

FACTS



**PREMIUM COATINGS
FOR DEMANDING TASKS
MEETING ALL CHALLENGES
WITH CemeCon TECHNOLOGY**

LONG TOOL LIFE AND BEST SURFACE QUALITY

HPTec COMPOSITE TOOL ACTION
WITH CCDia® AeroSpeed®

Pages 4-6

PERFORMANCE LEAP THANKS TO HIGH COATING THICKNESS

CC800® HiPIMS GIVES GESAC A HEAD START WITH
CUTTING INSERTS FOR HEAVY MACHINING

Pages 12-14

FLEXIBLY NETWORKED

Electric mobility, communication, medical technology – with the technological progress in these and other future markets, the machining of high-performance materials has become essential. For high productivity and first-class results in these areas, hoppers are increasingly demanding application-specific tool solutions. With CemeCon technologies, tool manufacturers have the necessary flexibility to meet these challenges. Our HiPIMS systems allow very thin coatings for micro tools (see pages 10/11) as well as high coating thicknesses up to 12 µm (see pages 12-14 and 15).

Good networking is just as important as powerful and flexible technologies for developing coordinated solutions for demanding machining tasks. SARTORIUS leads the way: Thanks to close cooperation with manufacturing companies, tool manufacturers and CemeCon as coating experts, premium tools are created – the best example: the new milling cutters for hard machining (see pages 8/9).

We are also constantly expanding our network: With our online live batches, we maintain close relationships with interested tool manufacturers and our customers and let them experience the advantages of our systems individually and directly – without having to leave their own office (see pages 20/21).

Yours sincerely,



Dr Toni Leyendecker



Dr Oliver Lemmer



Bernd Hermeler

Whether Sales Support or Customer Care – Premium Service is part of it at CemeCon (see pages 22/23).



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SARTORIUS milling cutters with HiPIMS coating for hard machining.



20/21

Online-Live-Batch: Get to know the advantages of CemeCon technology.

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CemeCon AG
Adenauerstraße 20 A4
52146 Würselen
Phone +49 24 05 44 70 100
Fax +49 24 05 44 70 399
www.cemecon.de
info@cemecon.de

Editor

KSKOMM GmbH & Co. KG
Jahnstraße 13
56235 Ransbach-Baumbach
Phone +49 26 23 900 780
Fax +49 26 23 900 778
www.kskomm.de
ks@kskomm.de

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LONG TOOL LIFE AND BEST SURFACE QUALITY

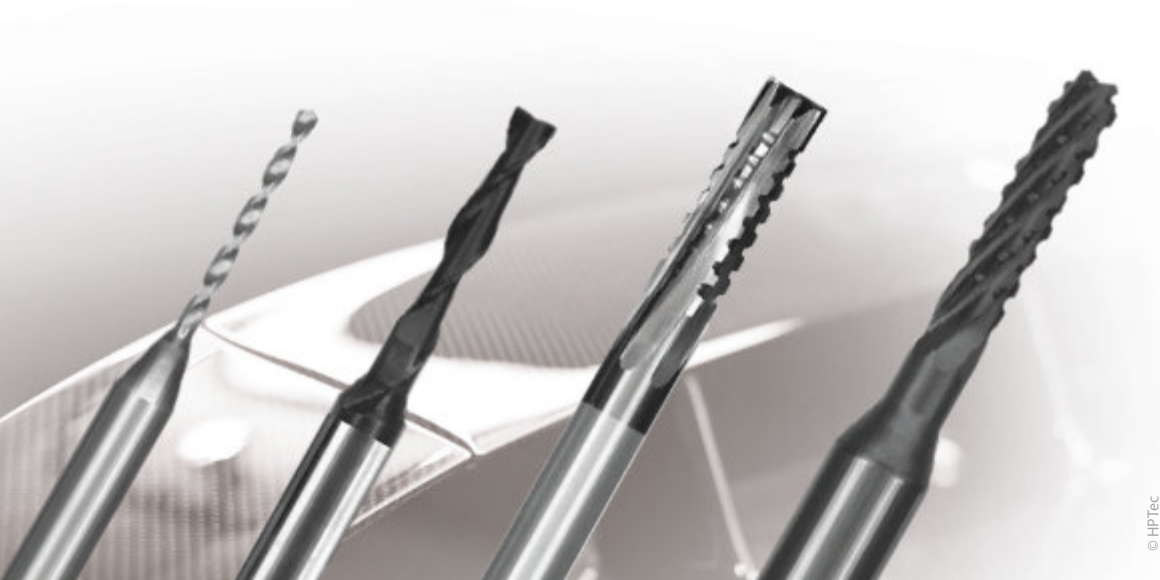
Because of their low weight and high load-bearing capacity, fibre-reinforced plastics (FRP) are being used in more and more applications. HPTec GmbH from Ravensburg is one of the world's leading specialists when it comes to the anything but simple machining of such high-performance materials. With a view to highest process reliability and component quality, the tool experts have developed the new micro cutters of the "HPTec Composite Tool Action". An important component is the diamond coating based on CCDia®AeroSpeed®.

Composites such as CFRP and GFRP consist of several layers. The targeted combination of fibers, such as carbon or glass, with various resins or bonding agents, such as Kevlar, aramids or polyester, enables the construction of complex components with high strength and low weight. This inhomogeneous material structure with hard and highly abrasive fibers as well as a thermally sensitive matrix poses

special challenges for machinists. Reliable process solutions are required that also meet the increasing demands on productivity.

"Delamination and fiber protrusions weaken the structure of FRP components. Therefore, they must be avoided at all costs during machining. A high cutting edge quality and the wear resistance of the cutting material play a decisive

role in this. Carbide tools with diamond coating have proven to be the best approach for reliable and economical machining. The substrate, geometry and coating must be perfectly matched to each other. In addition, very low cutting forces massively reduce delamination and fiber residues. Small tool diameters with optimized geometry reliably counteract workpiece damage," says the Head of Sales MCT (Micro



The MCT (Micro Cutting Tools) and MCT UP tool program includes micro tools with diameters from 0.05 to 10.00 mm for a wide range of materials, such as precious metals, steel, ceramics, CFRP and GFRP as well as non-ferrous metals.

Cutting Tools) at HPTec GmbH, describing the requirements for the development of a precision tool for machining FRP.

TEST WINNER: CCDia®AeroSpeed®

The goal for HPTec was clearly defined when developing tools for trimming or contour milling thin-walled FRP workpieces: A smooth surface was to be achieved – without fiber residues, delamination or component damage, and with maximum cutting force reduction. The results are the new micro-milling cutters “HPTec Composite Tool Action” with diameters from 1 to 3 mm. As the Sales Manager explains: “Thanks to the special toothing or chip breaker profile and six cutting edges, we reduce the cutting forces by up to 80 percent. The small helix angles reduce the tensile and compressive forces and thus also critical vibrations. We have selected an ultra-fine-grain carbide with a very high flexural strength for high

HPTec GmbH



HPTec GmbH is an internationally operating medium-sized company with its headquarters in Ravensburg. It develops, produces and markets drilling and milling tools made of hard metal for machining a wide variety of materials, such as precious metals, steel, ceramics, CFRP and GFRP as well as non-ferrous metals. For about 40 years, HPTec has been building up its competence in micro tools for the PCB industry in a determined and user-oriented manner and has become the European market leader in this field. For some years now, HPTec's customers have also increasingly included companies from the watch and jewelry industry, aerospace, medical and dental technology, automotive and the optical industry. The MCT (Micro Cutting Tools) and the MCT UP tool program includes micro tools with diameters from 0.05 to 10.00 mm. Innovative and specially adapted tool geometries, tightest manufacturing tolerances and 100 percent quality control along the entire manufacturing process ensure highest precision and efficient machining. In close cooperation with leading material and machine manufacturers as well as in research projects with external partners, HPTec's experts develop strategies and tools to optimize productivity and quality in their customers' manufacturing processes.

www.ssl-hptec.de

“In order to find the **BEST POSSIBLE COATING** for our **MATCHED MICRO TOOLS**, our development team carried out numerous laboratory tests. One **DIAMOND COATING** clearly stood out from the others and delivered **EXCELLENT RESULTS**: **CCDia®AeroSpeed®** from CemeCon.”

Sales Manager MCT (Micro Cutting Tools) at HPTec GmbH

process reliability as the cutting material. In order to find the best possible coating for our matched micro tools, our development team carried out numerous laboratory tests. One diamond coating clearly stood out from the others and delivered excellent results: CCDia®AeroSpeed® from CemeCon.”

CemeCon matched the multilayer coating material exactly to the processing of composites and adapted it to the new tools in close cooperation with HPTec. With its

extremely smooth and ultra-fine crystalline surface topography as well as excellent adhesion, CCDia®AeroSpeed® ensures very good chip flow and quickly conducts the frictional heat out of the contact zone. This significantly reduces thermal stress and avoids delamination. With a hardness of around 10,000 HV_{0.05}, the coating is highly resistant to the high-strength and highly abrasive fibers, thus ensuring long tool life. Due to the patented multilayer structure, the diamond coating has crack-stopping properties. This leads to significantly higher process reliability. "Particularly with small tools, it is

important that the coating does not affect the filigree geometry and that the cutting edges are unintentionally rounded. For optimum wear protection, we have chosen a coating thickness of 9 µm for HPTec milling cutters. Nevertheless, the milling cutters coated with CCDia®AeroSpeed® have sharp cutting edges and thus separate the abrasive fibers much better than milling cutters with conventional diamond coatings. There are no fiber protrusions and the excellent quality of the milled surfaces can be reproduced at any time," adds Manfred Weigand, Product Manager Round Tools at CemeCon.

PERFECTLY MATCHED FOR EXCELLENT RESULTS

"Micro cutting is a complete system in which every component is matched to it in order to achieve the highest possible dimensional accuracy, surface quality and very long tool life - this also includes, for example, the machine spindle and tool holder. That's why we also support our customers in optimizing their processes," says the HPTec Sales Manager. "This is the only way our high-performance micro-tools, such as the new micro-milling cutters, can achieve the best results when machining fiber composite plastics!"



The new micro-milling cutters "HPTec Composite Tool Action" (right downcut geometry; left upcut geometry) have been precisely adapted to the machining of fiber composite plastics. An important component is the diamond coating based on CCDia®AeroSpeed®. (Photos: HPTec)



TapCon®Gold

NOW ALSO AVAILABLE FROM CemeCon IN CHINA

INCREASE PERFORMANCE IN THREAD PRODUCTION

The demand for high-quality threading tools in China is considerable. In order to enable the local industry to make a performance leap in thread production, Chinese tool manufacturers can now have their HSS taps and formers coated with the new HiPIMS coating material TapCon®Gold at the CemeCon coating center in Suzhou.

“We have developed TapCon®Gold specifically for HSS taps and formers. This HiPIMS coating material achieves a significant increase in performance compared to old TiN and TiCN coatings, which have been the references for threading tools up to now. Also from Chinese tool manufacturers we receive more and more inquiries for a coating service with TapCon®Gold. This shows that the results of sampling are also very successful there,” says Marco Furrer, Sales Manager at CemeCon.

In addition to the specific composition of TapCon®Gold, the reason for the excellent cutting results is precisely its manufacture in the high-

tech HiPIMS process. HiPIMS coating materials are extremely smooth, very dense and adhesive. A very good combination for tapping and forming. This combination ensures low torques during forming and high wear resistance during drilling – decisive factors for thread production.

The low-friction surface of TapCon®Gold also prevents material build-up on the tools and ensures excellent chip removal and running-in behavior. The HiPIMS coating material achieves optimum protection for the cutting edges during threading thanks to its high toughness. Various tool manufacturers, espe-

cially those with their own coating production, are already successfully using TapCon®Gold on their taps or thread formers. “Now we want to make the HiPIMS coating material available worldwide. Especially in China's fast growing industry, high-performance threading tools are in enormous demand. The perfect market for TapCon®Gold. Therefore we have transferred the processes to our coating center in China. Now everything is ready there so that tool manufacturers can have their taps and thread formers coated with TapCon®Gold,” says Marco Furrer.



FIRST-CLASS TOOLS THANKS TO GOOD NETWORKING

Tools of the highest quality are required to ensure economical and reliable production in hard machining. The right partner for such demanding projects is SARTORIUS Werkzeuge GmbH & Co. KG. Thanks to extensive know-how in all aspects of machining and close cooperation with numerous experts, they help users to find the best possible tool solution – including coating technology from CemeCon.

The SARTORIUS Tools GmbH & Co. KG is more than just a tool dealer. Among experts, the Ratingen-based company is regarded as a center of excellence in the field of machining. Users from mechanical engineering, tool and mold making, plastics processing, track technology and the automotive industry rely on the experts' extensive

process know-how. "Our customers know: Only supplying outstanding tools is not enough for us. Together with our customers, we develop machining solutions for their production goals. That's why we train our employees, for example in our SARTORIUS Academy, to turn tool vendors into suppliers of manufacturing benefits," says Cristóvão

Belchior, Product Manager Cutting Tools at SARTORIUS.

The key to SARTORIUS' success also lies in close cooperation with the manufacturing companies, tool manufacturers and coating experts such as CemeCon. "The specialists at SARTORIUS bring a great deal of know-how to the table, particularly

SARTORIUS WERKZEUGE



The SARTORIUS Tools GmbH & Co. KG, with its headquarters in Ratingen and a branch office in Velbert, is one of the leading suppliers of high-quality cutting tools for the metalworking and processing industry. The company, which has approximately 160 employees, was founded in 1879 in Düsseldorf's Old Town and has been part of the Würth Group since 1989. With its high level of manufacturing competence and comprehensive consulting services, SARTORIUS occupies a special position there as a specialist for premium cutting solutions. In addition to representing well-known tool manufacturers, SARTORIUS also repeatedly demonstrates extensive process know-how with its own brands ATORN and SARA.

www.sartorius-werkzeuge.de



CemeCon coatings are often a central component of the successful tool solutions from SARTORIUS, as in the case of the ATORN RockTec PRO end mill for hard machining.

with regard to coatings, and provide the user with direct access to this know-how through their competent advice. In this way, they help them to find the best coating solution and thus to achieve greater process reliability for their application," says Christoph Heller, Sales Manager at CemeCon. Thanks to these competencies, SARTORIUS is also much more involved in the development process with the tool manufacturer. This creates trust and a significantly higher performance of the jointly developed precision tools.

CemeCon coatings are often a central component of the successful tool solutions from SARTORIUS: "On the one hand, we work directly with the CemeCon Coating Service to have precision tools 'refined' with the patented diamond coatings. On the other hand, our manufacturer

partners, who for example realize our premium lines for drilling, turning and milling – the SARA and ATORN own brands – use CemeCon coating systems in their own production. In addition, we also offer tool systems from CemeCon technology partners. For Palbit, for example, we have taken over the exclusive representation in Germany in 2019," Cristóvão Belchior describes the numerous points of contact.

HiPIMS TECHNOLOGY BRINGS DECISIVE ADVANTAGES

Different rules apply to hard machining than to the machining of "normal" materials: wear and heat development due to enormous feed rates and cutting speeds of up to 250 m/min are very high when machining hardened steels and require tools of uncompromising

quality. Cristóvão Belchior says: "The HiPIMS technology has shown new potentials in hard machining. The best example are our new ATORN RockTec PRO end mills. The HiPIMS coating, which has been precisely matched and specially developed for this application, impresses with extreme hardness and low friction thanks to a super smooth surface, and helps the tools to achieve top performance in materials up to 65 HRC". In a comparative test of the Gesellschaft für Fertigungstechnik und Entwicklung Schmalkalden e.V. (GFE) – milling tool steel 1.2379 (X153 CrMoV12) with a hardness of 58 HRC – the ATORN RockTec PRO end mill with the longest tool life clearly stood out from the competition. They scored with low flank wear, few chipping, hardly any built-up edges and minimal coating abrasion.

"The **HiPIMS TECHNOLOGY** has shown new potentials in **HARD MACHINING**. The best example are our **ATORN RockTec PRO END MILLS**. The precisely matched HiPIMS coating helps the tools to achieve **BEST PERFORMANCE** in materials **UP TO 65 HRC**".

Cristóvão Belchior, Product Manager Cutting Tools at SARTORIUS Werkzeuge GmbH & Co. KG.



ULTRA THIN AND EXTREMELY SMOOTH

In the fields of electronics and medical technologies, the high-precision machining of the smallest components, with tools that are only a few millimeters or even tenths of a millimeter thick, is the key to innovation – now more than ever. Ultra-thin and extremely smooth HiPIMS coatings from CemeCon AG provide the decisive advantages here – especially in hard materials that are difficult to machine.

High-precision tools are required to machine a workpiece reliably and economically in working ranges from 2 mm to 0.1 mm. In addition to special geometries, efficient coating solutions provide the decisive advantage. A condition is the precise coordination of geometry, material and coating. With CemeCon, tool manufacturers have the perfect partner at their side.

“With our premium engineering service, the focus is on the tool in its customer-specific form and function. Especially with new geometries, innovative tool concepts and special applications – such as tools for micro cutting – the path is increasingly leading to this fully engineered premium coating. In close cooperation with the tool manufacturer, we project a coating solution that is precisely tailored to the tool and application requirements,” says Marc Semder, Sales Manager at CemeCon.

SMOOTHER THAN ANY OTHER

When every μm determines the success or failure of a micro tool, tool manufacturers must be able to rely on the performance of the coatings. Uncompromising smoothness is a must. The HiPIMS process will be the key to success here. Because coating errors such as droplets cannot occur at all with this unique technology. The result are extremely smooth coatings that also meet the low tolerances of miniature production.

Such perfectly smooth surfaces on cutting tools reduce both friction and built-up edges, while at the same time shortening the contact time between chip and tool. The heat input is thus lower and much of it is dissipated with the chip. Oxidation wear is also significantly lower. The result is a long service life – even with dry and HSC machining.



THE LIST OF POSITIVE CHARACTERISTICS IS LONG

“HiPIMS coatings combine an extraordinary number of positive properties – perfect for micro cutting: They are not only extremely smooth, but also incomparably adhesive, hard and tough at the same time. In addition, they have a fine-grained, very dense morphology, a lower residual stress and high thermal stability. This is how they effectively counteract abrasive wear. No other coating process can achieve this combination,” says Marc Semder enthusiastically.

Ultra-thin coatings around 1 μm have (almost) no influence on the filigree geometry of the micro tools. HiPIMS allows very thin and thick layers down to 12 μm (see also page 15). Thanks to the process, the cutting edges are also not unintentionally rounded. Thereby HiPIMS enables a homogeneous layer growth on complex tool geometries around the cutting edge. This ensures an even coating thickness distribution within very narrow tolerances, which are required for micro cutting.

InoxaCon® FOR DEMANDING TASKS

Especially in miniature production, wear resistance and temperature resistance of the tools are

decisive factors for the economic efficiency of production. This is especially true when very hard materials have to be machined, such as those used in medical and dental technology.

“The composition of the coating material has a great influence on the cutting process. InoxaCon® – one of our HiPIMS coating materials – offers tool manufacturers decisive advantages, for example in the machining of chrome-cobalt alloys for implants,” says Manfred Weigand. The smooth surface of InoxaCon® reduces friction during machining. The very good coating properties allow the use under the toughest conditions with low coating thicknesses of, for example, 1.5 μm . Therefore, the cutting edges remain so sharp that feed and cutting speed can be selected for minimum cutting forces and thus better machining results. InoxaCon® prevents work hardening and ensures process stability – also because the HiPIMS coating material optimally protects the tool from heat in the cutting process thanks to its high temperature stability.

Adapted tools with a coating based on an InoxaCon® coating specification produce excellent surfaces during milling. This eliminates polishing work, for example. This shortens process times and ensures more efficient automated production.

CC800® HiPIMS GIVES GESAC A HEAD START WITH CUTTING INSERTS FOR HEAVY MACHINING



The CC800® HiPIMS is exactly the technology the GESAC development team was looking for.

PERFORMANCE LEAP THANKS TO THICK COATINGS

Heavy-duty machining is demanding – maximum cutting volumes, without sacrificing good surface quality, requires high feed rates and extreme wear. The company that can offer longer tool life and the best performance will quickly outpace the competition. GESAC, one of China's largest tool manufacturers, secures this advantage with the CC800® HiPIMS and thick coatings.

One of the leading addresses for high-quality cutting tools in China is GESAC. The comprehensive know-how of the experts ensures

the excellent quality of shank tools and cutting inserts. For many years, GESAC has also been operating a coating production with its own

processes also on diamond systems from CemeCon. "How can we increase our excellence in insert tools for heavy-duty machining of cast

iron and steel? Our traditional PVD and CVD machines do not offer sufficient potential for growth in the cutting insert market," asked the GESAC development team. They found the answer in the CC800® HiPIMS: With it, the experts are now able to achieve coating thicknesses that are unthinkable with other PVD technologies.

FOR THICK LAYERS: HiPIMS

"Whether it's machining machine frames, milling the heads of railway rails or preparing welding seams in the production of large pipeline pipes – maximum metal removal is the mantra and high wear is on the agenda. The inserts have to withstand quite a bit if work is to be



More performance and tool life for GESAC milling inserts – thanks to HiPIMS

GESAC



The high-tech company Xiamen Golden Egret Special Alloy Co, Ltd. (GESAC), is a Chinese-international joint venture and closely associated with XTC.

GESAC is one of the leading manufacturers of high-quality tungsten powders, carbides and precision tools in China. High development dynamics, first-class equipment and technology, creative employees and an application-oriented management concept are the basis for world-class innovations and products. Also because of the national R&D center established in 2008, GESAC is responsible for many research projects and has received numerous awards. With premium products and excellent service, GESAC's "Golden Egret" has become one of the leading brands, known in more than 40 countries and regions of the world.

<http://en.gesac.com.cn/>

economical. Every μm of coating thickness helps here. Especially in heavy machining, the relationship between coating thickness and tool life is quite linear. Added to this is the fact that the required chip thicknesses and feed rates in high-performance cutting are only possible with the highest toughness of the coating," describe Yuan Werner-Guo, Sales Manager at CemeCon, the challenges in heavy-duty cutting.

The solution to these challenges is the HiPIMS technology from CemeCon. This is the only way to produce smooth, hard and at the same time tough coatings with high adhesion and exceptionally high coating thicknesses. Other processes reach their limits here. Arc technology is very limited in the

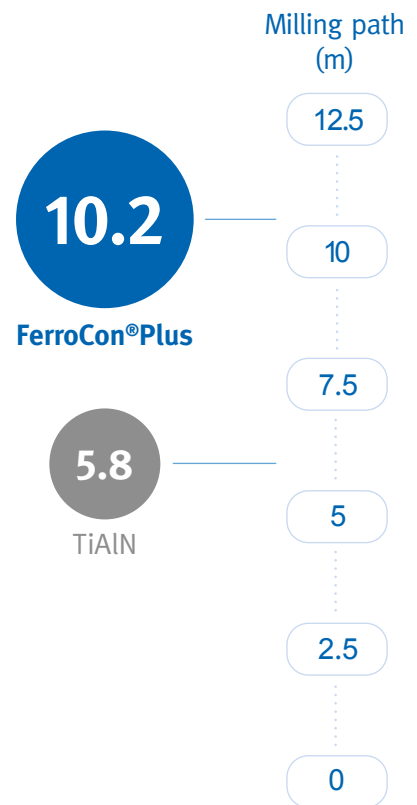
mass production of inserts in terms of coating thickness. Thanks to the synchronization of the HiPIMS cathode pulses with the substrate table – a unique CemeCon feature – the GESAC developers can actively manage the residual stresses of the layer. With CVD coatings, high residual tensile stresses always arise – fatal for the interrupted cut in milling applications. The HiPIMS innovation: Thick layers with 12 µm and low residual compressive stresses open up new worlds in terms of milling inserts for heavy machining.

CUTTING RESULTS ARE COMPLETELY CONVINCING

This was exactly what the GESAC development team was looking for: In order to achieve the best results, the micro geometry of the inserts for heavy machining and edge

Material: **Alloyed steel**
 Tool: **Milling tool with 4 cutting inserts (LNMT1506)**
 $v_c = 180 \text{ m/min}$
 $f = 0.15 \text{ mm/rev}$
 $a_p = 4 \text{ mm}$
 $a_e = 34 \text{ mm}$
With cooling
VB: 0.3 mm

rounding was precisely matched with the optimal coating thickness. The cutting results (see graph) exceeded all expectations: The new inserts achieved a tool life increase of 75 percent when milling alloyed steel! GESAC was completely convinced, and they invested in their own CC800® HiPIMS.



PERFECT FOR NEW IMPULSES

Developers are always bubbling over with ideas – how good it is that HiPIMS allows (almost) any layer composition. We are curious!

The GESAC development team is enthusiastic about the possibilities of the CC800® HiPIMS.





COMPLETE RANGE OF COATING THICKNESS FROM ONE SOURCE

NEW POSSIBILITIES FOR CUTTING INSERTS

High coating thicknesses for cutting inserts have always been a specialty of CemeCon. HiPIMS has again significantly expanded the possibilities here. The process can be used to produce coating thicknesses between 1 and 12 μm (see also pages 10/11). FerroCon®Quadro – the latest premium coating material especially for cutting inserts in CemeCon's success story – heralds a new era in heavy machining of cast iron and steel with a coating thickness of 12 μm .

“Even with our sputtering technology we were able to produce 6 μm thick layers without any problems. Especially in roughing, every μm more determines the economic efficiency of the process. So it is hardly surprising that the proportion of high coating thicknesses in our coating service has been rising steadily for years. Many customers have also signaled to us that there is definitely a need for even thicker coatings. This is how the idea for FerroCon®Quadro with a layer thickness of 12 μm was born early on,” recalls Inka Harrand, Product Manager Cutting Inserts at CemeCon. With HiPIMS the idea has now become reality. Tests have shown that thanks to the outstanding technology, even layer thicknesses of up to 25 μm can be realized.

FerroCon®Quadro is now penetrating into areas where previously only CVD coatings worked. In the heavy-duty machining of cast iron and steel – precisely where thick chips are produced – the HiPIMS coating material ensures increased perfor-

mance and significantly longer tool life. This enables best performance when turning, milling or drilling with cutting inserts.

In addition, with FerroCon®Quadro and HiPIMS, a decision was made in favor of an environmentally friendly technology that does not use toxic or explosive gases. The process temperatures of around 500 degrees during coating additionally protect the substrate and prevent the carbide from becoming brittle.

A successful premium coating is more than just the right coating material. It is the result of a targeted combination of special pre- and post-treatments, coating material, coating thickness and other details. Especially with cutting inserts there are special challenges: For example, different surface conditions often have to be adapted to ensure

high and uniform adhesion. The CemeCon production line especially for cutting inserts is precisely geared to the requirements of this tool group. And the experts' decades of experience ensure that manufacturers receive the best possible advice here.

Inka Harrand: “Since the introduction of FerroCon®Quadro at EMO 2019, we have been offering manufacturers the complete range of coating thickness from 3 to 12 μm for their cutting inserts from a single source – in consistently high quality and with short delivery times.”



INCREASE PERFORMANCE WITH DIAMOND

Anyone who thinks that diamond coatings are only suitable for shank tools and that PCD is always required on cutting inserts in corresponding applications is mistaken: Diamond coatings can also be used excellently for cutting inserts. The tools achieve excellent results when cutting CFRP and GFRP, graphite, non-ferrous metals and plastics.”

In many industries such as aerospace or tool and mold making, shank tools with multilayer diamond coatings from CemeCon are now indispensable. With their nanocrystalline, extremely smooth and hard surfaces, they are often superior to other solutions in terms of performance, quality and precision. And even with diamond-coated cutting inserts, graphite, non-ferrous metals or fiber-reinforced plastics can be machined excellently.

COMPLEX GEOMETRIES,
MORE CUTTING EDGES
AND HIGH FEEDINGS

“On the way to optimized machining, the numerous advantages of diamond coatings can also be used profitably for cutting inserts. Extraordinary cutting edge geometries, multi-bladed cutting edges and high feed rates are keywords that make diamond-coated inserts a good alternative to PCD tools,” explains Inka Harrand, Product

Manager Cutting Inserts at CemeCon.

Especially positive insert geometries with bore can be coated with diamond in a particularly economical way. The chip shape geometry is not changed, as the diamond coatings grow directly on the substrate surface and thus precisely reproduce the geometry. In addition, a diamond-coated carbide cutting edge is stable and very robust. This enables high feed rates and is particularly advantageous for roughing operations.

Three multilayer diamond coatings from CemeCon are particularly suitable for cutting inserts: CCDia®CarbonSpeed is the ideal solution for graphite as well as carbide and ceramic green bodies, CCDia®FiberSpeed for fiber-reinforced plastics and CCDia®MultiSpeed for AISi alloys and composites. Whether in Germany, China, USA or Japan – in all CemeCon coating centers, users can have their tools coated in the



same quality with the same coating specification. Nobody has to make any concessions here.

10 TIMES TOOL LIFE

Diamond-coated cutting inserts have already proven themselves in practice, for example when drilling CFRP: Compared to uncoated inserts, CCDia®MultiSpeed increases tool life tenfold (see graph). "Such values are not peak values from test series, but are achieved by our customers on a daily basis in normal everyday production. And this with stable machining processes," says Inka Harrand happily.

Material: **CFK**

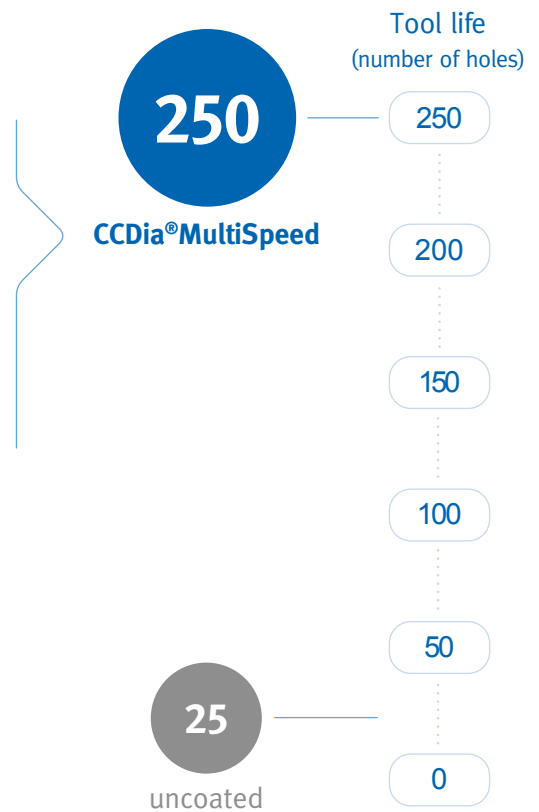
Tool: **Cutting insert for drilling**

Cut length: **35 mm**

$v_c = 150 \text{ m/min}$

$f = 0.15 \text{ mm/rev}$

Without cooling



Diamond coating materials for cutting inserts

CCDia®CarbonSpeed

for graphite, carbide green bodies and ceramic green bodies

Coating material

Diamond

Coating structure

Multilayer, sp^3

Color

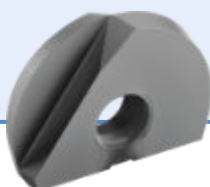
Grey

Microhardness

10,000 HV_{0,05}

Coating thickness

7 μm



CCDia®FiberSpeed

for fibre reinforced plastics, aluminum with high Si content and ceramics

Coating material

Diamond

Coating structure

Multilayer, sp^3

Color

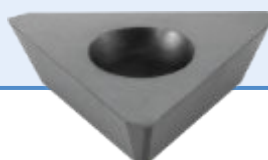
Grey

Microhardness

10,000 HV_{0,05}

Coating thickness

9 μm



CCDia®MultiSpeed

for fibre reinforced plastics, aluminum with high Si content and ceramics

Coating material

Diamond

Coating structure

Multilayer, sp^3

Color

Grey

Microhardness

10,000 HV_{0,05}

Coating thickness

14 μm





NEW DIAMOND COATING MATERIAL – A MILESTONE FOR TOOL AND MOLD MAKERS

MACHINING SINTERED CARBIDE MORE ECONOMICALLY – MILLING INSTEAD OF ERODING WITH CCDia® CarbideSpeed®

Milling carbides instead of eroding or grinding them brings enormous advantages: shorter cycle times, better surface finishes, more environmentally friendly machining, no corrosion and the production of more complex contours. With the newly developed CCDia® CarbideSpeed®, CemeCon now provides tool manufacturers with a precisely matched diamond coating material that creates ideal conditions even for the toughest operating conditions – and thus enables users to cut carbide economically.

In the manufacture of punches and dies made of carbide, tool and mold makers today often use the cost- and time-intensive eroding process. Milling and drilling operations offer

enormous possibilities in this respect: By cutting the carbide and thus manufacturing the actual component, the previously necessary and costly electrode production is

no longer necessary. The production of a punch, for example, is thus significantly shorter. In addition, eroding produces a white edge zone with slight damage due to the

heat input. This has to be removed again by elaborate polishing. When machining, there is no “damage” to this edge zone. This enables an extremely high contour accuracy with better surface qualities. The range of complex 3D contours that can be produced is also greatly expanded.

The fact that the numerous advantages of machining are currently not used more frequently is not least due to the difficult machinability of the sintered carbides “Hardness grades between 900 and 2,200 HV, high wear resistance and heat

hardness require extremely powerful and stable precision tools. For this reason, very few solutions for milling carbide have been found on the market to date. The lack of coating solutions sets limits here for many tool manufacturers – but this is changing with immediate effect,” says Manfred Weigand, Product Manager Round Tools at CemeCon.

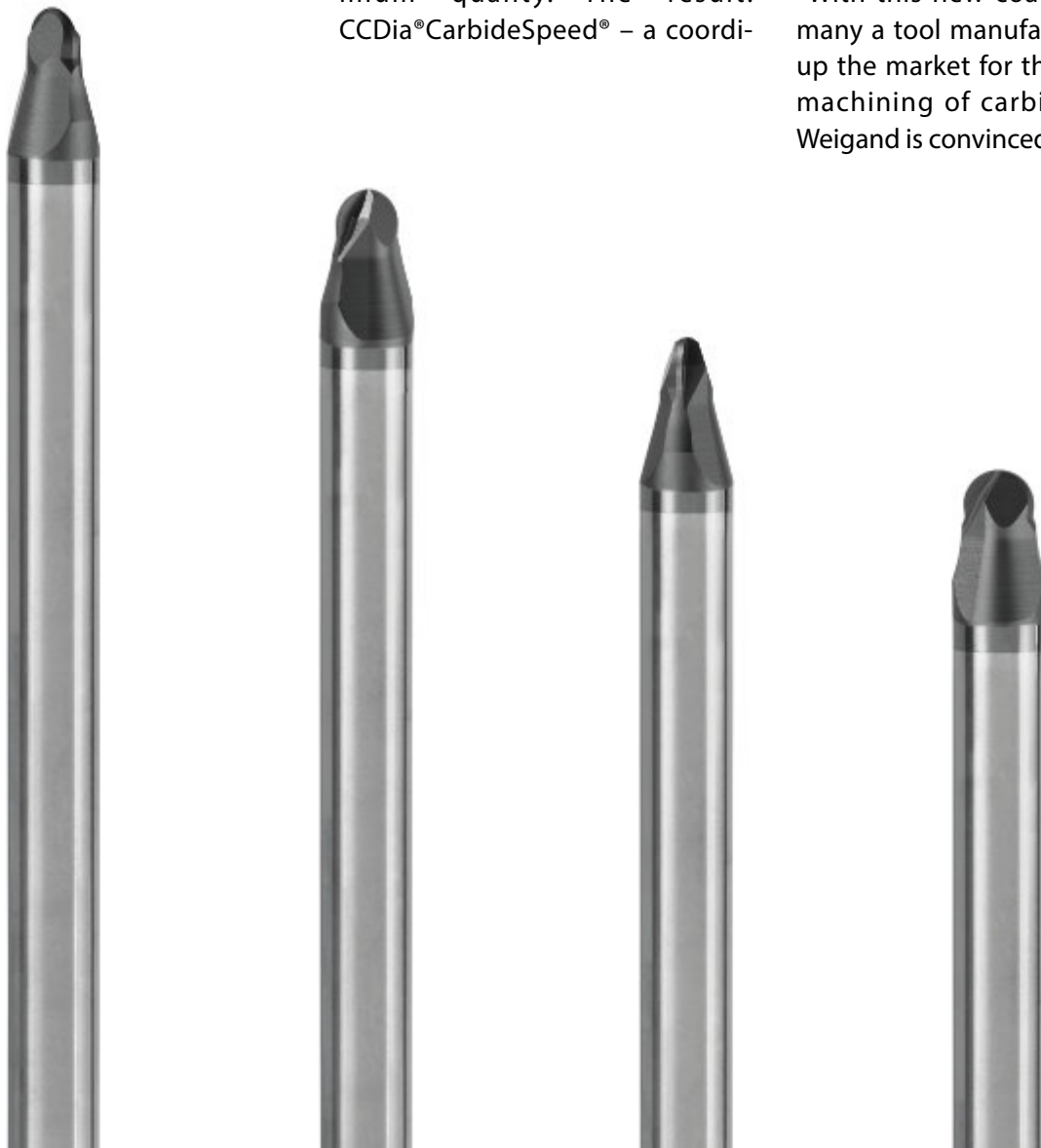
CCDia®CarbideSpeed® –
THE SOLUTION FROM
THE MARKET LEADER

The above-mentioned challenges did not leave CemeCon in peace. As the market and technology leader, the company always has the claim to present coating solutions in premium quality. The result: CCDia®CarbideSpeed® – a coordi-

nated solution for carbide machining. The diamond coating material combines maximum adhesion with a microhardness of 10,000 HV_{0.05} for maximum wear resistance.

Already in the first pilot projects during the development phase, it has been shown that precision tools with a CCDia®CarbideSpeed® coating achieve at least the same, usually even better performance in terms of productivity and economy than existing solutions. This shows the great potential of the new coating material – not to mention a significantly improved workpiece surface quality. Series production has now begun.

“With this new coating material, many a tool manufacturer will stir up the market for the economical machining of carbide,” Manfred Weigand is convinced.



ONLINE LIVE BATCHES HIGHLY POPULAR

How to coat cutting tools? It is best to have a look at it! For this purpose, CemeCon offers live batches in which interested people can see how a batch of tools passes through the coating process. With the pandemic, however, such exciting on-site appointments at CemeCon ended abruptly for the time being. But it is also possible to do this contactlessly as an online live batch. And the demand is great!

Camera? Check! Microphone? Check. We are live! Three CemeCon colleagues stand together in front of the webcam in the CemeCon production area with mouth-nose protection masks, as the current situation demands, and welcome the contact persons of an interested tool manufacturer at the other end of the World Wide Web. Christine Hammer, Cyrille Tsobgni and

Valentin Reimche are now already experienced with this form of presentation. They and other experts from CemeCon will show participants from all over the world live via the Internet what advantages CemeCon's premium technology offers and what is possible today in the coating of precision tools. Each session is a 1-to-1 dialogue with a customer and individ-

ually tailored to his tools. In a relaxed atmosphere, all questions from the tool experts are answered in a concentrated manner.

WITH SPATIAL DISTANCE
AND YET VERY PERSONAL

“Even though we are on the Internet, an online live batch is a very individual experience. The partici-



Christoph Schiffers, Dietmar Heldt and Markus Rauber (from left) also expertly demonstrate the advantages of the HiPIMS technology during the online live batch.



Open and honest dialog with a customer – Christine Hammer, Cyrille Tsobgni and Valentin Reimche (from right) show live what is possible with CemeCon technology.

pants appreciate the intimacy provided and very quickly ask the questions that are most important to them. This creates a real working atmosphere,” reports Christine Hammer, who moderates the dialogue.

Her two colleagues are currently preparing the next coating batch, explaining individual components and steps, and are pleased about the great interest shown. Cyrille Tsobgni thinks that the current situation due to the pandemic is not only unpleasant: “At the beginning I had to get used to looking at a webcam. Now I understand moderators and newsreaders much better and in the meantime it feels almost natural. We’re all making changes to our workflows and a lot of good things are coming out of it.”

Live batches from CemeCon have always inspired. Without tricks and false bottoms, everyone can experience how easy it is to handle the systems, how fast batch changes can be made and how flexibly premium results can be achieved for coatings from 1 µm to 12 µm with one and the same coating system.

Online live batches are an attractive offer now and in the future: Interested customers can experience coating live without the CO₂ footprint that a journey leaves behind. “On the other side of the line, there are certainly very different perspectives on in-house coating: On the one hand the production managers, who want to ensure that the integration of a coating system runs smoothly, operation is process-safe and, above all, runs at high cycle

rates. On the other hand, tool developers who want to transfer their product visions into layers and are looking for the ideal technology to do so. Most people are surprised when they see that such different requirements are served by one and the same system,” says Valentin Reimche, Customer Care at CemeCon, who has daily contact with customers from all over the world.

Whether on site or online – the answers to every question from the live batch participants follow promptly. Here, practice speaks for itself: Several 10,000 precision tools are “refined” every day in the world’s largest coating center at CemeCon.

FROM THE COORDINATED COATING TO OUR OWN COATING LINE

UNIQUE WEALTH OF EXPERIENCE ENSURES PREMIUM SERVICE

Personal consultation, coating app, order tracking, online live batch: CemeCon supports customers and interested parties in a wide variety of ways. The unique wealth of experience of the experts from Sales Support ensures the best possible individual support – regardless of whether it is a coordinated coating solution or a production-owned coating line. This is what makes a premium partner.

At CemeCon, tool manufacturers receive everything from a single source – from coating design and coating service to the coating system. In the world's largest coating center for cutting tools, the experts coat up to 80,000 precision tools daily with high-quality premium coatings on the premium systems developed and continuously opti-

mized in-house. This is unique worldwide and brings enormous advantages for customers.

“The fact that we here in Würselen combine the complete know-how in one place ensures a comprehensive and versatile wealth of experience from which the customers benefit. This enables us to work closely together across all departments. This leads to an optimum exchange of knowledge and ensures the best possible support for our customers in all matters relating to their premium solution – whether it is a coordinated coating or a turnkey coating line in the customer's own production,” says Dennis Miranda, Head of Sales Support at CemeCon.

WITH THE COATING APP
FOR COATING RECOMMENDATION

With the Coating App, CemeCon also offers tool manufacturers a very special service: “On our website at coating-app.cemecon.de they can get an initial orientation for their premium coating – and that with just three clicks. Depending on the tool, application and the material to be processed, they receive a recommendation for the right coating material. This already defines 50 percent of the premium coating,” explains Dennis Miranda. For the other 50 percent, the experts coordinate the variants, parameters and process steps in personal discussions to precisely meet the respective requirements.



In addition to our online possibilities, the sales support team with team leader Dennis Miranda is always personally available to you.

CONTACT AT SALES SUPPORT

TEAM OF EXPERTS COATING SERVICE:



+49 2405 4470 123 or coatingservice@cemecon.de

TEAM OF EXPERTS COATING TECHNOLOGY:



+49 2405 4470 122 or coatingtechnology@cemecon.de

The sales support team advises and supports customers and interested parties on all questions by telephone, e-mail, video conference and hopefully soon again personally.

EXPERIENCE COATING TECHNOLOGY LIVE

You not only want support in the design of a coordinated coating solution for your precision tools, but are also interested in your own coating production with CemeCon technology? In addition to individual consultation by the Sales Support Team, CemeCon offers tool

manufacturers and other interested parties online live batches to allow them to experience the coating technology and its advantages. Each of the free and non-binding online events is individual and can thus be tailored precisely to the needs of the respective customer (further information on pages 20/21).

In the Coating Technology area, the team also works closely with the colleague from Customer Care. This enables technology customers to be supported around the clock. The experts from the Customer Care team are available to customers 24

hours a day, seven days a week via hotline and online service (see article in FACTS 50).

By the way: Anyone who would like information on the status of their coating order around the clock can view the status of the order with order tracking and their personal access data on the CemeCon website. "In this way we want to give our customers more flexibility. They can find out at any time when their tools are ready for shipment," adds Dennis Miranda. You do not have access yet? Your contact at Sales Support will be happy to help you!

“Technological **CHANGE** and modern **MATERIALS** pose new **CHALLENGES** to hoppers again and again – at the same time they offer unique opportunities. As a **TOOL MANUFACTURER**, our **INNOVATIVE STRENGTH** is the **KEY COMPETENCE** of our time. Increasingly, we are slipping into the role of a holistic **PROCESS OPTIMIZER**. In close cooperation with **COATING EXPERTS** and **END USERS**, we bundle our extensive **KNOW-HOW** and jointly develop application-specific **PRECISION TOOLS** – including **COATING SOLUTIONS.**”



Stefan Zecha,
Chairman of VDMA Trade Association Precision Tools
and Managing Partner of the
ZECHA Hartmetall-Werkzeugfabrikation GmbH

WOULD YOU LIKE TO LEARN MORE ABOUT OUR COATING TECHNOLOGY?

All contact information for our Coating Service and Coating Technology experts around the globe can be found at www.cemecon.de/en/contact

We're only a click away!

READER SERVICE

Your address has changed? Would you also like to receive the FACTS regularly? Please send your company, name and address by e-mail to: marketing@cemecon.de