and dental industries, IDI offers a comprehensive line-up of premium end-mills engineered for milling **graphite, zirconia, titanium, hardened steel, and stainless steel.** The company is renowned for its engineering-driven culture and exacting manufacturing standards, with tool profile tolerances held to ±0.002 mm thanks to state-of-the-art grinding technologies and strict process controls. From custom machine design to sensitive laser detection and synthetic grinding media, every step is built to maximize tool performance and longevity. With advanced quality instrumentation and global distribution, IDI continues to deliver cutting-edge solutions for even the most challenging applications worldwide.



AlCrN GOES HiPIMS: MultiCon®—THE NEW ALL-ROUNDER FOR STEEL MACHINING

# Assured premium quality worldwide

**As a HiPIMS coating material based on AlCrN, MultiCon® has a particularly wide range of applications in steel machining. Through international coating centers and partner companies CemeCon makes it possible that customers receive the best coating quality with MultiCon® wherever they are: Mirrored processes and productions as well as sophisticated logistics ensure consistent quality worldwide!**

"Many tool manufacturers are active globally now," says Inka Harrand, Product Manager Cutting Inserts at CemeCon, describing the situation. "Our customers naturally want their coating partner to reliably guarantee the same quality standards everywhere. They are also very interested in avoiding long transportation routes and the hurdles of legal import regulations." Challenges that CemeCon meets with an international network of coating centers and partners. The CemeCon subsidiaries in the USA, China and Japan as well as the partner companies in India and South East Asia guarantee both the consistently high, reproducible coating quality of the technology leader and efficient logistics on all relevant global markets.

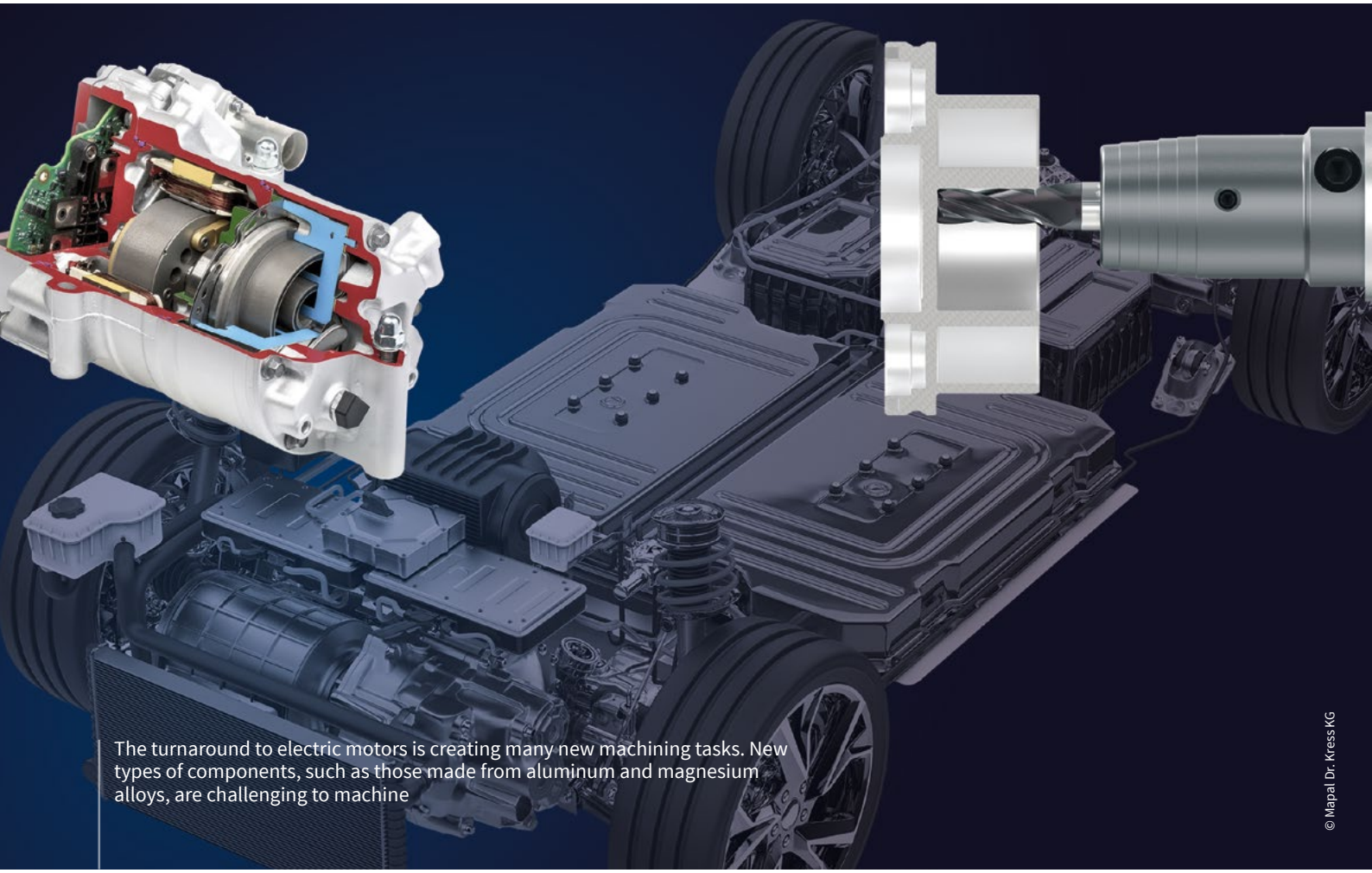
The new HiPIMS coating material MultiCon® is a convincing example of global technological consistency. Being extremely versatile, it enables the machining of soft to medium-hard steel, an AlCrN based on HiPIMS technology for the first time. Analyses show: MultiCon® significantly increases productivity in practice, enables long tool life and maximum process reliability—especially in comparison with arc variants. This is due to the extremely smooth, dense, homogeneous and high-temperature-resistant coating that can be achieved with HiPIMS.

Designed for a particularly wide range of applications, MultiCon® is therefore an important "top performer" in steel machining.

## CEMECON COATINGS—AN INTERNATIONALLY COMPETITIVE ADVANTAGE

For companies that operate globally, the wide availability of high-performance coating materials such as MultiCon® means high-end coating results at a consistently high level of quality. Regardless of where the coating center is located, the promise applies: 'developed in Germany—guaranteed quality worldwide'. In view of the challenge of remaining competitive as a tool manufacturer in particularly price-sensitive markets, the concept plays to its strengths.

"Our customers benefit in two ways: We combine the development expertise of our CemeCon headquarters in Würselen with the in-depth know-how of our regional contacts who can operate locally, overcoming linguistic, cultural and operationale distances. This simplifies logistics." says Manfred Weigand, Product Manager Round Tools at CemeCon. "Technically, the CemeCon subsidiaries and partners are always closely accompanied and receive comprehensive support in order to guarantee our high level of quality and service wherever it is needed."



The turnaround to electric motors is creating many new machining tasks. New types of components, such as those made from aluminum and magnesium alloys, are challenging to machine



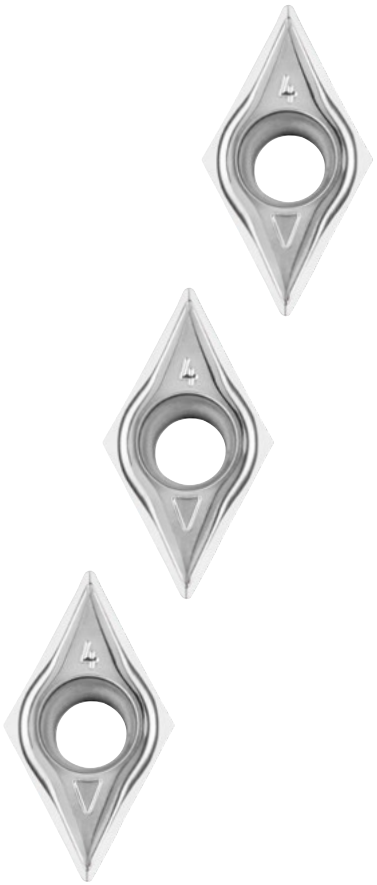
# Industries in upheaval: Drive turnaround changes machining tasks

**Electric drives are increasingly replacing traditional combustion engines. As a result, many engine components are no longer needed. They are being replaced by completely new components made from materials that are sometimes difficult to machine—with corresponding new requirements for cutting tools. Thanks to high-performance coatings from CemeCon, tool manufacturers can face these challenges with confidence.**

The move away from conventional drives is becoming increasingly apparent—especially in the automotive industry. However, electrification has long since penetrated far more areas: Two-wheelers, construction machinery, motorized work equipment or industrial trucks such as telescopic handlers and forklifts are also gradually being equipped with electric drives. A far-reaching structural change that undoubtedly poses challenges for the

## AluCon® for non-ferrous metals

Aluminum alloys are gaining widespread acceptance as versatile lightweight materials in more and more applications. Thanks to the $TiB_2$-based HiPIMS coating material AluCon®, machinists can meet the challenges of machining aluminum and other non-ferrous metals with ease. AluCon® is a nanocrystalline, extremely dense and smooth coating material with maximum coating adhesion and a hardness of up to 4,000 $HV_{0.05}$. It effectively prevents built-up edges and ensures optimum cutting results even at high temperatures.



Extremely smooth and with layer thicknesses of only 2 µm, AluCon® is highly effective in preventing built-up edges from forming in the first place

machining industry. Because wherever a combustion engine is replaced by an electric drive, other components are installed. Changing shapes and modern materials are placing fundamentally new demands on processes and tools.

### NEW MATERIALS— NEW CHALLENGES— NEW OPPORTUNITIES

In the past, the majority of machining tasks involved aluminum, cast iron and steel components for engine blocks, cylinder heads or crankshafts for combustion engines. Today, typical components of electric drive systems—motor housings, battery frames or components for thermal management—are increasingly made of aluminum and magnesium alloys. These materials are challenging to machine and are often thin-walled and therefore very sensitive to vibration. The mixed machining of different material combinations, such as aluminum motor housings with pressed-in steel bushings, is particularly complex.

For toolmakers, this new variety of materials means that many previous solutions will soon be obsolete. However, this does not have to jeopardize their own economic success—it can be consolidated and even expanded with coordinated, specialized precision tools. “Tailor-made coating technologies are a good way forward here,” says Inka Harrand with conviction. The experienced product manager for cutting inserts at CemeCon explains the target-oriented approach: “To ensure maximum performance, we first identify the right coating material. Then we tailor the coating precisely to the tool, component geometry, material and machining situation. With our highly developed processes, we make a decisive contribution to maximum precision and flawless surface finishes in every specific application.”

### USING COATINGS OF THE FUTURE TODAY

CemeCon offers the perfect answer to the special requirements that modern lightweight materials—aluminum and magnesium alloys—place on cutting tools during machining. The HiPIMS coating AluCon® for round tools and cutting inserts, for example, has al-

CCDia® coatings ensure precise and highly efficient machining of scroll compressors made of aluminum alloys with increased silicon content

ready proven itself in an exceptionally wide range of applications. With its smooth coating, which is only 2 µm thick, it is extremely effective in preventing built-up edges from occurring in the first place. At the same time, the high hardness and nanocrystalline structure of AluCon® enable outstandingly long tool life and high cutting speeds when machining aluminum—for battery housings, for example.

Another important component to be machined is the scroll compressor. It is a central element of the temperature management in electric vehicles and was previously mostly made from heavy iron materials. With the switch to aluminum, the compressor is a current prime example of the change in materials due to the demand for lightweight construction. Tools with adapted CemeCon diamond coatings from the CCDia® series are an ideal solution here. They enable precise, reliable, highly efficient and economical machining of the aluminum alloys with increased silicon content from which the complex-shaped components are manufactured today.

Other future-proof coating solutions are also already tried and tested. For the demanding mixed machining of aluminum-steel components, for example, CemeCon offers InoxaCon® and InoxaCon® Plus tool coatings with high wear resistance. The characteristic red-gold HiPIMS coating material with its balanced ratio of hardness and toughness combined with very high temperature resistance is predestined for high-performance applications in this area.

## InoxaCon® Plus for stainless steels, titanium and steels up to 70 HRC

Very hard and tough materials place high demands on cutting tools. CemeCon has developed the coating material InoxaCon® Plus especially for the high-precision machining of high-alloy steels or titanium. Thanks to its temperature stability, outstanding adhesion and high degree of hardness, it guarantees reliable processes and a long tool life. In addition, its very smooth surface with extremely low coefficients of friction effectively prevents built-up edges and adhesions.

### ACTIVE PARTNERSHIP RIGHT FROM THE START

“If you rely on the right partner, your range of tools can hold its own in the dynamic competition in the long term,” summarizes Manfred Weigand, CemeCon Product Manager Round Tools. “Our material expertise, which has grown over decades, our close cooperation with users and the efficiency of our own coating center make us an active, strategic ‘ally’ in tool development.” This is expressly about an active partnership: Through early consulting, engineering and process support as early as the development phase, the optimal coating becomes an integral part of the overall concept of the ‘precision tool of the future’.

We offer a service that is as diverse as the challenges our customers face, and we aspire to be a long-term, successful partner

# Premium in every respect: Technology and service from CemeCon

**With a diamond, DC or HiPIMS coating system from CemeCon, tool manufacturers get far more than just high-performance technology. A comprehensive range of services ensures that all coating processes "run smoothly" in the long term. The freedom that comes with in-house coating is complemented by the reassurance of knowing that help is always available: personally, quickly, competently, and always on an equal footing.**

"Being able to use outstanding technology in your own company with good training already gives tool manufacturers a clear advantage on the market. Those who can also count on an experienced partner with comprehensive expertise at all times gain additional competitive advantages," explains Tanja Maubach, Product Manager After-Sales at CemeCon. Her statement is based on many years of practical experience: "Some of the customer


Many technicians have been looking after the coating systems for a very long time and actively contribute to the continuous further development of CemeCon coating technology

systems that we support have been delivering consistently reliable and high-performance coating results at the highest level for over 25 years."

## VALUABLE SUPPORT RIGHT FROM THE START

The CemeCon service begins long before commissioning. Even before the system door closes behind the first batch of cutting tools, CemeCon service technicians are active on site at the customer's premises: for installation, instruction and training of those who operate and monitor the system. All training takes place in accordance with a high, uniform quality standard and can be called up very flexibly. This makes knowledge transfer possible even at short notice: "In the event of staff changes or an expansion of the range of services we offer targeted individual 'refresher trainings'," explains Tanja Maubach.

Once a system is up and running after the start-up phase, the CemeCon service enters the next phase for the customer: thanks to the supply of optimally coordinated consumables, maintenance services and prompt delivery of original spare parts, it ensures the long-term quality of HiPIMS, DC and diamond systems. Customers who opt for a service contract with CemeCon have the best possible all-round protection. In addition to annual maintenance, they also benefit from an extended warranty. And this is also contractually guaranteed: Competent and experienced CemeCon technicians are available seven days a week to provide immediate support.

High-quality consumables and original spare parts are usually dispatched to the customer on the same day after ordering

Expert CemeCon employees answer customer calls around the clock, every day of the week. They often offer a solution directly via remote access

## PERSONAL SERVICE INSTEAD OF A CALL CENTER

At CemeCon, calls do not end up in a call center or on an answering machine, but directly with an expert contact person who knows what to do immediately. “When a system comes to an unplanned standstill, every second counts. Our technicians know this—and act quickly,” says Andrea Merz, Executive Director Technology Transfer at CemeCon. The situation is then analyzed via online access and often resolved immediately. Or the required spare part is identified remotely and sent to the customer. CemeCon maintains a comprehensive stock of spare parts for all generations of systems at its own coating center in Würselen, the largest of its kind in the world, from where the items can be dispatched on the same day. Installation on site is usually possible without any problems thanks to the pre-trained system operators. If an on-site visit by a CemeCon technician is necessary, they will be dispatched immediately and efficiently worldwide. The right spare part will also be on its way thanks to the perfect preparation. “It is this personal proximity and our sense of the urgency of the situation that sets us apart, alongside our leading coating technology,” emphasizes Andrea Merz.

## ALWAYS AT THE CUSTOMER’S SIDE

The regular supply of original consumables such as targets, CemeCon cleaning solutions for tools or technical oils also makes an essential contribution to the long-term performance of the system and peripherals. This has a significant influence on the quality of

the coatings. The wide range of existing and new coating formulations allows for specific special solutions as well as an effective transfer of know-how to customers. In the CemeCon web catalog, customers will find a complete overview, including all relevant information and the option to order directly. If required, a qualified contact person will provide individual advice: “Many of our technicians, myself included, have been with the company for a very long time. They have played a key role in the continuous further development of CemeCon coating technology,” describes Tanja Maubach.

“For CemeCon, sustainability means that we think far beyond pure sales in our business relationships. Rather, we aim to support our customers as partners over many years and ensure their long-term success,” summarizes the product manager. When it comes to premium coating, this is based on premium service: expert advice, tailored training, fast-response, worldwide troubleshooting remotely or on site, digital tools as well as high-quality consumables and original spare parts, including for old systems. “Our service is as diverse as the challenges our customers face. And we stand by that: Those who trust us should be able to rely on us completely—today, tomorrow and in the future.”

**Request access now and discover the world of CemeCon products!**

**catalog.cemecon.com**

CemeCon’s experienced team of technicians is always ready to provide on-site service worldwide

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

TECHNOLOGICAL EDGE: HiPIMS OFFERS UNIQUE ADVANTAGES

# On course for growth: In-house coating 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

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

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."

## 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 Schiffers, 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.

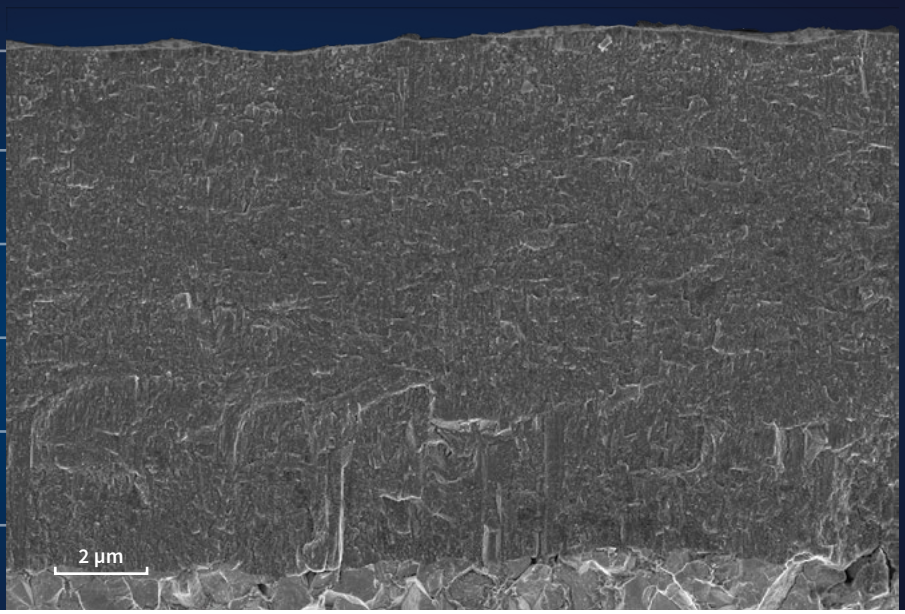
### HiPIMS

- smooth
- no droplets
- excellent adhesion
- hardness and toughness: thanks to dense coating

## 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

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




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

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 Schiffers. 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."


# Convincing performance in heavy-duty machining

**In heavy-duty machining of ferrous materials, tool life is directly proportional to coating thickness. With FerroCon®Quadro, CemeCon achieves coating thicknesses of up to 12 µm on cutting inserts, making it the thickest PVD-based coating on the market. Compared to the CVD process, HiPIMS technology offers advantages such as smoother and tougher coatings, greater flexibility, more stable process control at lower temperatures and the possibility of targeted management of residual stresses.**

Whether a high-speed train or a freight train weighing several hundred tons—the weights to which railroad tracks and switches are exposed give an idea of the immense demands placed on cutting inserts during overmilling for track maintenance. This also applies to many other applications in heavy-duty machining, such as the machining of large components for shipbuilding or mining, the aerospace industry or the energy sector: high metal removal rates, changing cutting conditions, extreme mechanical loads. At the same time, expectations regarding tool life, quality of the machined surface and process stability are increasing. A real test for the tool!

## EXTREMELY SMOOTH, HARD AND TOUGH COATINGS FOR TOOLS WITH A LONG TOOL LIFE

HiPIMS technology provides a solution for competitive performance and quality in heavy-duty machining: With FerroCon®Quadro, coating thicknesses of up to 12 µm can be achieved on

cutting inserts—significantly more than with other PVD processes. CemeCon has thus created a premium alternative to conventional CVD coatings. This is because the HiPIMS process—developed by CemeCon from sputtering—can be used to produce extremely smooth coatings with a dense and fine-grained structure as well as unprecedented toughness and homogeneity. The residual stresses can also be precisely adjusted via the layer thickness. Thanks to HiPIMS, a higher machining speed is often possible. In addition, the high machining quality remains constant over the entire service life of the cutting inserts.

## TECHNOLOGY THAT MAKES AN IMPACT

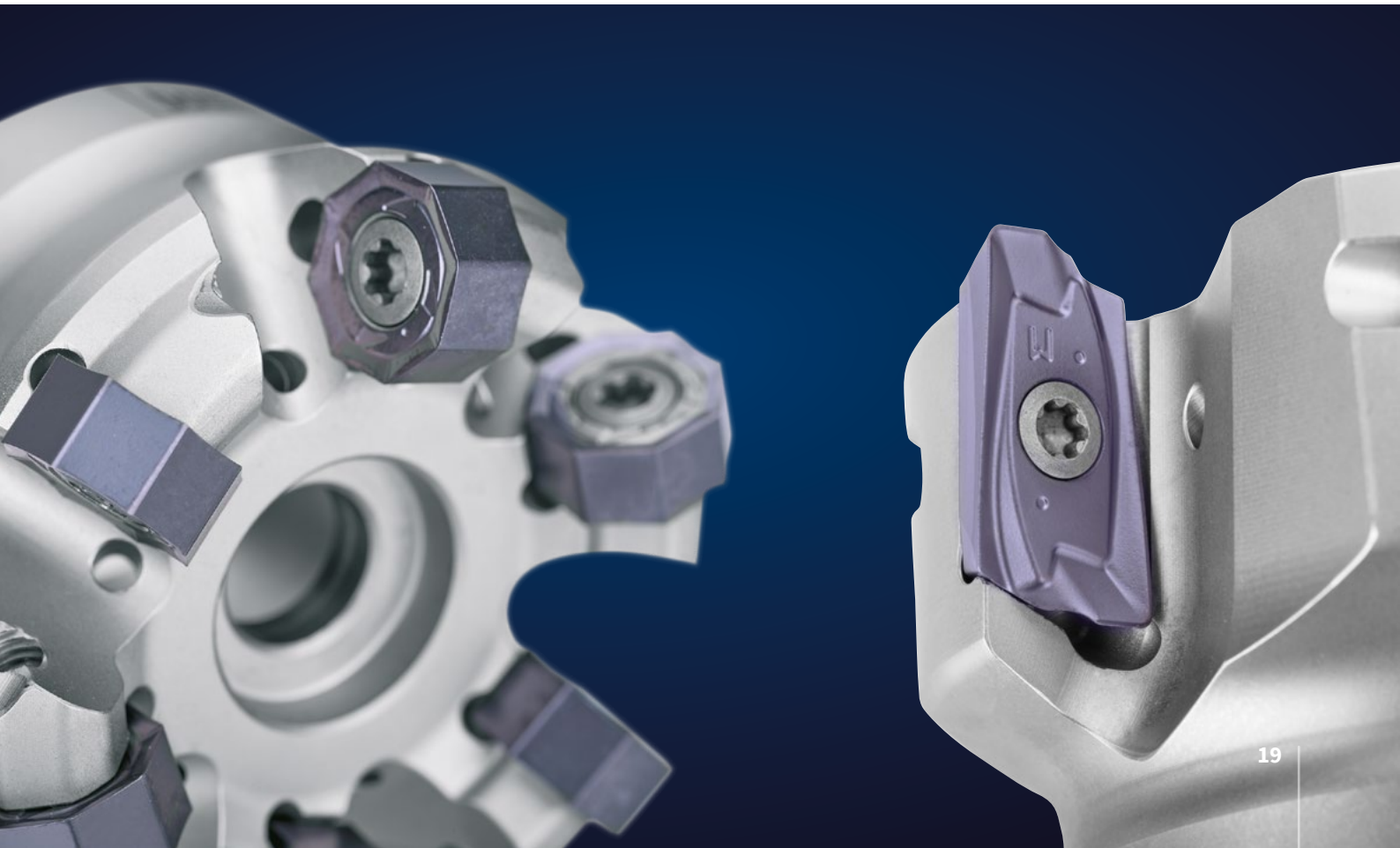
Furthermore, the process control is much simpler and more stable than with the CVD process thanks to the reliable deposition at moderate temperatures achieved with HiPIMS. Due to a process temperature of only around 500 °C, it is possible to coat temperature-sensitive substrates without them becoming brittle. It is also easier and more cost-effective to comply with environmental regulations, as no harmful waste products are produced in the process.

At the same time, HiPIMS technology offers maximum flexibility and versatility when coating a wide variety of tool types. Almost any chemical element can be used as a coating material on the same system—even extremely thin coatings of less than 1 µm can be applied to the delicate geometries of shank tools.

## A PLUS FOR TOOL MANUFACTURERS

The high performance of HiPIMS technology opens up significant potential for manufacturers of cutting tools. Heavy-duty machining is an excellent example: FerroCon®Quadro can be used to create coating solutions for a wide range of applications and new business areas. The unique combination of the greatest possible coating thickness, optimized toughness and flawless surface smoothness creates space for premium tools with a clear positioning in numerous markets.

Customers can rely on CemeCon's strong consulting services to help them navigate and develop these markets. With decades of experience in its own coating center, the CemeCon engineering team works closely together with the customers to individually adapt coating materials and coating processes to the application, substrate and geometry. This results in customized solutions for demanding fields of application in heavy-duty machining and beyond. Tool manufacturers gain a decisive advantage in terms of performance, quality and cost-effectiveness.



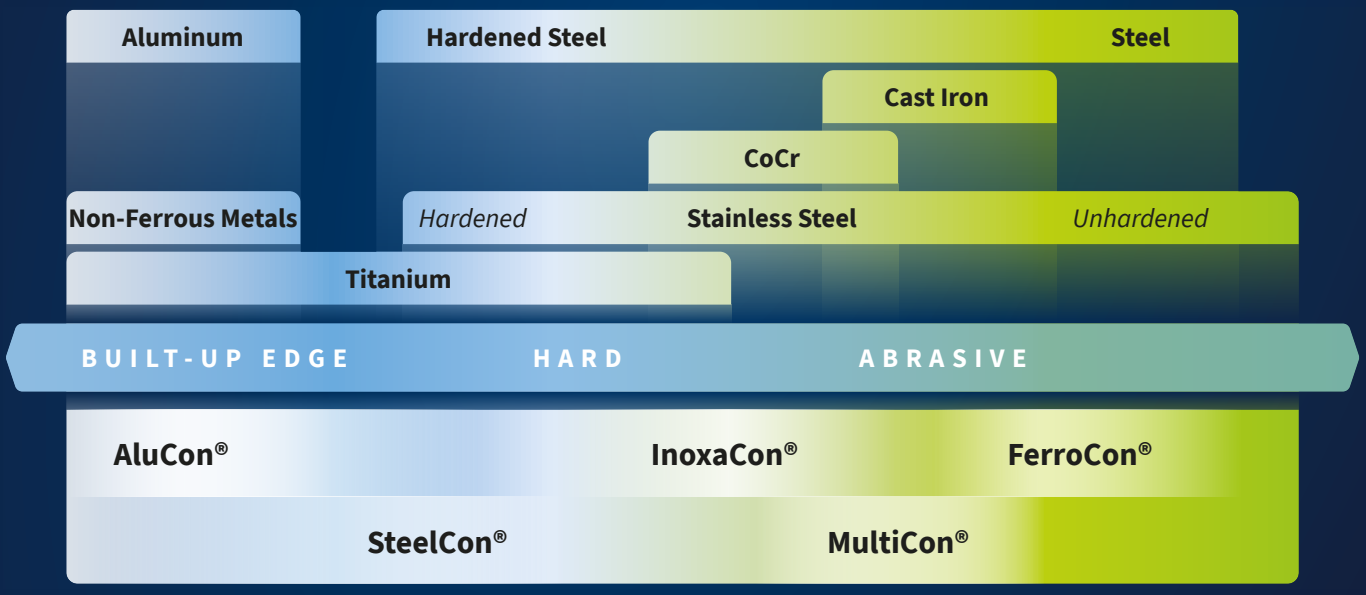
# AlCrN goes HiPIMS: The new all-rounder for steel machining

**NEW: For wet and dry processing of steel and cast iron**

AlCrN coatings have long been established in steel processing, mostly using the arc process. Despite proven efficiency, performance gains have recently stagnated—until now: HiPIMS technology is providing new impetus. It enables extremely smooth, dense, and adhesive coatings. With MultiCon®, CemeCon presents the next evolutionary stage of its HiPIMS-based AlCrN coatings—significantly more powerful than arc alternatives.

Steel is ubiquitous in industrial manufacturing and demands maximum performance from tools and coatings. With its latest HiPIMS coating material MultiCon®, CemeCon offers a high-performance solution specifically for milling and drilling cast iron and steels between 30 and 50 HRC.

MultiCon® combines excellent adhesion, an extremely smooth surface, and optimized wear behavior to take machining quality and tool life to a new level—both in wet and dry machining.

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