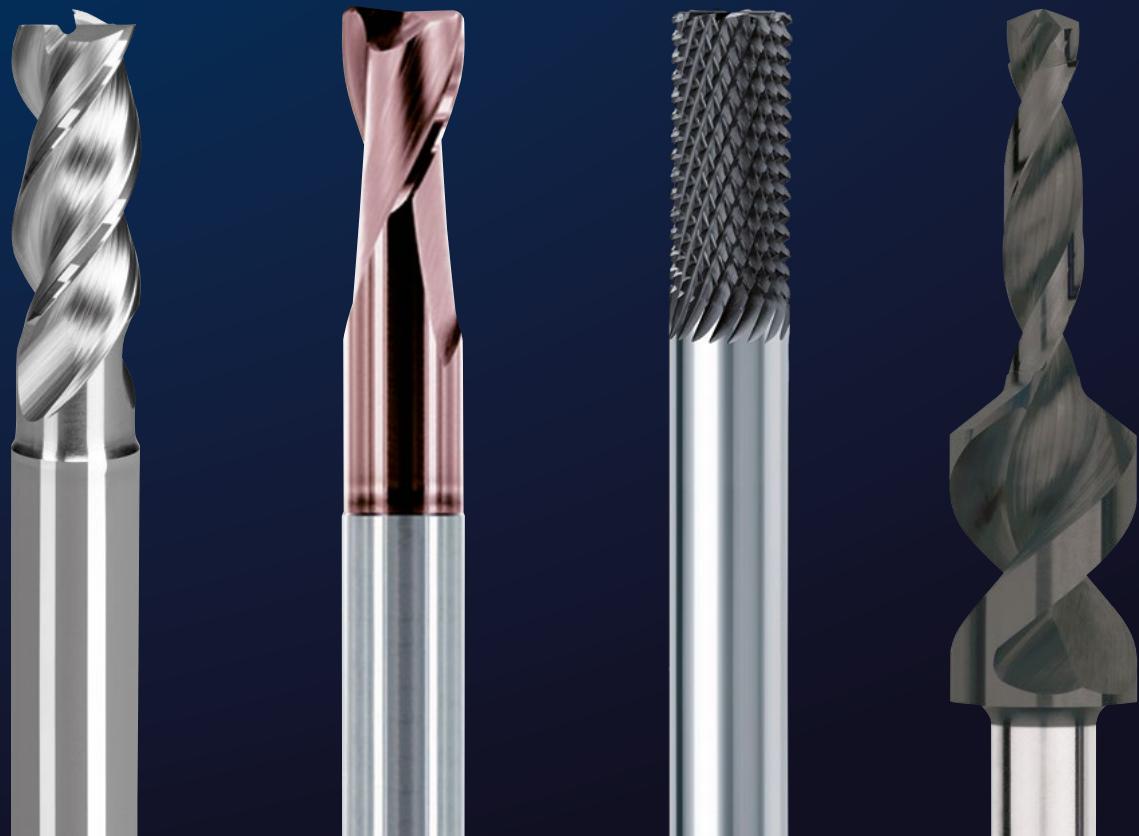


# Premium Coatings

for your Precision Tools



# Electromobility, Communication, Medical Technology

## Develop your Business in these Markets with CemeCon Coating Technologies.

Machinists demand application-specific solutions for high productivity and first-class results in these markets.

With our HiPIMS and diamond coating technologies, we offer you the leading technologies on the market and the largest selection of premium coating materials. We will put you in the best position to lead your competitors in these new markets.



### 50 % of a perfect coating

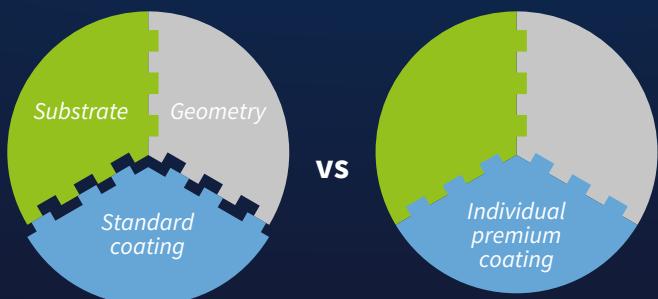
... is the choice of the right coating material. With CemeCon Engineering, we tailor the other 50 % to premium coating!



50 % – COATING MATERIAL  
50 % – Engineering  
100 % – Premium coating

High-performance coating materials are the precondition for first-class coatings.

Your precision tool with its individual form, function and objectives is our focus. During the development phase of your tool, our coating experts work together with you, because a successful precision tool is the result of an optimal substrate, elaborated geometry and the best individual premium coating.



# Unrivaled Products through CemeCon Engineering

## We fit your Individual Coating perfectly to your Precision Tool.

35 years of coating know-how enable us to produce perfect products from outstanding cutting tools. We open up completely new levels of performance in machining and thus also particularly attractive sales markets.

Your individual premium coating in 2 steps:

**1. selection of the suitable coating process and assembly of the appropriate coating material specification** for your precision tool. Adapted to the machining task, specified application parameters and other technical and commercial objectives for your precision tool, we will compose your premium coating from a wide range of options. This includes, for example, the pre- and post-treatment, the coating thickness, final dimension with measurement report, tolerances, colors, packaging, delivery time and much more.

**2. you supply us with your test tools – we coat them with the best coating materials in the world.** You then test

the quality of the tool in real-world applications. In close collaboration, we work together to achieve the desired performance goals of your precision tool.

We are technology developers, equipment manufacturers, and coaters in one.

In the world's largest coating center, we coat up to 80,000 precision tools every day.

We use this wealth of experience to ensure that each tool is treated the optimal way. Strictly separated batches, individual production processes, and precise documentation ensure that your recipe for success is guaranteed at all times and all over the world with equally perfect results.

Our coating experts are just a click away:  
[coatingservice@cemecon.de](mailto:coatingservice@cemecon.de)



# The Right Coating



# for Round Tools



# The Right Coating



# for Cutting Inserts

Reaming		CCDia®CarbonSpeed®	CCDia®FiberSpeed®	CCDia®MultiSpeed	AluCon®	FerroCon®	InoxaCon®	SteelCon®
Steel						●		
Stainless steel						●	●	●
Cast Iron						●		
Aluminum				●				
Graphite/Green Compact								
Ceramics								
Titanium							●	
Hard Materials (> 50 HRC)						●		●
CFRP/GFRP								

Threading		CCDia®CarbonSpeed®	CCDia®FiberSpeed®	CCDia®MultiSpeed	AluCon®	FerroCon®	InoxaCon®	SteelCon®
Steel						●		
Stainless steel						●	●	●
Cast Iron						●		
Aluminum				●				
Graphite/Green Compact								
Ceramics								
Titanium							●	●
Hard Materials (> 50 HRC)						●		●
CFRP/GFRP								

Gear Cutting		CCDia®CarbonSpeed®	CCDia®FiberSpeed®	CCDia®MultiSpeed	AluCon®	FerroCon®	InoxaCon®	SteelCon®
Steel						●		
Stainless steel								
Cast Iron								
Aluminum								
Graphite/Green Compact								
Ceramics								
Titanium								
Hard Materials (> 50 HRC)								
CFRP/GFRP								

# Characteristics of the Coating Materials

	Coating material	Layer thickness ≈ $\mu\text{m}$	Composition	Color				
Diamant	CCDia®AeroSpeed®Thin	3	C					
	CCDia®AeroSpeed®	9	C					
	CCDia®AeroSpeed®Plus	14	C					
	CCDia®AeroSpeed®Extra	17	C					
	CCDia®CarbideSpeed®		C					
	CCDia®CarbonSpeed®	7	C					
	CCDia®CarbonSpeed®Plus	9	C					
	CCDia®CarbonSpeed®Extra	12	C					
	CCDia®FiberSpeed®	9	C					
	CCDia®MultiSpeedThin	3	C					
	CCDia®MultiSpeed	14	C					
	CCDia®MultiSpeedPlus	17	C					
HiPIMS	AluCon®	2	TiB <sub>2</sub> -based					
	FerroCon®Thin	1.5	AlTiN-based					
	FerroCon®	3	AlTiN-based					
	FerroCon®Plus	4.5	AlTiN-based					
	FerroCon®Plus	6	AlTiN-based					
	FerroCon®Quadro	12	AlTiN-based					
	InoxaCon®Thin	1.5	TiAlSiN-based					
	InoxaCon®	3	TiAlSiN-based					
	InoxaCon®Plus	6	TiAlSiN-based					
	MultiCon®	3	AlCrN-based					
	SteelCon®Thin	1.5	TiAlN/TiSiN-based					
	SteelCon®	3	TiAlN/TiSiN-based					
	TapCon®Gold	3	AlTiN-TiN-based					

\* On request in USA and Japan

# Diamond – the Hardest Material in the World

## Cutting of Graphite, CFRP, GFRP, Composites, Abrasive Non-ferrous Metals and Ceramics with Patented Multilayers.

The patented CemeCon multilayer structure ensures maximum stability of the individual layers within the coatings. Due to their extremely high hardness – with up to 10,000 HV<sub>0.05</sub> close to natural diamonds – all coatings of the product group CCDia® are extremely wear-resistant. The performance of shank tools and cutting inserts made of solid carbide is increased significantly with a CCDia®-coating. The high thermal conductivity of the diamond coating ensures rapid heat dissipation. This is important when

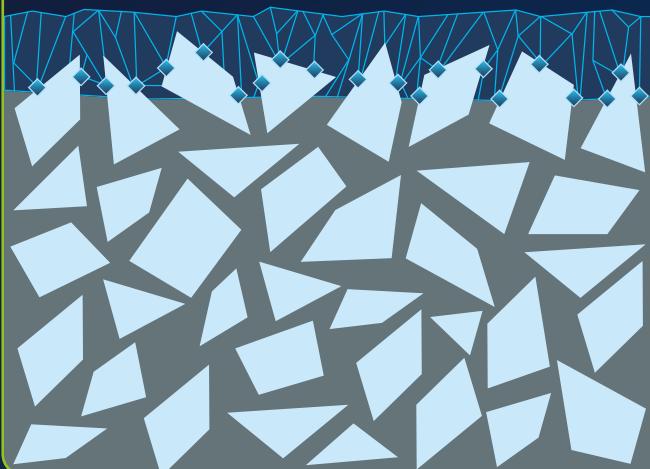
processing temperature sensitive materials like CFRP and GFRP and enable a higher machining speed during manufacturing.

All these properties make the coating materials of the CCDia®-series the first choice for machining of graphite, composites, non-ferrous metals, green parts, and ceramics according to VDI standard 3323.



# The Advantages of our Diamond Coatings at a Glance

## Excellent adhesion and very smooth surfaces

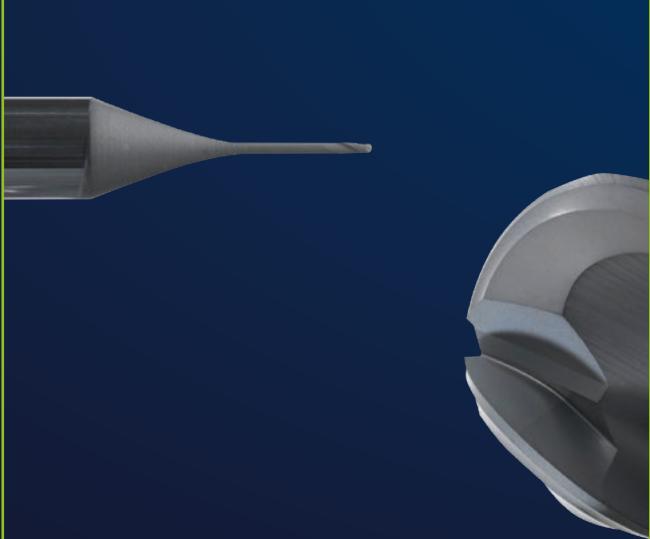


### Coating

Cobalt ■ Tungsten carbide ▲ Diamond ▴

The patented CCDia®-multilayer-diamond-coatings have excellent adhesion because they are adapted to the carbide, geometry, and application. At the same time, they form very smooth surfaces.

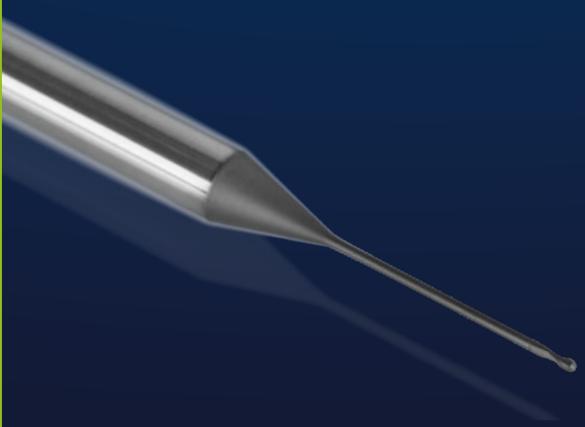
## Wide range of coating thicknesses



From thin coatings to very thick diamond coatings, CCDia®-coatings are high-precision up to 20 µm coating thickness.

## Precision is a matter of course

You would like to have your tools coated to a specific final diameter including a measurement report? Thanks to our hot filament process, complex three-dimensional tools receive a particularly homogeneous coating thickness distribution with narrow tolerances. We attach great value on precision.



# The Diamond Coatings from the CC Dia®-series clearly stand out from other Solutions.

## Special material requirements – Best machining results

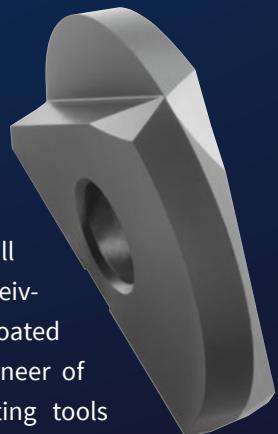


IDI Precision Machinery Ltd.

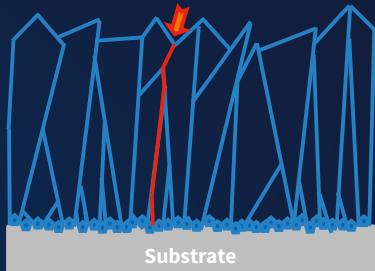
Due to their extreme hardness close to natural diamond, combined with high thermal conductivity, diamond-coated tools achieve long tool life and best machining results in high-tech materials.

## World market leader for 25 years in diamond coating

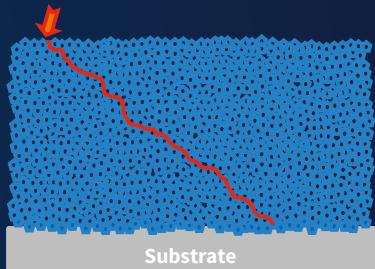
The machining of demanding materials in dental and medical fields or the production of cell phone molds are not conceivable without diamond-coated tools. CemeCon is the pioneer of diamond coating for cutting tools and has offered its customers the advantages of this technology for more than 25 years.



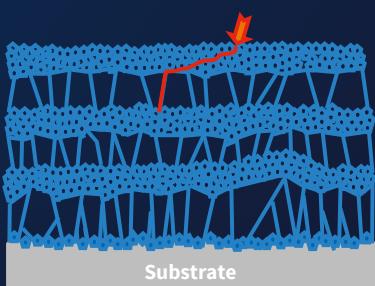
## High process reliability



Micro-Crystalline Diamond Coating



Nano-Crystalline Diamond Coating



CemeCon Multilayer Diamond Coating CC Dia®

The crack-stopping properties of CC Dia®-coatings ensure high process reliability in the machining process.

## Open for carbides

Approximately 100 carbide grades, including grades with a higher cobalt content of up to 10 %, are ideally suited for coating with CC Dia®-coating materials.

# CCDia®AeroSpeed®

## for CFRP, GFRP, Composites

The Premium Diamond Coating CCDia®AeroSpeed® was developed in order to achieve the highest surface qualities with the machining of fiber materials. The excellent adhesion combined with the unique smoothness guarantee productive drilling and milling of CFK, GFK and composites. Additionally, the very sharp cutting edge enables a better separation of the fibers. CCDia®AeroSpeed® is also suitable for solid carbide grades with increased cobalt content. The increased toughness of these grades in combination with a diamond coating enables process-safe drilling in aircraft construction.



### TECHNICAL DATA

Coating technology:  
**Diamond**

Microhardness:  
**10,000 HV<sub>0.05</sub>**

Composition of the coating material:  
**Multilayer, sp<sup>3</sup>**

Color:  
**Grey-shiny**

Max. operating temperature:  
**650 °C**

Available coating thicknesses:

≈ 3 µm (Thin)	•	•
≈ 9 µm	•	•
≈ 14 µm (Plus)	•	•
≈ 17 µm (Extra)	•	•

### APPLICATION EXAMPLE: PERFECT SURFACE QUALITY THROUGHOUT THE ENTIRE TOOL LIFE

Material:  
**CFRP, IMA-M21E**

Tool:  
**Carbide  
countersink-drill**

$d = 5.6 \text{ mm}$

$d_{\text{countersink}} = 12.5 \text{ mm}$

$f = 0.05 \text{ mm}$

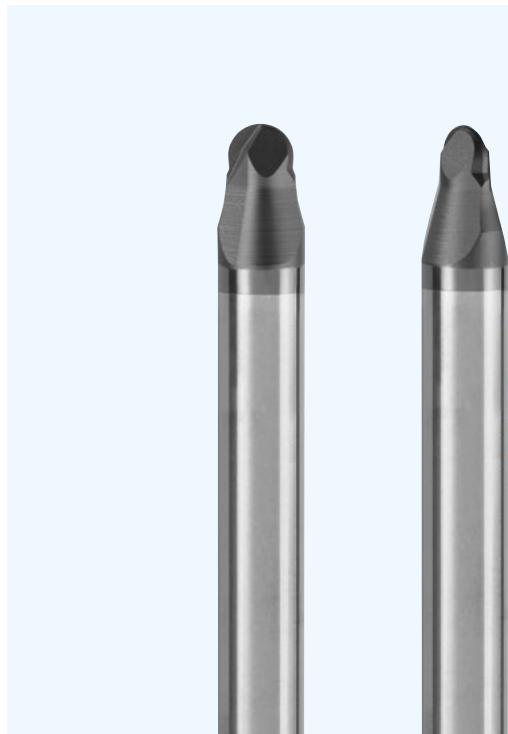
$n = 6,000 \text{ min}^{-1}$



# CCDia®CarbideSpeed®

## Milling Sintered Carbide instead of Eroding

Milling hard metals instead of eroding them or grinding has enormous advantages: shorter cycle times, better surface quality, more environmentally friendly machining, no corrosion, and the production of more complex contours. With the newly developed CC Dia®CarbideSpeed®, we offer tool manufacturers a precisely matched diamond coating material which creates ideal conditions even for the hardest operating conditions.



### TECHNICAL DATA

Coating technology:  
**Diamond**

Microhardness:  
**10,000 HV<sub>0.05</sub>**

Composition of the coating material:  
**Multilayer, sp<sup>3</sup>**

Color:  
**Grey-shiny**

Max. operating temperature:  
**650 °C**

### APPLICATION EXAMPLE: A MILESTONE FOR TOOL AND MOLD MAKERS

Material:  
**Sintered Carbide, 20 % Co**

Tool:  
**Coated ball nose end mill**

$n = 30,000 \text{ min}^{-1}$

$v_f = 350 \text{ mm/min}$

$a_p = 0.15 \text{ mm}$

$a_e = 0.08 \text{ mm}$

$Q = 0.0042 \text{ cm}^3/\text{min}$

**454**

CC Dia®CarbideSpeed®

Tool life (mm<sup>3</sup>)

450

300

150

**0**

uncoated/  
PVD coated  
(machining operation  
not possible)

# CCDia®CarbonSpeed®

## for Graphite and Green Materials

Ultra-hard against abrasion wear: CCDia®CarbonSpeed® is the coating solution when economical machining of graphite and green materials is required. Coatable on more than 100 carbides, its unique fine crystalline and smooth multi-layer structure provides process reliability and best the workpiece surfaces.



### TECHNICAL DATA

Coating technology:  
**Diamond**

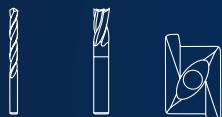
Microhardness:  
**10,000 HV<sub>0.05</sub>**

Composition of the coating material:  
**Multilayer, sp<sup>3</sup>**

Color:  
**Grey**

Max. operating temperature:  
**650 °C**

Available coating thicknesses:



≈ 7 µm	•	•	•
≈ 9 µm (Plus)	•	•	-
≈ 12 µm (Extra)	•	•	-

### APPLICATION EXAMPLE: COST-EFFECTIVENESS COMBINED WITH A HIGHLY RELIABLE PROCESS

Material:  
**EDM graphite ISO-63**

Tool:  
**Endmill**

$v_c = 600$  m/min  
 $f_z = 0.06$  mm/tooth

Tool life  
(m)

**400**

CCDia®CarbonSpeed®  
7 µm

500

400

300

200

100

0

**20**

uncoated

# CCDia®FiberSpeed® and CCDia®MultiSpeed for CFRP/GFRP/Ceramics

Layer thicknesses of 3 to 17  $\mu\text{m}$  make CCDia®FiberSpeed® and CCDia®MultiSpeed universal and economical solutions for drilling and milling of fiber composites and ceramics. The very good adhesion gives highly reliable processes and different coating thicknesses give sharp cutting edges or maximum wear volume.



## TECHNICAL DATA

Coating technology:  
**Diamond**

Microhardness:  
**10,000 HV<sub>0.05</sub>**

Composition of the coating material:  
**Multilayer, sp<sup>3</sup>**

Color:  
**Grey**

Max. operating temperature:  
**650 °C**

Available coating thicknesses:

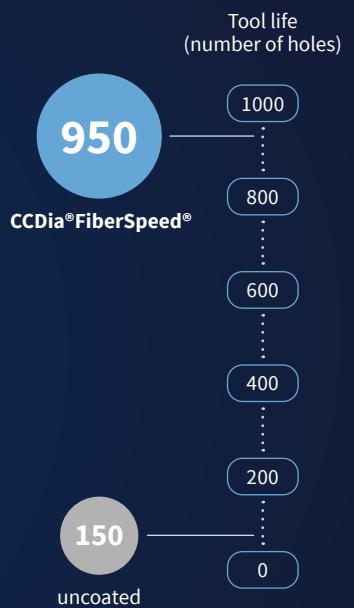


$\approx 3 \mu\text{m}^{**}$ (Thin)	•	•	-	-
$\approx 9 \mu\text{m}^*$	•	•	•	•
$\approx 14 \mu\text{m}^{**}$	•	•	•	-
$\approx 17 \mu\text{m}^{**}$ (Plus)	•	•	-	-

## APPLICATION EXAMPLE: HIGH WEAR VOLUME FOR MAXIMUM PERFORMANCE

Material:  
**CFRP, M21E**

Tool:  
**Solid carbide drill,  
ø 5.6 mm**  
 $f_z = 0.06 \text{ mm/tooth}$   
 $n = 6,500 \text{ min}^{-1}$



\*CCDia®FiberSpeed®, \*\*CCDia®MultiSpeed

## Application examples

## Material to be machined

## Diamond coatings



IDI Precision Machinery Ltd.

Crowns, inlays and  
bridges in the  
dental technology

Zirconium oxide

CCDia®CarbonSpeed®



Structural components  
for aircraft



Back implants

Fiber reinforced  
plastics  
(CFRP/GFRP)

CCDia®AeroSpeed®  
CCDia®FiberSpeed®  
CCDia®MultiSpeed



Sporting goods  
such as bicycle rims



Lightweight construction  
components for e-mobility



Graphite electrodes  
for the mold production  
of displays

Graphite

CCDia®CarbonSpeed®



Stamps  
and dies  
for forming

Carbide

CCDia®CarbideSpeed®



Lightweight components in  
automotive engineering

Hypereutectic  
aluminum

CCDia®FiberSpeed®  
CCDia®MultiSpeed



*As the market leader, we offer future-proof diamond coatings  
to meet the challenges of the aerospace,  
3-C (Computer, Communication and Consumer Electronics)  
industry and medical and dental technology.*

# HiPIMS Provides Maximum Flexibility. The Largest Range of Coating Materials and Substrates is Possible.

HiPIMS (High Power Impulse Magnetron Sputtering) combines the advantages of all coating technologies used for cutting tools. Smoothness without any droplets, high hardness, compact layer structures, and scratch loads over 130 Newton make the difference. Tools coated in this way offer excellent protection against wear in extremely hard, especially tough and oxidation-resistant materials such as stainless steel, titanium or nickel-based alloys. Of course, HiPIMS coatings also show their full performance in unalloyed, alloyed and high-speed steels. High metal ionization close to 100 % ensures the best coating adhesion, even in materials that particularly difficult to machining such as cold welds.

## Advantages of HiPIMS

Flexibility  
Coating thickness  
Smoothness

Advantages  
Sputtering

Advantages  
ARC

Adhesion  
Hardness/Toughness  
Shift rate

Layer distribution

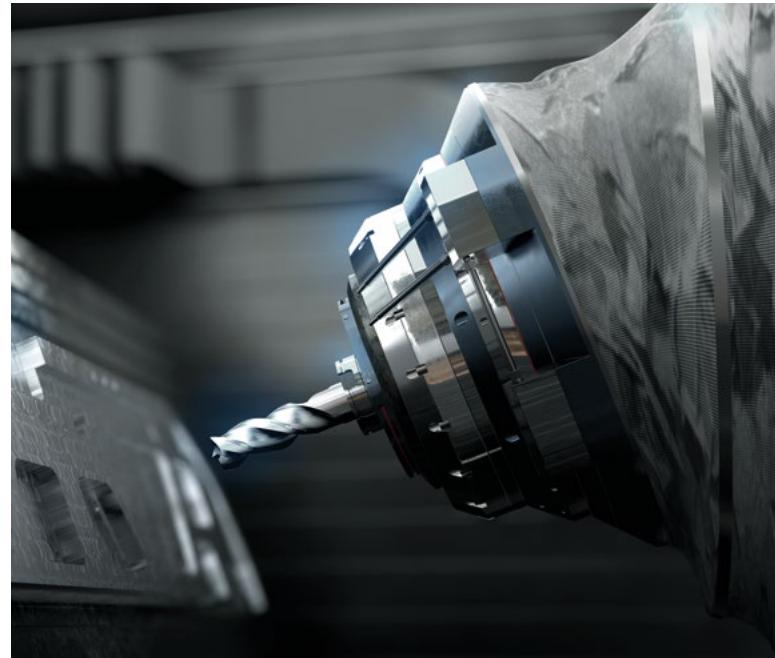
Learn more  
about our  
premium coating  
materials

[coatings.cemecon.com](http://coatings.cemecon.com)



## for Aluminum, Titanium and Non-ferrous Metals

The coating material AluCon® is a TiB<sub>2</sub>-based HiPIMS coating material. It forms a unique combination of nanocrystalline, extremely dense and at the same time smooth coating material with maximum coating adhesion. It effectively prevents built-up edges and has a hardness of up to 5,000 HV<sub>0.05</sub>. The guarantor for optimum machining results in non-ferrous metals, even at high operating temperatures.



### TECHNICAL DATA

Coating technology:  
**HiPIMS**

Composition of the coating material:  
**TiB<sub>2</sub>-based**

Color:  
**Silver**

Max. operating temperature:  
**1,100 °C**

Available coating thickness:



≈ 2 µm

### APPLICATION EXAMPLE: AGAINST BUILT-UP EDGES WITH MAXIMUM COATING ADHESION

Material: **TiAl6V4**

Tool:  
**Inserts with x-geometry**

$v_c = 100 \text{ m/min}$

$f_z = 0.6 \text{ mm}$

$a_e = 15.28 \text{ mm}$

$a_p = 0.8 \text{ mm}$

$v_b = 0.34 \text{ mm}$

Cooling: **Oil**

**14.48**

AluCon®

Tool life  
(m)

15

14

13

12

11

10

**11**

Coating of  
Competitor:  
TiAlSiN

# The Advantages of our HiPIMS Coatings at a Glance

## HiPIMS Coatings are the Future of PVD Technology.

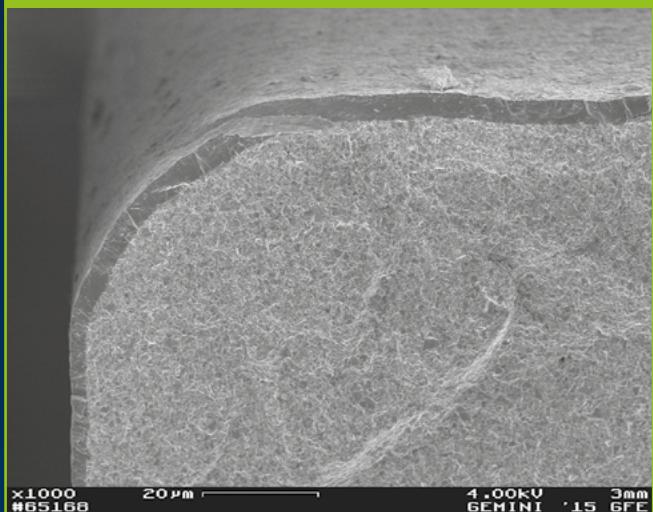
### Perfect for heavy-duty machining

HiPIMS coatings from CemeCon, such as FerroCon®Quadro, are available in a coating thickness of up to 12 µm. Only our HiPIMS can do this!

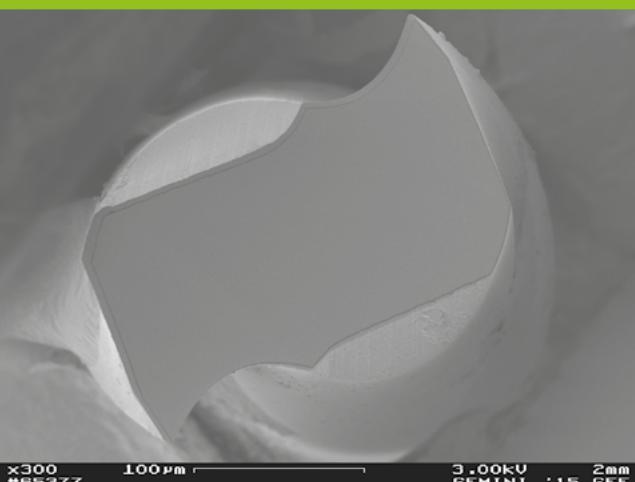
**12 µm**

FerroCon®Quadro

### Homogeneous coating of the cutting edges



### Perfect for micro tools



Defect free and without antenna effects. HiPIMS is perfect for very small geometries since there are no disturbing droplets and it does not produce damaged or rounded cutting edges.

The high level of ionization produces a denser structure and compact coatings which are at the same time very hard and tough. Using the HiPIMS technology, deposited coatings grow extremely homogeneously. Even very complex tool geometries are coated homogeneously around the cutting edge.

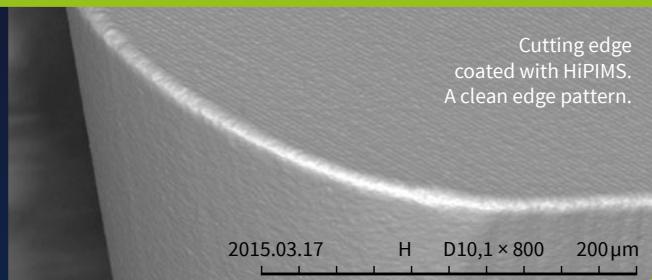
### Protection against thermal overload

HiPIMS coatings have a coating structure with higher density and thereby have more favorable thermo-physical properties in machining. The heat is mainly removed by the chip which protects the substrates from thermal overload.

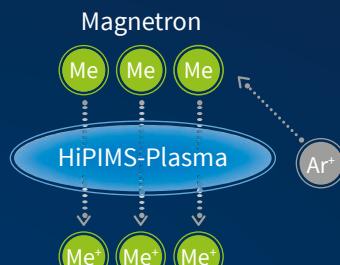
## Very good residual stress management

HiPIMS reduces the residual stress in the coating radically. This enables a high range of coating thickness. In contrast, ARC coatings have to deal with high compressive stress and CVD coatings with tensile stress.

## CemeCon Sputtering

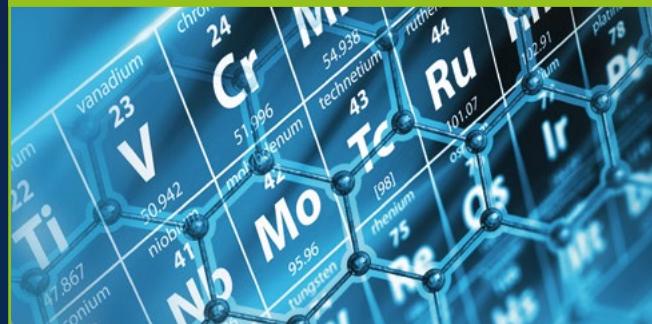


## Very dense and fine crystalline coating structures



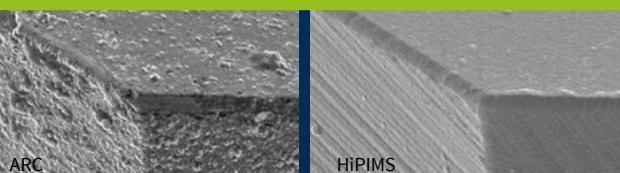
The power peaks of the HiPIMS process form a high-energy plasma, which ionizes deposited materials in a so far unmatched degree. The high flow of highly ionized particles forms very dense and fine crystalline coating structures.

## Maximum flexibility in material selection



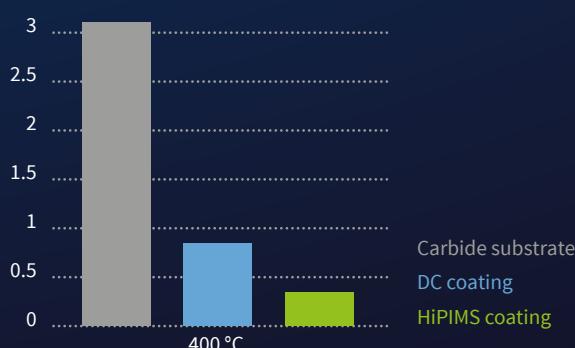
HiPIMS is a sputtering process and nearly every material can be sputtered. This means an unlimited material variety due to the combination possibilities of the elements of the periodic table for the production of coatings.

## Extremely smooth and droplet free

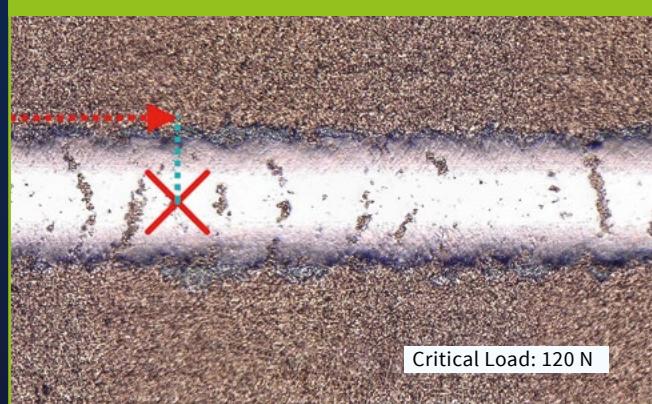


In contrast to droplets on the surface using other coating methods such as Arc, the surfaces are extremely smooth when using the HiPIMS process.

## Thermal conductivity of coatings



## Highest adhesion

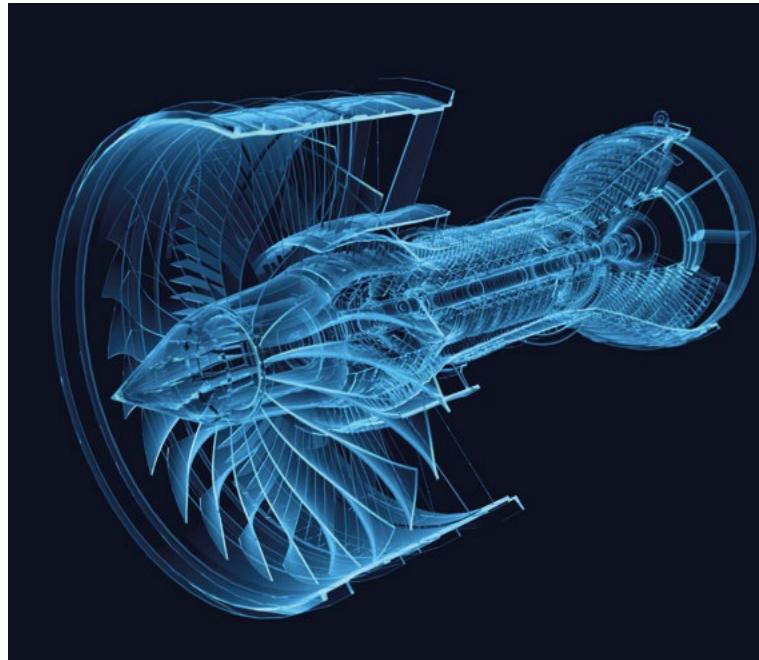


The high level of metal ionization ensures best adhesion. A scratch load of 120 Newtons for the Si-doped – and therefore very hard – InoxaCon®-coating is extraordinary. The AlTiN-based product FerroCon® achieved up to 130 Newtons. This enables the machining of the most difficult materials.

# FerroCon®

## For Unalloyed, Alloyed and High-speed Steel (Ferrous Materials)

The premium HiPIMS coating for high-performance applications in unalloyed, alloyed and high-speed steel. Optimum adhesion, smoothest surfaces, high hardness values and toughness for your tool. Pure performance.



### TECHNICAL DATA

Coating technology:  
**HiPIMS**

Composition of the coating  
material:  
**AlTiN-based**

Color:  
**Anthracite**

Max. operating temperature:  
**1,100 °C**

Available coating thicknesses:



≈ 1.5 µm (Thin)	•	•	-
≈ 3 µm	•	•	•*
≈ 4.5 µm (Plus)	•	-	-
≈ 6 µm (Plus)	-	-	•*
≈ 12 µm	-	-	•

### APPLICATION EXAMPLE: PERFORMANCE THANKS TO HiPIMS

Material: **1.2315**

Tool with  
**WSP SNMX12**

Machining operation:  
**milling**

$v_c = 180 \text{ m/min}$

$f_z = 0.2 \text{ mm}$

$a_p = 2 \text{ mm}$

**1700**

FerroCon®

Cutting volume  
[ $\text{cm}^3$ ]

**1700**

1600

1500

1400

1300

1200

**1200**

Competitor

\* Also available with a golden top coating

# FerroCon®Quadro

## for Highest Wear Volume

With FerroCon®Quadro, up to 12 µm can be realized with strong adhesion! For the processing of cast iron and steel this gives completely new possibilities. Everywhere where thick chips fall, such as for heavy machining and turning certain materials, protective coatings are vital for the tool and ensure high productivity. Very smooth and adhesive coatings are deposited using PVD coating processes. However, many applications require thicker layers, which so far have been produced exclusively by CVD. Suitable for indexable inserts with min. 40 µm edge honing.



Source: voestalpine

### TECHNICAL DATA

Coating technology:  
**HiPIMS**

Composition of the coating material:  
**AlTiN-based**

Color:  
**Anthracite**

Max. operating temperature:  
**1,100 °C**

Available coating thickness:



≈ 12 µm

### APPLICATION EXAMPLE: EXTRA HIGH WEAR VOLUME FOR ROUGHING OPERATIONS IN STEEL AND CAST IRON

Material: **1.0503 (C45), 32 HRC**

Tool: **mill with cutting inserts**

$v_c = 220$  m/min

$a_p = 0.5$  mm

**Without cooling**

**FerroCon®Quadro**

**180**

Tool life (min)

200

160

**120**

**95**

**65**

Competitor  
1, 2, 3

120

80

40

0

# InoxaCon®

## for Machining Stainless Steel, Titanium and Medium-hard Steels

Developed for machining of hardened and high alloyed steel as well as titanium. Its very high thermal stability makes the silicon-doped material InoxaCon® the first choice for your high-end tools.



### TECHNICAL DATA

Coating technology:

**HiPIMS**

Composition of the coating material:

**TiAlSiN-based**

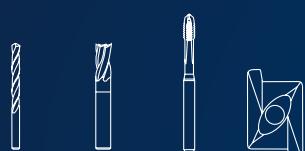
Color:

**Red gold**

Max. operating temperature:

**1,100 °C**

Available coating thicknesses:



≈ 1.5 μm (Thin)	•	•	-	-
≈ 3 μm	•	•	•	•
≈ 6 μm (Plus)	-	-	-	•

### APPLICATION EXAMPLE: HEAT RESISTANT AND REDUCED REWELDING

Material: **1.4301**

Tool:

**Solid carbide mill,  
Ø 8 mm**

$v_c = 80 \text{ m/min}$

$f_z = 0.035 \text{ mm/tooth}$

$a_e = 5 \text{ mm}$

$a_p = 3 \text{ mm}$

$z = 4$

Max. wear  
( $\mu\text{m}$ )

0

20

40

60

80

100

**26**

InoxaCon®

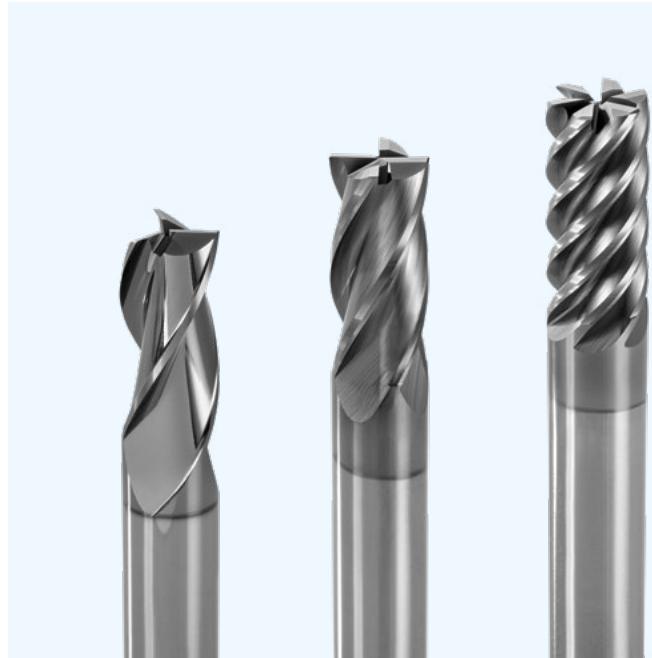
**97**

AlCrN

# MultiCon®

## for wet and dry machining of steel and cast iron

MultiCon® is the consistent and logical further development of conventional AlCrN coatings using HiPIMS technology. Excellent adhesion paired with a very smooth surface and optimised wear behaviour are the outstanding properties of MultiCon®. Suitable for use in both wet and dry machining, MultiCon® promises reproducible tool life at the highest level.



### TECHNICAL DATA

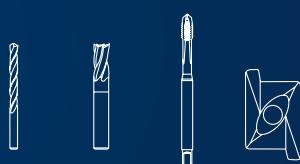
Coating technology:  
**HiPIMS**

Composition of the coating material:  
**AlCrN-based**

Color:  
**Dark grey**

Max. operating temperature:  
**1,100 °C**

Available coating thicknesses:



### APPLICATION EXAMPLE: UNIVERSAL FOR 30-50 HRC

Material: **Heat-treated steel 1,400 N/mm<sup>2</sup>**

Tool:  
**Solid carbide mill, Ø 8 mm**

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

$n = 6,460 \text{ min}^{-1}$

$f_z = 0.085 \text{ mm/tooth}$

$a_p = 0.028 \text{ mm}$

$a_e = 0.5 \text{ mm}$

Cooling: **Emulsion**

\* On request in  
USA and Japan

**128**

MultiCon®

[%]

140

130

120

110

**100**

AlCrN-based  
milling layer

100

90

# SteelCon®

## for the Machining of Hardened ( $\geq 50$ HRC) as well as Stainless Steels

SteelCon® is a HiPIMS coating material with a particularly high silicon content, and enables economical machining under the extreme conditions of hard machining with first-class surface quality.

SteelCon® is highly resistant to wear. Highest temperature resistance is combined with excellent adhesion. The very homogeneous wear behavior of SteelCon® ensures high process stability. In addition to the dense layer structure, the very high silicon doping also ensures high thermal stability. Since no droplets can form thanks to the HiPIMS process, SteelCon® is also extremely smooth. The heat is dissipated in the chip, process stability increases. Excellent surface finishes are produced, eliminating the need for time-consuming reworking of components.



### TECHNICAL DATA

Coating technology:

**HiPIMS**

Composition of the coating material:

**TiAlSiN-based**

Color:

**Red gold**

Max. operating temperature:

**1,100 °C**

Available coating thicknesses:



$\approx 1.5 \mu\text{m}$ (Thin)	•	•	-
$\approx 3 \mu\text{m}$	•	•	•

### APPLICATION EXAMPLE: DIE AND MOLD MAKING

Material:

**1.2379: 62 HRC**

Tool:

**Ball nose end mill,  
Ø 6 mm**

$v_c = 120 \text{ m/min}$

$n = 6,366 \text{ min}^{-1}$

$f = 0.13 \text{ mm}$

$a_p = 0.1 \text{ mm}$

$a_e = 0.1 \text{ mm}$

Cooling: **Air**

**120**

SteelCon®

[%]

120

115

110

105

AlTiN/TiSiN  
Special coating  
Hard machining

**100**

100

# TapCon® Gold

## Best Performance in Thread Production for Steels/Aluminum/Cast Iron

The golden HiPIMS coating material TapCon® Gold is the first choice when it comes to the perfect coating of HSS threading tools. TapCon® Gold offers optimal adhesion to HSS, optimized wear resistance, and an extremely smooth surface which is ideal for low torque.



### TECHNICAL DATA

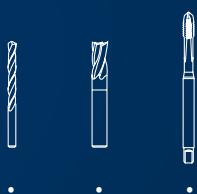
Coating technology:  
**HiPIMS**

Composition of the coating material:  
**AlTiN-TiN-based**

Color:  
**Gold**

Max. operating temperature:  
**900 °C**

Available coating thickness:



≈ 3 µm

### APPLICATION EXAMPLE: THE LAYER FOR THE PERFECT THREAD

Material:  
**Heat-treated steel**

Tool:  
**HSS Tap M8 x 1.25**

$v_c = 42 \text{ m/min}$

Torque  
[Nm]

2.5

2.75

3

3.25

3.5

**2.73**

TapCon® Gold

**3.37**

Competitor  
TiN

# Never before has the Decision for the Right Coating Technology been so easy!

HiPIMS (High Power Impulse Magnetron Sputtering) is sputtering with increased energy – with full control of the energy input – and combines the advantages of all current technologies. HiPIMS produces smooth, droplet-free, and low-stress coatings in an almost unlimited variety.

	ARC	CVD	HiPIMS
Surface			<b>Smooth</b>
Coating temperature	<b>500 °C</b>	<b>1,000 °C</b>	<b>500 °C</b>
Max. coating thickness	<b>4 µm</b>	<b>10 – 15 µm</b>	<b>12 µm</b>
Residual stresses of the coating	<b>High compressive stresses</b>	<b>Tension</b>	<b>Residual stress management for low compressive stresses</b>
Toughness of the coating	<b>High</b>	<b>Low</b>	<b>Very high</b>
Easy production	<b>Yes</b>	<b>No (Precursor)</b>	<b>Yes</b>
Flexibility	<b>Low</b>	<b>None</b>	<b>High (all materials, all substrates)</b>
Mini tools	<b>No</b>	<b>No</b>	<b>Yes</b>

