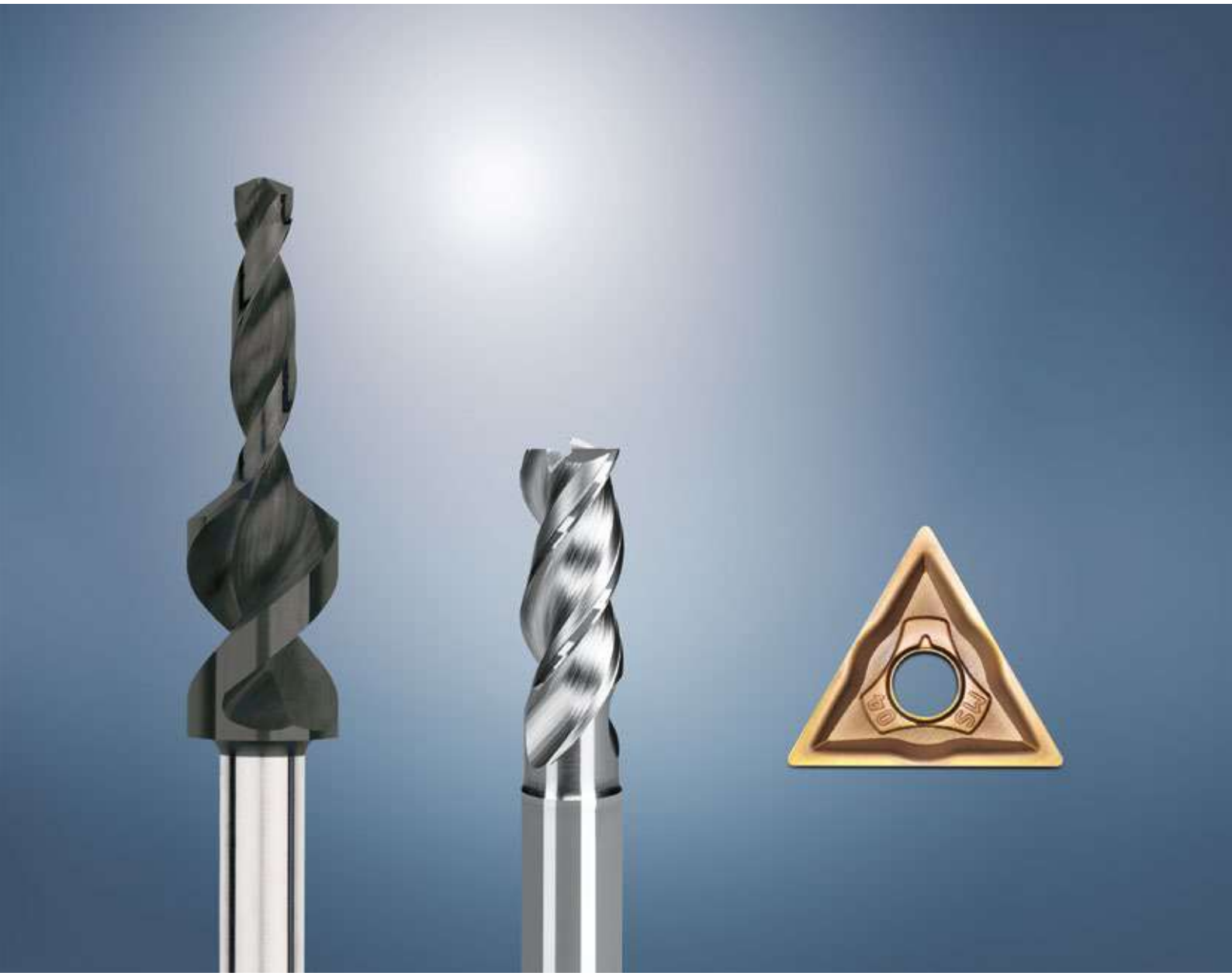
CemeCon
The Tool Coating



The Coatings

Diamond and PVD premium coatings for cutting tools

At a glance

We have developed the right technology, built the appropriate production plants and thereby made the best PVD and diamond coatings in the world a reality. In CemeCon's own job coating centre, which is one of the biggest in the world, ten thousand precision tools are coated for our customers every day. For 30 years, the experience and know-how gained here have been feedback into the ongoing development of our PVD and diamond coating machines. This also enables our customers to benefit in terms of productivity, ergonomics, processing quality and cost-effectiveness.

Board: Dr Oliver Lemmer and Dr Toni Leyendecker

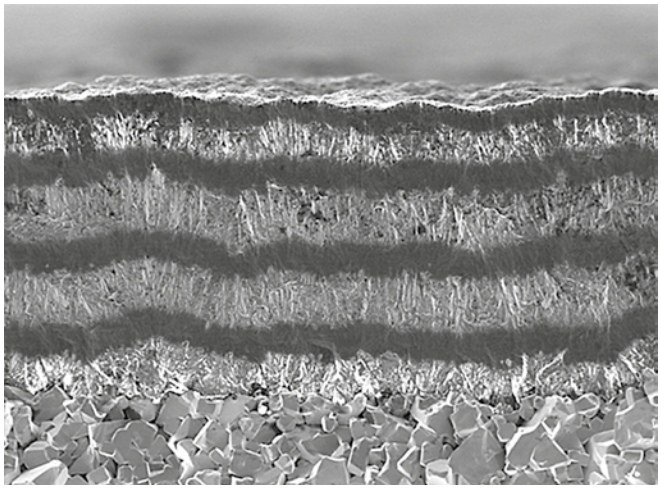
The Diamond-Coating-Technology

Patented multilayers for machining graphite, carbon-fiber and glass-fiber reinforced plastics and composites, abrasive non-ferrous metals and ceramics

Diamond, the hardest material in the world as a coating material for maximum protection against wear.
For many years, CemeCon has used the diamond technology to produce diamond coatings for cutting tools – real crystalline and nanocrystalline sp^3 diamonds with a Vickers hardness of about 10,000. More than 20 years ago, CemeCon developed the diamond hot filament process and is now the world leader in diamond coatings and technologies.

In the hot filament process, diamond is produced from gas. In an Hydrogen-Methane gas atmosphere, carbon is turned into pure diamond. Depending on the application, the diamond coating can be deposited as a microcrystalline, nanocrystalline or multi-layer coating. Fully automatic coating machines combined with pretreatment ideally adapted to the substrate enable diamond coatings to be produced with thicknesses of more than 20 µm with an outstanding adhesion.

CemeCon's patented multi-layer technology ensures maximum stability of the individual layers within the coatings. Any cracks that may occur cannot spread beyond the layer boundaries. Thanks to their extreme hardness – with up to 10,000 $HV_{0.05}$, close to that of natural diamond – all coatings in the CCDia® product group are extremely wear resistant. The performance of round tools and inserts made of solid carbide is significantly increased by applying a CCDia® coating. The diamond coating's high heat conductivity is responsible for a fast heat dissipation. This is tremendously important when processing temperature-sensitive materials such as carbon-fiber and glass-fiber reinforced plastics, and enables higher processing speeds to be used when machining. All of these properties make the CCDia® line the first choice for machining graphites, composites, non-ferrous metals, green parts and ceramics according to VDI standard 3323.



Smooth, highly adhesive and resistant thanks to multi-layer diamond coating

CCDia®
AeroSpeed®

for CFRP/GFRP/ composites

Technical data

Coating technology:
Diamond

Microhardness:
10,000 $HV_{0,05}$

Coating material:
Multilayer, sp^3

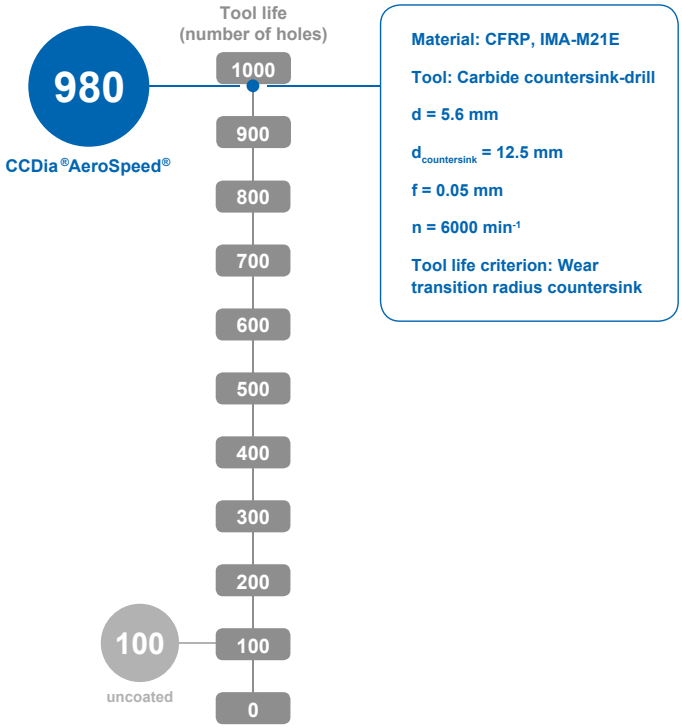
Color:
Grey-Shiny

Max. operating temperature:
650 °C

Available coating thicknesses:

≈ 3 µm	•	–
≈ 9 µm	•	•
≈ 14 µm	•	•

Perfect surface quality throughout the entire tool life



The CCDia®AeroSpeed® premium diamond coating was developed in order to obtain the best possible surface quality when machining fiber materials. The excellent adhesion coupled with the unique smoothness guarantee highly reliably drilling and milling of CFRP, GFRP and composites. In addition, the very sharp edges – CCDia®AeroSpeed® does not change the microgeometry of your precision tools – are able to cut the fibers more effectively. CCDia®AeroSpeed® is also ideally suited to carbide grades with higher cobalt content. The increased ductility of these carbide grades in connection with a diamond coating allow a reliable drilling process in aircraft manufacturing.

Scan QR code.
Receive further information.

CCDia®
CarbonSpeed

for graphites/ green compacts

Technical data

Coating technology:
Diamond

Microhardness:
10,000 $HV_{0,05}$

Coating material:
Multilayer, sp^3

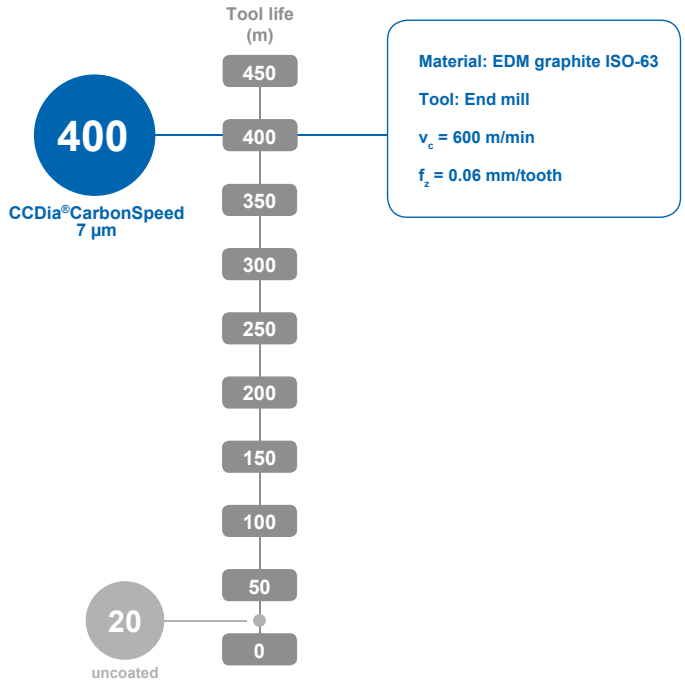
Color:
Grey

Max. operating temperature:
650 °C

Available coating thicknesses:

≈ 7 µm	•	•	•
≈ 9 µm	•	•	–

Cost-effectiveness combined with a highly reliable process



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Ultrahard protection against abrasive wear: CCDia®CarbonSpeed is the best coating solution when the cost-effective machining of graphites and green parts is the main aim. It can be applied to more than 80 carbides for fine crystalline smooth multilayer structures for highly reliable processes and the best workpiece surfaces.

CCDia®
FiberSpeed

CCDia®
MultiSpeed

for CFRP/GFRP/ceramics

Technical data

Coating technology:
Diamond

Microhardness:
10,000 $HV_{0,05}$

Coating material:
Multilayer, sp^3

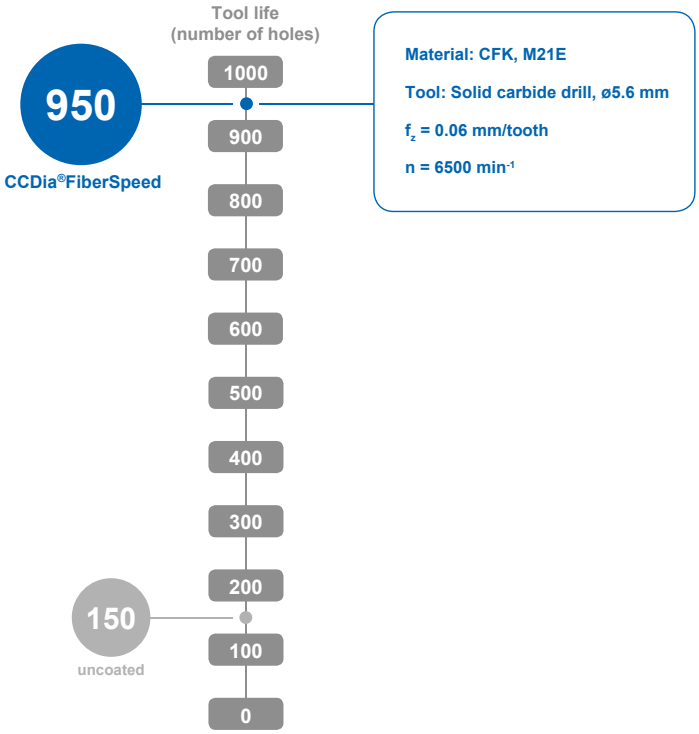
Color:
Grey

Max. operating temperature:
650 °C

Available coating thicknesses:

≈ 3 µm	•	•	–	–
≈ 9 µm	•	•	•	•
≈ 14 µm	•	•	–	•

High wear volume for maximum performance



Coating thicknesses of 3 to 14 µm 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 the various coating thicknesses can give sharp edges as well as maximum wear volumes.

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The HiPIMS-Technology

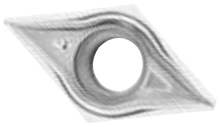
HiPIMS, the PVD coating technology of the future

HiPIMS (High Power Impulse Magnetron Sputtering) combines the advantages of all conventional coating technologies for cutting tools available on the market. The smoothness of the sputtering, the high hardness values, compact coating structures and scratch resistance to over 130 newtons, tools coated in this way are exceptionally resistant to wear in extremely hard, especially tough and oxidation-resistant materials such as stainless steel, titanium or nickel-based alloys.

But HiPIMS coatings can also deliver top performance in unalloyed, alloyed and high-speed steels.
The high metal ionisation of nearly 100 per cent gives the best adhesion, even in cold-welded materials, which are particularly difficult to machine.
In addition, coatings deposited by HiPIMS technology give extremely homogeneous surfaces, even on very complex 3D geometries.

AluCon®

for aluminium, titanium and non-ferrous metals



Technical data

Coating technology:
HiPIMS

Coating material:
TiB_2-based

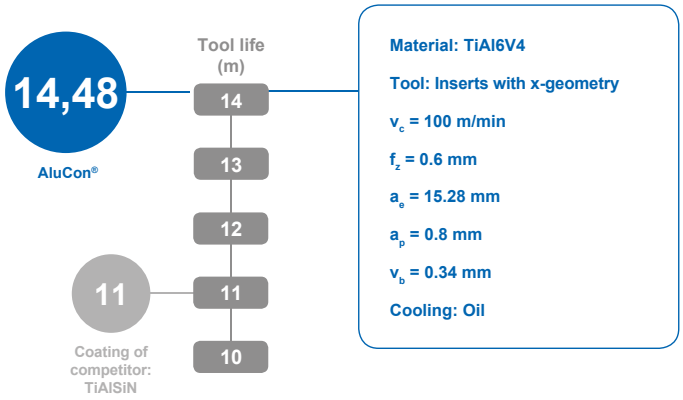
Color:
Silver

Max. operating temperature:
1,000 °C

Available coating thicknesses:

≈ 1 µm	•	•	–
≈ 2 µm	•	•	•
≈ 4 µm	–	–	•

To avoid built-up edges and offering maximum coating adhesion



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TiB_2 and HiPIMS. The unique combination of a nano-crystalline coating material, which effectively prevents built-up edges, and the HiPIMS technology for the smoothest coatings, maximum coating adhesion and a hardness of up to 5,000 $HV_{0.05}$. Guarantor for optimal machining of non-ferrous metals.

The Right Coating For Round-Tools

Drilling

	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel						●		●				●	●	●
Stainless steel							●	●			●			
Cast Iron						●		●				●		
Aluminium	●		●	●	●				●					
Graphite/Green Compact		●												
Ceramics		●	●											
Titanium					●		●		●					
Hard Materials (>50 HRC)							●				●			
CFRP/GFRP	●		●	●										

Milling

	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel						●						●	●	●
Stainless steel							●				●			
Cast Iron						●					●	●		
Aluminium				●	●				●					
Graphite/Green Compact		●	●											
Ceramics		●	●											
Titanium					●		●		●		●			
Hard Materials (>50 HRC)							●				●	●		
CFRP/GFRP	●		●											

Turning / Grooving

	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel												●	●	●
Stainless steel							●				●			
Cast Iron												●		
Aluminium					●				●					
Graphite/Green Compact														
Ceramics														
Titanium					●		●		●		●			
Hard Materials (>50 HRC)							●				●	●		
CFRP/GFRP														

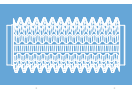
Reaming

	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel						●						●		●
Stainless steel							●				●			
Cast Iron						●						●		
Aluminium				●	●				●					
Graphite/Green Compact														
Ceramics														
Titanium					●		●		●		●			
Hard Materials (>50 HRC)							●				●	●		
CFRP/GFRP	●			●										

Threading

	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel										●			●	●
Stainless steel							●			●	●			
Cast Iron										●		●		●
Aluminium					●				●	●				
Graphite/Green Compact		●												
Ceramics		●												
Titanium							●			●	●			
Hard Materials (>50 HRC)							●							
CFRP/GFRP	●			●										

Gear Cutting



	CCDia® AeroSpeed®	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	CCplusC®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel											●		
Stainless steel											●		
Cast Iron											●		
Aluminium			●										
Graphite/Green Compact													
Ceramics													
Titanium													
Hard Materials (>50 HRC)													
CFRP/GFRP			●										

The Right Coating For Cutting Inserts

Drilling

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●		●			●	●	●
Stainless steel						●	●		●	●		
Cast Iron					●		●			●		
Aluminium		●	●	●				●				
Graphite/Green Compact	●											
Ceramics	●	●										
Titanium						●			●			
Hard Materials (>50 HRC)						●			●	●		
CFRP/GFRP		●	●									

Milling

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●		●			●	●	●
Stainless steel						●	●		●	●		
Cast Iron							●			●		
Aluminium		●	●	●				●				
Graphite/Green Compact	●											
Ceramics	●	●										
Titanium				●		●		●	●			
Hard Materials (>50 HRC)						●			●	●		
CFRP/GFRP		●	●									

Turning / Grooving

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●		●			●	●	●
Stainless steel						●	●		●	●		
Cast Iron					●		●			●		
Aluminium		●	●	●				●				
Graphite/Green Compact	●											
Ceramics	●	●										
Titanium				●		●			●			
Hard Materials (>50 HRC)						●			●	●		
CFRP/GFRP		●	●									

Reaming

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●		●			●	●	●
Stainless steel						●	●		●	●		
Cast Iron					●		●			●		
Aluminium				●				●				
Graphite/Green Compact												
Ceramics												
Titanium						●			●			
Hard Materials (>50 HRC)						●			●	●		
CFRP/GFRP												

Threading

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●					●	●	●
Stainless steel						●			●	●		
Cast Iron					●					●		●
Aluminium				●				●				
Graphite/Green Compact												
Ceramics												
Titanium						●			●			
Hard Materials (>50 HRC)						●			●			
CFRP/GFRP												

Gear Cutting

	CCDia® CarbonSpeed	CCDia® FiberSpeed	CCDia® MultiSpeed	AluCon®	FerroCon®	InoxaCon®	ALOX®	AluSpeed®	HARDLOX®	HYPERLOX®	Supertin®	TINALOX®
Steel					●		●			●		
Stainless steel										●		
Cast Iron					●		●			●		
Aluminium												
Graphite/Green Compact												
Ceramics												
Titanium												
Hard Materials (>50 HRC)												
CFRP/GFRP												

Characteristics Of The Coating Materials

	Coating material	Version	Layer thickness ≈ µm	Composition	Color				
Diamond	CCDia®AeroSpeed®	Thin	3	C		●			
			9	C		●	●		
		Plus	14	C		●	●		
	CCDia®CarbonSpeed		7	C		●	●	●	
		Plus	9	C		●	●		
	CCDia®FiberSpeed		9	C		●	●	●	●
	CCDia®MultiSpeed	Thin	3	C		●	●		
			14	C		●	●	●	
HiPIMS	AluCon®	Thin	1	TiB_2-based		●	●		
			2	TiB_2-based		●	●	●	
		Plus	4	TiB_2-based				●	
	FerroCon®		3	AlTiN-based		●	●	●	
		Plus	4.5	AlTiN-based		●			
		Plus	6	AlTiN-based				●	
	InoxaCon®	Thin	1.5	TiAlSiN-based			●		
			3	TiAlSiN-based		●	●	●	
Sputtering	ALOX®		4.5	TiAlN-based		●			
			6	TiAlN-based				●	
		Gold	6	TiAlN-based				●	
		Plus	10	TiAlN-based				●	
	AluSpeed®		2	TiB_2-based		●	●	●	
	CCplusC®		3	TiAlN+C-based			●		
	HARDLOX®	Thin	1.5	TiAlN/TiSiN-based			●		
			3	TiAlN/TiSiN-based		●	●	●	
	HYPERLOX®		3	AlTiN-based		●	●	●	
		Blue	4.5	AlTiN-based					●
		Plus	4.5	AlTiN-based		●			
		Plus	6	AlTiN-based				●	●
	SUPERTIN®		3	TiN-based		●	●	●	
	TINALOX®	Thin	1.5	TiAlN-based			●		
			3	TiAlN-based		●	●	●	
		Blue	3	TiAlN-based		●	●	●	
		Gold	3	TiAlN-based				●	

FerroCon®

for unalloyed, alloyed and high-speed steel

Technical data

Coating technology:
HiPIMS

Coating material:
AlTiN-based

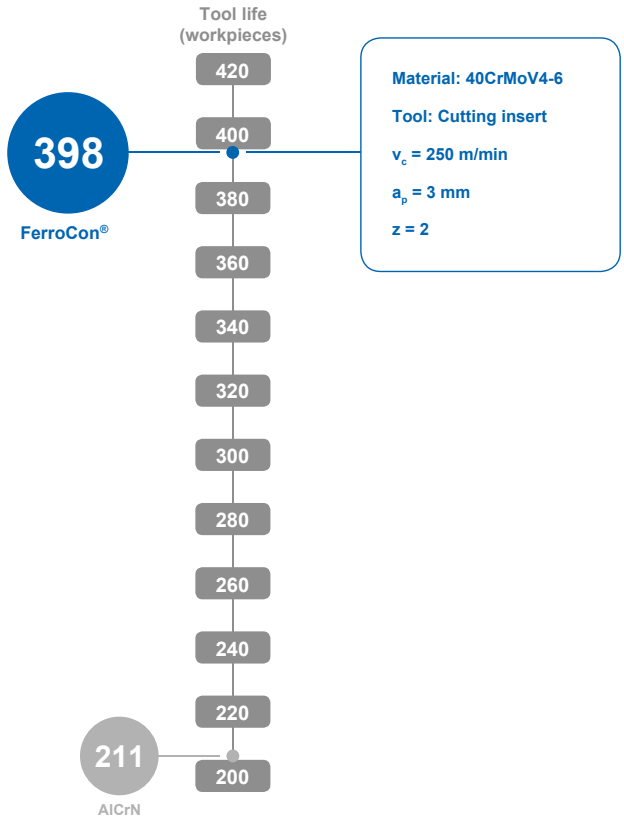
Color:
Anthracite

Max. operating temperature:
1,100 °C

Available coating thicknesses:

≈ 3 µm	•	•	•
≈ 4.5 µm	•	–	–
≈ 6 µm	–	–	•

Performance thanks to HiPIMS



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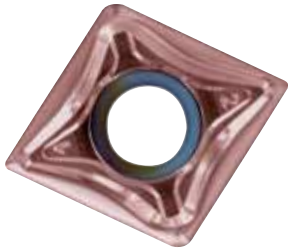
The premium HiPIMS coating for high-performance applications in unalloyed, alloyed and high-speed steel. Optimum adhesion, smoothest surfaces, high hardness values and toughness for your tool. Pure performance.

InoxaCon®

for hardened and stainless steels/titanium



Technical data

Coating technology:
HiPIMS

Coating material:
TiAlSiN-based

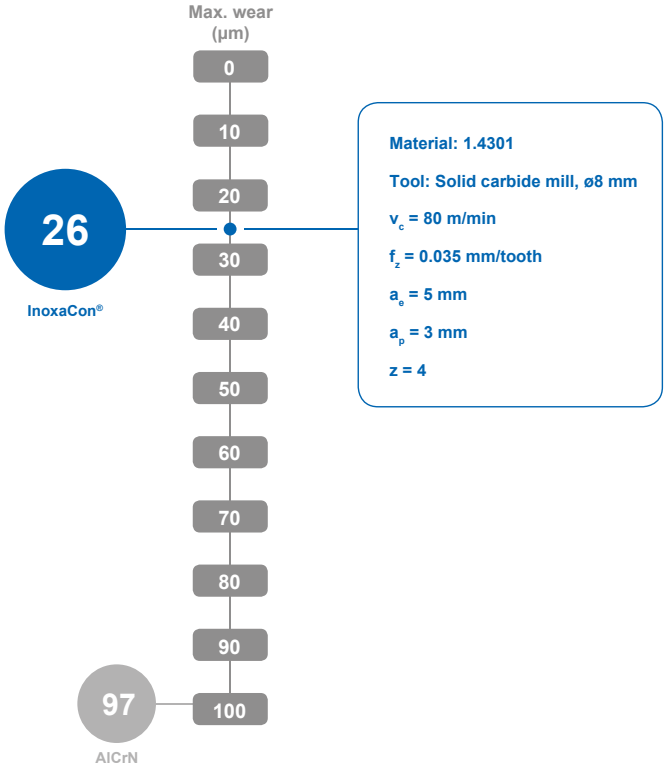
Color:
Copper

Max. operating temperature:
1,100 °C

Available coating thicknesses:

≈ 1.5 µm	•	•	–
≈ 3 µm	•	•	•

Heat resistant and reduced rewelding



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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.

PVD Sputter-Technology

Smooth, droplet-free coatings for cutting tools

Since 1986, CemeCon has been a trailblazer in developing hardcoatings by using the PVD sputter technology. During sputtering, the material is vaporised and deposited as a coating directly from solid into gas. In traditional processes, the coating material must be melted. This inevitably creates droplets that become blemishes on the coating structure and lead to a very rough surface. During sputtering, these droplets do not appear. The USP of the sputter technology is the extremely smooth surface.

Another advantage of the sputter technology is a significant reduction of the internal stress inside the coating. This enables the deposition of, e.g. AlTiN layers up to a layer thickness of 15 µm and more. An unbeatable advantage in all applications with a great deal of wear volume.

Furthermore, adhesion values – determined by a scratch test – of about 100 newtons are typical.

Sputtering is tremendously flexible. It can be used to produce all known coating compositions. There are no limits to the tools that can be coated – from the smallest microtool measuring less than 0.1 mm to big hobs.

ALOX®
TINALOX®

for steel from soft to medium hardness

Technical data

Coating technology:
Sputtering

Coating material:
TiAlN-based

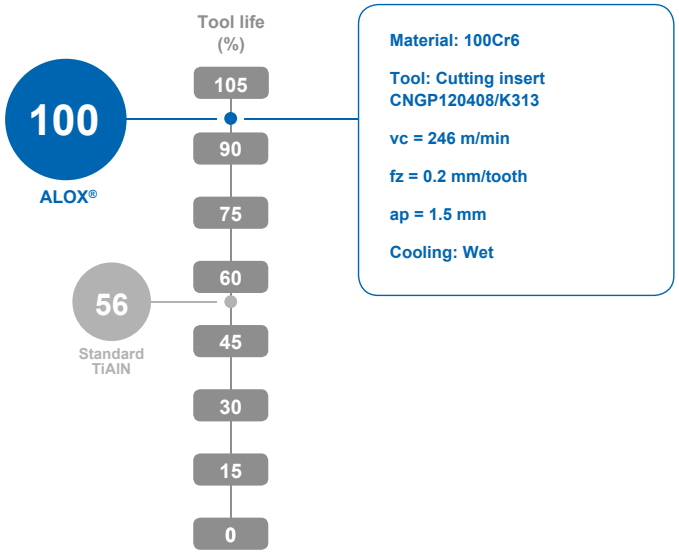
Colors:
Anthracite / blue / gold

Max. operating temperature:
1,000 °C

Available coating thicknesses:

≈ 1.5 µm	•	•	–
≈ 3 µm	•	•	•
≈ 4.5 µm	•	–	–
≈ 6 µm	–	–	•
≈ 10 µm	–	–	•

The universal solution for steel



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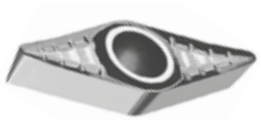
Receive further information.

These TiAlN coatings are universally suitable for machining most common steels. The optional finishing additional smoothness to the adds coatings which are already smooth and free of droplets.
From thin to thick, with coating thicknesses from 1.5 to 10 µm, all kinds of cutting tools can be optimised to their specific applications.

AluSpeed®

for aluminium/ non-ferrous-materials



Technical data

Coating technology:
Sputtering

Coating material:
TiB_2-based

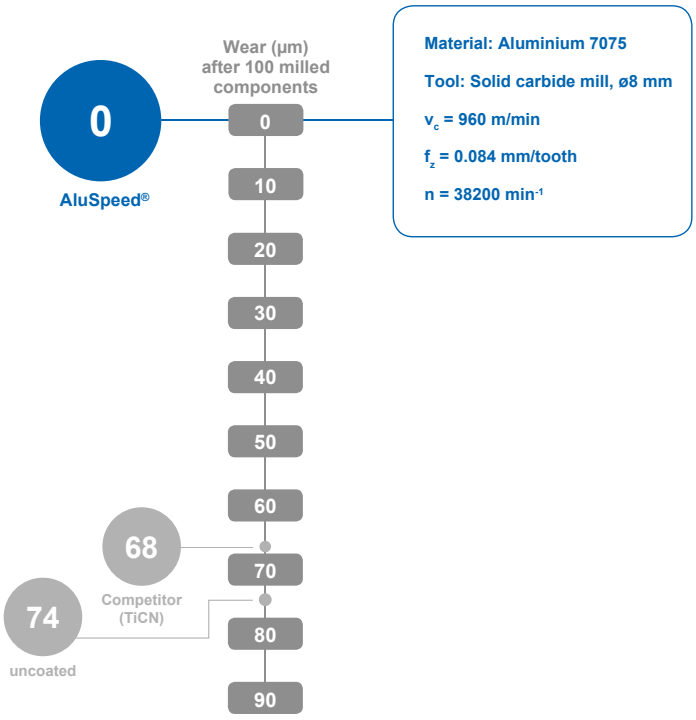
Color:
Silver

Max. operating temperature:
900 °C

Available coating thicknesses:

≈	2 µm	•	•	•

Protection against cold welding



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TiB_2, this sputtered coating composition has nearly no affinity to non-ferrous materials, especially aluminium. There is virtually no material adhesion, the optimised adhesion in combination with the very high hardness guarantees highly reliable processes and maximum productivity.

HARDLOX®

for titanium/stainless steel/steels up to 70HRC

Technical data

Coating technology:
Sputtering

Coating material:
TiAlN/TiSiN-based

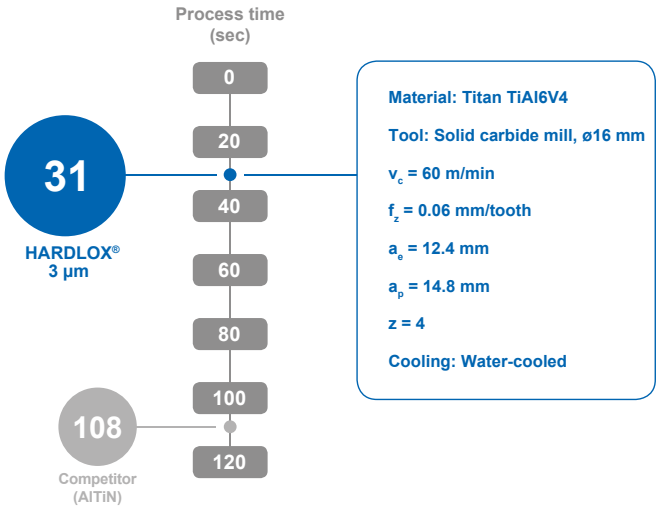
Color:
Copper

Max. operating temperature:
1,100 °C

Available coating thicknesses:

≈ 1.5 µm	•	•	–
≈ 3 µm	•	•	•

Easy Cutting at high temperatures



Scan QR code.
Receive further information.

Silicon doping gives HARDLOX® an especially high hardness and oxidation-resistance. The sputtering results in a very smooth surface. Titanium, stainless steel or hardened steels, HARDLOX® is just perfect for machining at high temperatures.

HYPERLOX®

for cast iron/ steel up to 60HRC

Technical data

Coating technology:
Sputtering

Coating material:
AlTiN-based

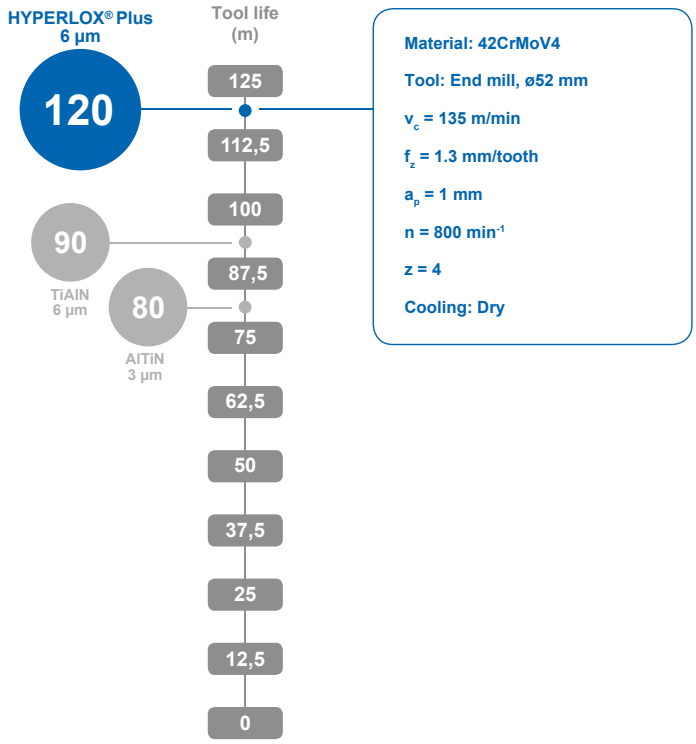
Colors:
Anthracite / blue

Max. operating temperature:
1,000 °C

Available coating thicknesses:

≈ 3 µm	•	•	–	•
≈ 4.5 µm	•	–	•	–
≈ 6 µm	–	–	•	•

For enhanced performance in cast iron and steel



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HYPERLOX®, the universal solution for all types of cast iron and steel up to 60HRC, is AlTiN-based. The high content of aluminum results in high hardness. The smooth and droplet-free surface and the very good adhesion of the coating make HYPERLOX® perfect for end mills, the Plus versions also feature greater wear volumes to increase tool life and productivity.

CCplusC®

Technical data

Coating technology:
Sputtering

Coating material:
TiAlN+C-based

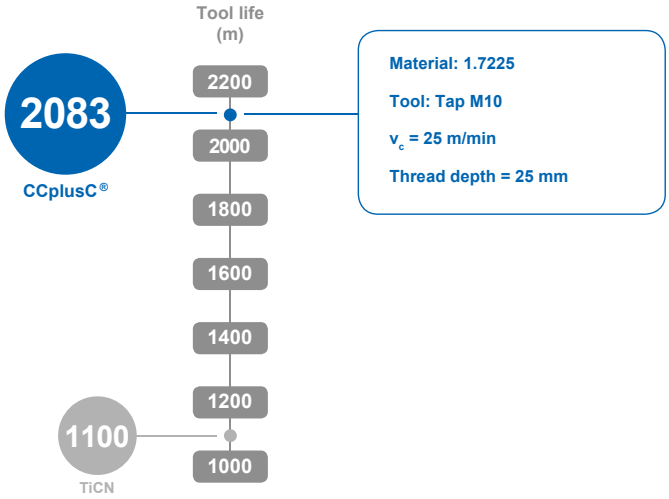
Color:
Black

Max. operating temperature:
900 °C

Available coating thicknesses:
≈ 3 µm

for threading tools

Efficient and friction-reducing



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Reduced friction and wear. These properties make CCplusC® the first choice for threading tools. The carbon top layer acts as a solid lubricant, while the TiAlN anti-wear layer gives extended tool life.

SUPERTIN®

Technical data

Coating technology:
Sputtering

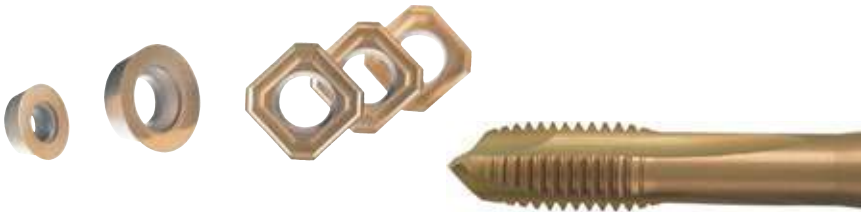
Coating material: **TiN-based**

Color: **Gold**

Max. operating temperature:
700 °C

Available coating thicknesses:
≈ 3 µm

for soft steels



Developed for easy cutting, SUPERTIN® scores highly above all in wet cutting.

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CemeCon
The Tool Coating

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CC_EN_2019_V1.2

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