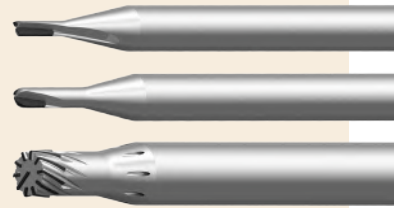




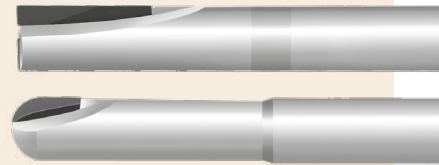
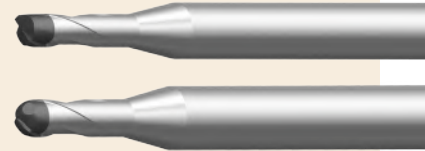
End Mills $\varnothing 0,20-20,00$
PCD, CVD-D, UltraDiamond, CBN



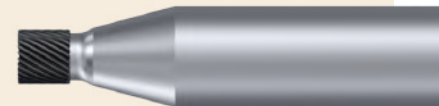
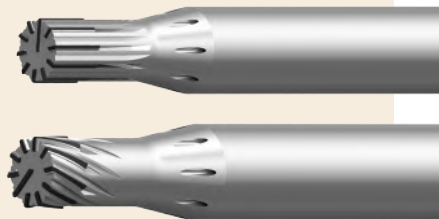
Die and Mold
Industry



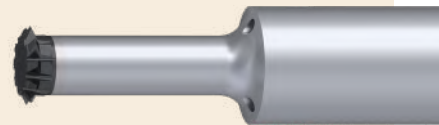
Automotive
Mechanical Engineering



Medical Technology
Micro Technology



Aerospace
Engineering



About us

Diamond Tooling Systems - DTS GmbH



Welcome to Diamond Tooling Systems - DTS GmbH!

Based in Kaiserslautern - Germany - we have specialized in the development, production and distribution of precision tools equipped with ultrahard cutting materials, such as PCD (polycrystalline Diamond), CVD-D (CVD thick-film Diamond), UltraDiamond (monocrystalline binderless Diamond) and CBN (cubic boron nitride). As a leading manufacturer for tools with lasered cutting edges, we offer machining solutions in the areas of turning, milling, grooving, drilling, reaming, threading, and tool holding.

To be able to economically process ultra-hard cutting materials such as PCD, CVD-D and CBN on precision tools werealized early on that we would have to move away from the traditional production technology of „grinding“ to new technologies such as the „laser removal process“. This decision has contributed to the fact that our customers regard us, DTS GmbH, as the pioneer and leading manufacturer of lasered tools for machining.

Ultra-hard high-performance cutting materials have a key function in Metal-cutting manufacturing. Precision toolsequipped with ultra-hard cutting materials are products that require a great deal of explanation. The economical use of the cutting materials is only ensured if the machining process and the cutting material are coordinated with each other.

This is exactly where we at DTS - Diamond Tooling Systems GmbH - step in: Tools and processes are subjected to a comprehensive analysis by our experienced application engineers. Subsequently, the new process optimization is presented to the customer and in the next step, it is implemented in their production. Only in that way is it possible to exploit the optimum potential of our high-tech cutting materials.

Our experienced application engineers are also available to advise you during ongoing production. This close cooperation and mutual trust is the basis of our success.

With more than 25 years of optimization experience in the processing industry, this is where we see our strength!

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End Mills

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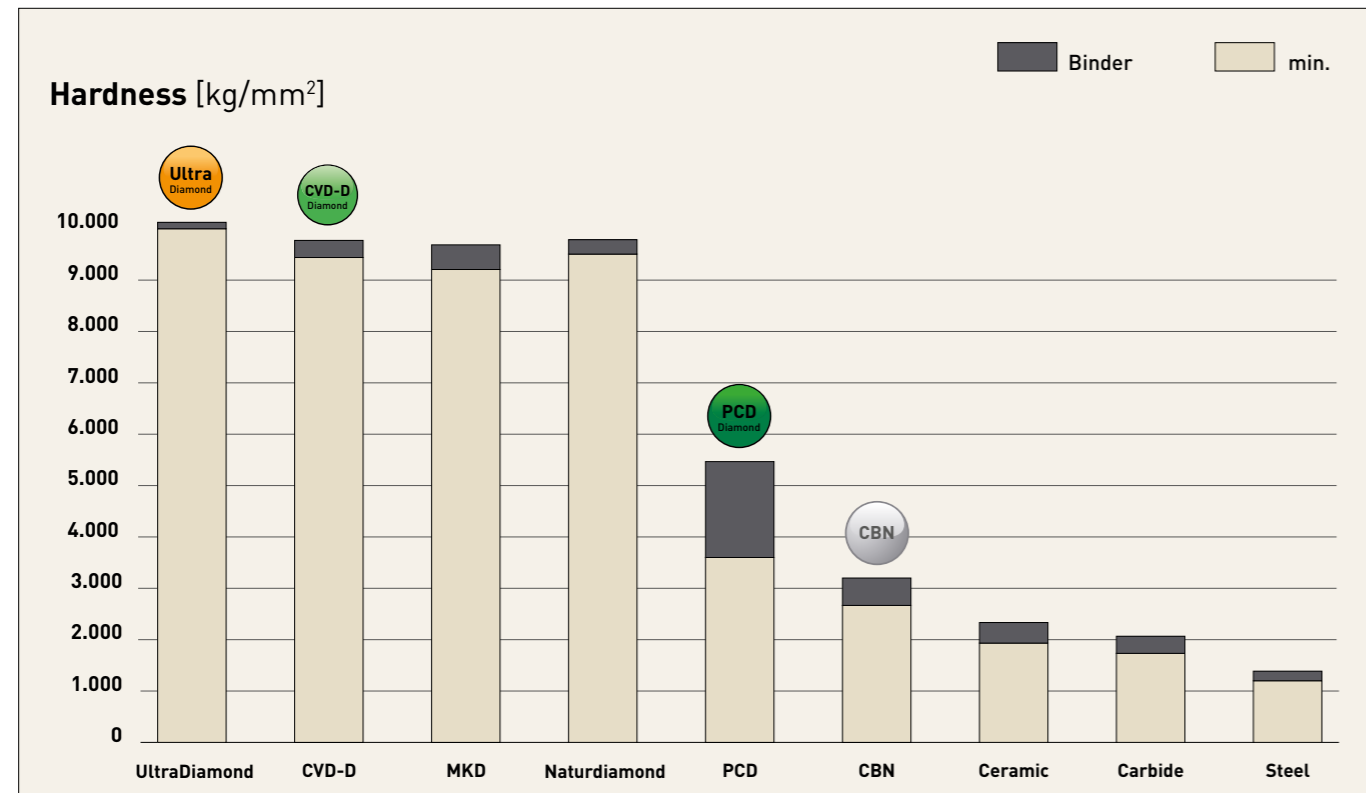
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PASSION FOR DIAMOND...

Ultrahard Cutting Materials at a Glance

... is not just a slogan for us - we live this passion in our daily dealings with our customers and we are your partner when it comes to Diamond or CBN tools.



Polycrystalline Diamond (PCD)

The well-known standard Diamond

PCD is a synthetically produced, extremely tough, intergrown mass of Diamond particles with random orientation in a Metal matrix. It is produced by sintering selected Diamond particles at high pressure and high temperatures.

Graphite is used as a catalyst so that the PCD crystals grow together. PCD has high thermal conductivity and good heat dissipation from the cutting area. In addition, PCD has the highest bending strength of all cutting materials bending strength of all cutting materials.

PCD is very well suited for machining aluminium with a Si content of up to 10% and/or other abrasive fillers. The hot hardness is approx. 750°C, the areas of application are similar to those of CVD thick film Diamond, but the high efficiency of CVD thick film Diamond comes into its own with hard-brittle materials or aluminium with a Si content of 10% or more.

CVD thick film Diamond (CVD-D)

The star among Diamond Cutting Materials

For machining hard-brittle materials such as ceramics, glass, glass-ceramics, hard Metal, MMC and fibre composites such as CFK and GFK. Due to the lack of a bonding matrix, the Diamond content is much higher than with PCD. In the group of ultra-hard cutting materials, the binderless CVD-D is one of the hardest, artificially produced Diamond cutting materials.

CVD-D is characterised by high hardness and high wear resistance. These properties make CVD-D the perfect cutting material for machining abrasive materials. Compared to PCD, which is damaged by the abrasive particles due to its soft metallic binder phase, the CVD-D cutting edge remains stable due to its binderless anchoring in the Diamond matrix.

If CVD-D is used correctly, the service life can be increased by up to 10 times (and even more) compared to PCD!

Binderless Diamond (UltraDiamond)

The hardest single Crystal

Single-crystal elements are laser-cut from Diamond blanks in a defined orientation using laser segmentation technology. This new technology makes it possible, in addition to polycrystalline cutting materials such as PCD and CVD-D, to also braze a monocrystal (UltraDiamond) under high vacuum on any tool carrier. Compared to PCD, the tool life can be increased by approx. 15 to 25 times and compared to CVD-D by approx. 2 to 5 times.

The areas of application are similar to PCD and CVD-D, but this monocrystalline cutting material offers a further significant increase in tool life in all applications where PCD and CVD-D reach the limits of economic viability. The UltraDiamond cutting material makes economical machining of very hard, highly brittle materials such as Ceramics, glass, glass-Ceramics and hard metals with low cobalt binder and nickel binder (<10%) possible. Ceramics, glass, glass-ceramics and hard metals with low cobalt binder and nickel binder (<10%).

Polycrystalline Cubic Boron Nitride (CBN)

Chemically resistant and stable at high temperatures

CBN is stable up to 1,400°C. Boron nitride powder is the starting point for the production of CBN, which has been available since the late 1960s. It is produced under high pressure as well as at temperatures of over 1,500°C and is specially adapted to the final application through many different substrates.

Today, CBN is considered the second hardest material after Diamond cutting materials!

The applications of CBN are in the automotive industry, aerospace, tool and mould making and mechanical engineering. The wide spectrum as a cutting and abrasive material includes hardened Steels, Cast Iron, chilled Cast Iron, sintered materials, stellite, nickel and cobalt-based superalloys. In many applications, cubic boron nitride is preferred over Diamond cutting materials because it is absolutely stable in air at temperatures up to 1,400°C. Diamond, on the other hand, starts to decompose at a temperature of about 750°C.

Compared to PCD, CBN is also characterised by its chemical resistance to ferrous materials.

Our cutting materials

and their main areas of application at a glance

We want to offer you the ideal solution for your application. Therefore, we also offer you a wide range of cutting materials on our internal turning tools.

Below you will find an overview of the different cutting materials.

PCD
Diamond

PCD

is ideally suited for the machining of *

Aluminium <10% Si | Graphite | Ceramic green compact | Copper | Copper Alloy | Magnesium | Brass | PEEK | Tungsten Alloy

CVD-D
Diamant

CVD-D

is ideally suited for the machining of *

Acrylic (PMMA) | Aluminium >10% Si | Glas, Glas Ceramic | Carbide >10%Co | Ceramic | Plastics | Copper, Copper Alloy | Magnesium | Silver, Gold, Platin | Titanium | Composite Materials (CFK,GFK) | Zirkon

Ultra
Diamond

UltraDiamond

is ideally suited for the machining of *

Acrylic (PMMA) | Glas, Glas Ceramic | Carbide <12%Co | Ceramic

CBN-H

CBN-H

is ideally suited for the machining of *

Steels, hardened up to 72 HRC
Sintered Steels, hardened

- continuous cut
- light interrupted cut
- heavy interrupted cut

CBN-K

CBN-K

is ideally suited for the machining of*

Grey Cast Iron (GG)
Ductile Cast Iron (GGG)

- continuous cut
- light interrupted cut
- heavy interrupted cut

CBN-X

CBN-X

is ideally suited for the machining of*

HSS, Tool Steel
ASP, CPM and other PM Steels
Cold- and Warmarbeitsstähle
VHM-Steel-Composite

- continuous cut
- light interrupted cut
- heavy interrupted cut

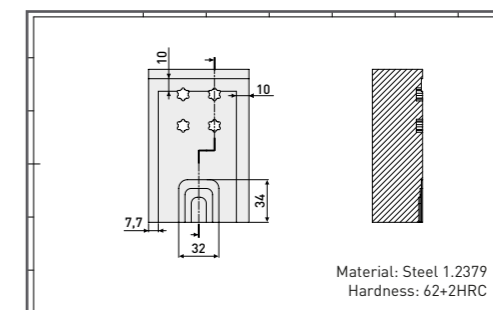
* You will find all other applications in the complete cutting material classification from Page 8.

Application Examples

our end mills in use

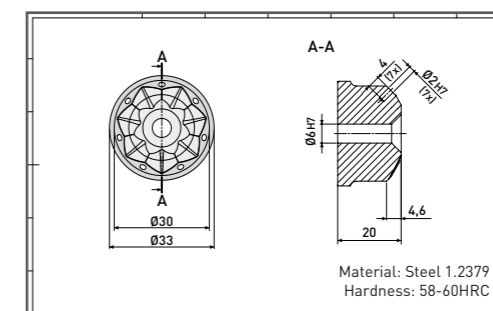
Not only theory - we would like to show you our tools in action. Below you will find a selection of our CBN application videos. Click on the QR code for more information and the video.

Also visit our YouTube Channel at [dts-gmbh!](https://www.youtube.com/dts-gmbh)



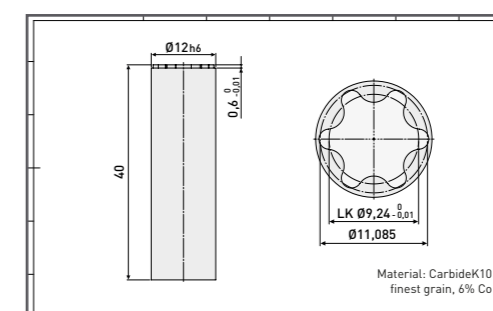
Milling
Steel 1.2379 62+2HRC
WSP-Milling cutter Ø10

Here you can see the video!



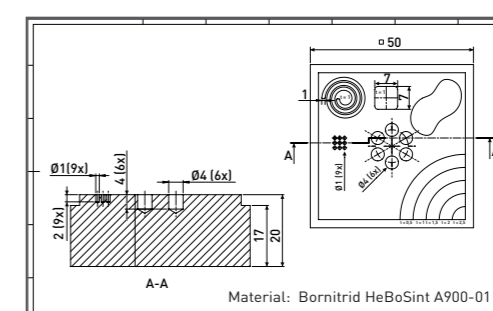
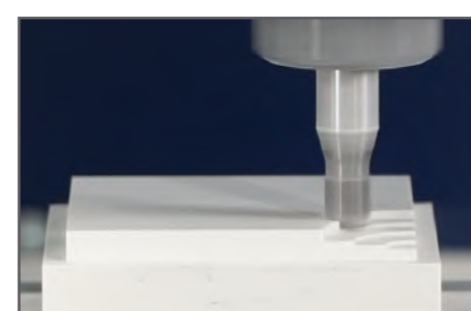
Milling
Steel 1.2379 58-60HRC
CBN Radiusfräser Ø1,50

Here you can see the video!



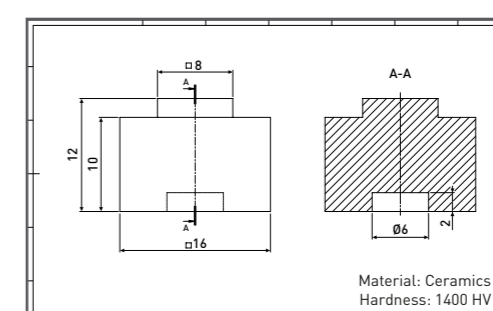
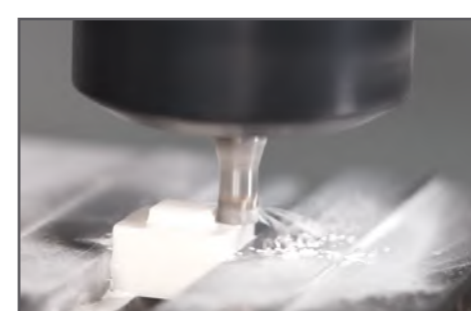
Milling
Carbide K10
Multi Tooth cutter Ø3,00

Here you can see the video!



Milling
Bornitrid HeBoSint
Multi Tooth cutter Ø6,00

Here you can see the video!



Milling
Ceramic
Multi Tooth cutter Ø6,00

Here you can see the video!

Our Cutting Material Assignment

about the materials

1. Choice Alternative

		DTS Diamond Types		
ISO	Materials	PCD	CVD-D	Ultra Diamond
H	Cold Work Steel, hardened to 72 HRC			
	PM Steels (ASP, CPM, Vanadis, Böhler)			
	Steel, hardened to 72 HRC			
	Hot Work Steel, hardened to 72 HRC			
	Tool Steel, hardened to 72 HRC			
P	Sintered Steel			
	Sintered Steel, hardened			
K	Grey Cast Iron (GG)			
	Ductile Cast Iron (GGG)			
	Shell Chilled Cast Iron			
M	Stainless Steel, hardened			
N	Acrylic (PMMA)		<input type="radio"/>	<input checked="" type="radio"/>
	Aluminium, < 10% Si	<input checked="" type="radio"/>	<input type="radio"/>	
	Aluminium, > 10% Si		<input checked="" type="radio"/>	<input type="radio"/>
	Glas, Glas Ceramic		<input type="radio"/>	<input checked="" type="radio"/>
	Carbide Green	<input checked="" type="radio"/>	<input type="radio"/>	
	Carbide G-Type, < 12% Co		<input type="radio"/>	<input checked="" type="radio"/>
	Carbide G-Type, > 10% Co		<input checked="" type="radio"/>	<input type="radio"/>
	Carbide K-Type, < 12% Co		<input type="radio"/>	<input checked="" type="radio"/>
	Carbide K-Type, > 10% Co		<input checked="" type="radio"/>	<input type="radio"/>
	Carbide with Ni-Binder			<input checked="" type="radio"/>
	Ceramic	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Ceramic Green	<input checked="" type="radio"/>	<input type="radio"/>	
	Plastics		<input checked="" type="radio"/>	
	Copper, Copper Alloy	<input type="radio"/>	<input checked="" type="radio"/>	
	Magnesium	<input type="radio"/>	<input checked="" type="radio"/>	
	Brass	<input type="radio"/>	<input checked="" type="radio"/>	
	MMC		<input checked="" type="radio"/>	<input type="radio"/>
	PEEK	<input checked="" type="radio"/>	<input type="radio"/>	
	Silver, Gold, Platin		<input checked="" type="radio"/>	<input type="radio"/>
	Titanium	<input type="radio"/>	<input checked="" type="radio"/>	
	Composite Materials like CFK/GFK	<input type="radio"/>	<input checked="" type="radio"/>	
	Tungsten Alloy	<input type="radio"/>	<input checked="" type="radio"/>	

DTS cutting materials are successfully used in many industries:

- Mechanical Engineering
- Die and Mold Industry
- Automotive
- Aerospace
- Medical Technology
- optical Industry
- Ceramic Industry



The Material-Cutting Material combination you are looking for is not in the table?

Our consultants and application engineers are available by phone or e-mail:

Tel.: +49(0)6301 32011-0
Mail: info@diamond-toolingsystems.com

CBN Types			Materials	ISO
CBN-K	CBN-H	CBN-X		
	<input type="radio"/>	<input checked="" type="radio"/>	Cold Work Steel	H
	<input type="radio"/>	<input checked="" type="radio"/>	PM Steels (ASP, CPM, Vanadis, Böhler)	
	<input checked="" type="radio"/>	<input type="radio"/>	Steel, hardened to 72 HRC	
	<input type="radio"/>	<input checked="" type="radio"/>	Hot Work Steel	
	<input type="radio"/>	<input checked="" type="radio"/>	Tool Steel, hardened to 72 HRC	
		<input checked="" type="radio"/>	Sintered Steel	P
		<input type="radio"/>	Sintered Steel, hardened	
<input checked="" type="radio"/>	<input checked="" type="radio"/>		Grey Cast Iron (GG)	K
<input checked="" type="radio"/>	<input checked="" type="radio"/>		Ductile Cast Iron (GGG)	
		<input type="radio"/>	Shell Chilled Cast Iron	
	<input type="radio"/>	<input checked="" type="radio"/>	Stainless Steel, hardened	M
				N



Carbide, > 20% Co*
* for the machining of Carbides
we recommend the use of
CVD-D Cutting edges see Catalogue 01

The Machining of Brittle-Hard Materials

Application and explanation of brittle-hard materials

Brittle-Hard Materials

High brittleness is usually found in materials with high hardness, such as Diamond, carbides, nitrides, salts and ceramics. In contrast, ductile materials - mostly metals and plastics - have a comparatively high plastic deformability until they finally break.

Brittleness is a material property that describes the failure or fracture behavior. A brittle material can only be plastically deformed to a small extent and is therefore characterized by low ductility. Brittle fracture occurs at low elongation and usually close to the yield point.

With DTS tools you can economically machine almost all brittle-hard materials.



- Mould and Tool Making → Components made of Carbide or Ceramic
- Medical Industry → Ceramiken im Dentalbereich
- Glass Industry → Technical and optical Glass
- Jewellery Industry → Elements for Jewellery and Watches
- Electrical Industry → Components made of Glass Fibre Reinforced Materials

Application range:

- **PCD** Acrylic, Glass Materials, Carbide, Ceramics, PEEK, Composites (CFK, GFK, MMC), sintered ceramic materials, all highly abrasive difficult-to-machine materials ...
- **CVD-D** Carbide >8% Co, Composites (GFRP, CFRP), Aluminum >10% Si, Copper, Graphite, Intermetallic, MMC (=Metal Matrix Composite), Titanium (Finishing) ...
- **UltraDia.** Carbide <10% Co, Carbide with Ni Binder, Glass Materials, highly abrasive materials, sintered ceramic materials ...

You will find further application ranges in the detailed overview from page 8.

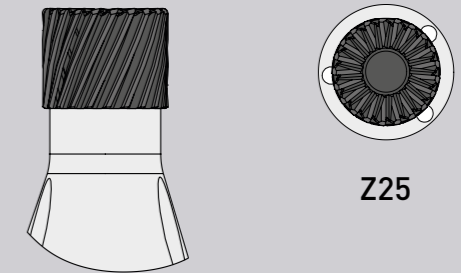
Solid Corner End Mills - SD-Line

PCD tipped for machining brittle-hard Materials

Solid PCD-Cutting Edge - twisted

Example:
 Ø3,00 mm with Z25

3D lasered Multi Tooth cutter
 with 3x internal cooling



Diameter
 Ø0,40 mm – 6,00 mm

Teeth Count
 from Z3 to Z55

Benefits of the system:

- ✓ Precise
- ✓ lasered cutting edges
- ✓ Smooth running
- ✓ With internal cooling on request
- ✓ Very high feed rates possible
- ✓ For roughing and finishing
- ✓ Plunging possible

Application range:

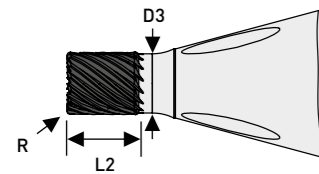
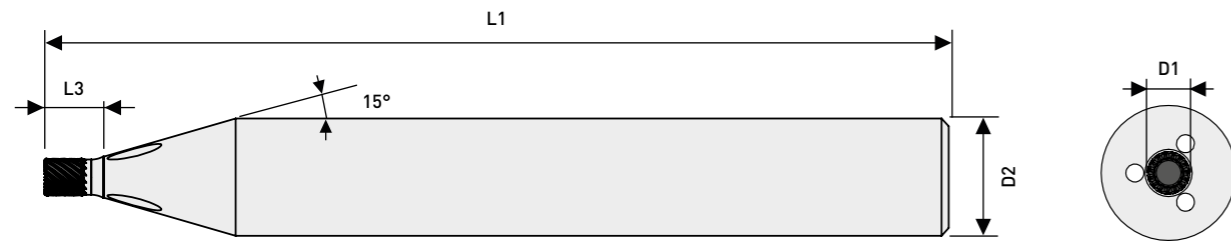
- Ceramics
- Glass
- Glass Ceramic
- Carbide
- Aluminum with high Si-content
- GFK / CFK / MMC



Ø2,80 mm
 Z23
 with 3x internal cooling

Solid Corner End Mills - SD-Line

Diamond tipped - with Helix | Ø0,40 - 2,00



with 3x internal cooling
Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	D3	Item No.
0,40	40,00	1,50	2,00	3	0,05	6h5	0,35	FS1040-0530
0,50	40,00	1,50	2,00	5	0,05	6h5	0,45	FS1040-0540
0,60	40,00	1,50	2,00	9	0,05	6h5	0,55	FS1040-0550
0,70	40,00	1,50	2,00	9	0,05	6h5	0,65	FS1040-0560
0,80	40,00	1,50	2,00	9	0,05	6h5	0,70	FS1040-0570
0,90	40,00	1,50	2,00	9	0,05	6h5	0,80	FS1040-0580
1,00	40,00	2,00	2,50	9	0,10	6h5	0,90	FS1040-0590
1,10	40,00	2,00	2,50	11	0,10	6h5	1,00	FS1040-0600
1,20	40,00	2,00	2,50	11	0,10	6h5	1,10	FS1040-0610
1,30	40,00	2,00	2,50	11	0,10	6h5	1,20	FS1040-0620
1,40	40,00	2,00	2,50	13	0,10	6h5	1,30	FS1040-0630
1,50	40,00	2,00	2,50	13	0,10	6h5	1,40	FS1040-0640
1,60	40,00	2,00	2,50	13	0,10	6h5	1,50	FS1040-0650
1,70	40,00	2,00	2,50	15	0,10	6h5	1,60	FS1040-0660
1,80	40,00	2,00	2,50	15	0,10	6h5	1,70	FS1040-0670
1,90	40,00	2,00	2,50	15	0,10	6h5	1,80	FS1040-0680
2,00	40,00	2,00	2,50	15	0,10	6h5	1,90	FS1040-0690

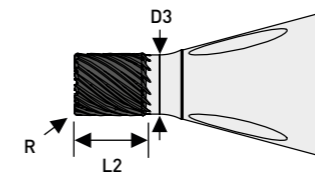
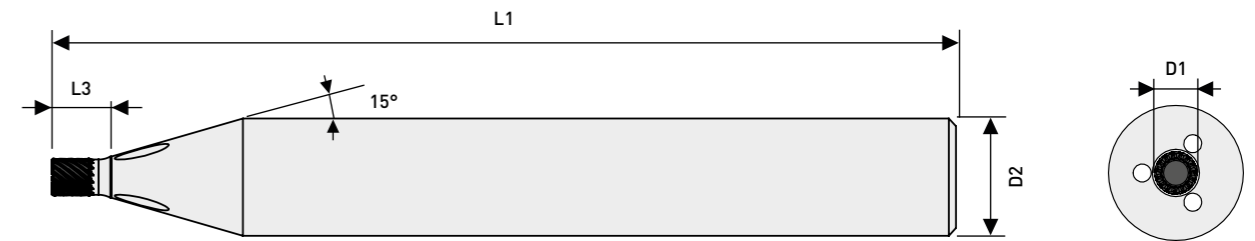
Application range:

- PCD** Acrylic, Glass Materials, Carbide, Ceramics, PEEK, Composites (CFK, GFK, MMC), sintered ceramic materials, all highly abrasive difficult-to-machine materials ...

You will find further application ranges in the detailed overview from page 8.

Solid Corner End Mills - SD-Line

Diamond tipped - with Helix | Ø2,10 - 6,00



with 3x internal cooling
Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	D3	Item No.
2,10	40,00	2,00	3,00	15	0,10	6h5	2,00	FS1040-0700
2,20	40,00	2,00	3,00	15	0,10	6h5	2,10	FS1040-0710
2,30	40,00	2,00	3,00	15	0,10	6h5	2,20	FS1040-0720
2,40	40,00	2,00	3,00	17	0,10	6h5	2,30	FS1040-0730
2,50	40,00	2,00	3,00	17	0,20	6h5	2,40	FS1040-0740
2,60	40,00	2,00	3,00	17	0,20	6h5	2,50	FS1040-0750
2,70	40,00	2,00	3,00	23	0,20	6h5	2,60	FS1040-0760
2,80	40,00	2,00	3,00	23	0,20	6h5	2,70	FS1040-0770
2,90	40,00	2,00	3,00	25	0,20	6h5	2,80	FS1040-0780
3,00	40,00	2,00	3,50	25	0,20	6h5	2,90	FS1040-0790
3,10	40,00	3,00	3,50	25	0,20	6h5	3,00	FS1040-0800
3,20	40,00	3,00	3,50	25	0,20	6h5	3,10	FS1040-0810
3,30	40,00	3,00	3,50	25	0,20	6h5	3,20	FS1040-0820
3,40	40,00	3,00	3,50	25	0,20	6h5	3,30	FS1040-0830
3,50	40,00	3,00	3,50	25	0,20	6h5	3,40	FS1040-0840
4,00	40,00	4,00	6,00	29	0,20	6h5	3,90	FS1040-0850
5,00	40,00	4,00	6,00	41	0,20	6h5	4,90	FS1040-0870
6,00	40,00	4,00	6,00	55	0,20	6h5	5,90	FS1040-0890

Other diameters and cutting materials on request.

- Special tools on request for you! Please send inquiries to info@diamond-toolingsystems.com
- All our products are also available in our online shop. Visit us at Diamond-tools24.com



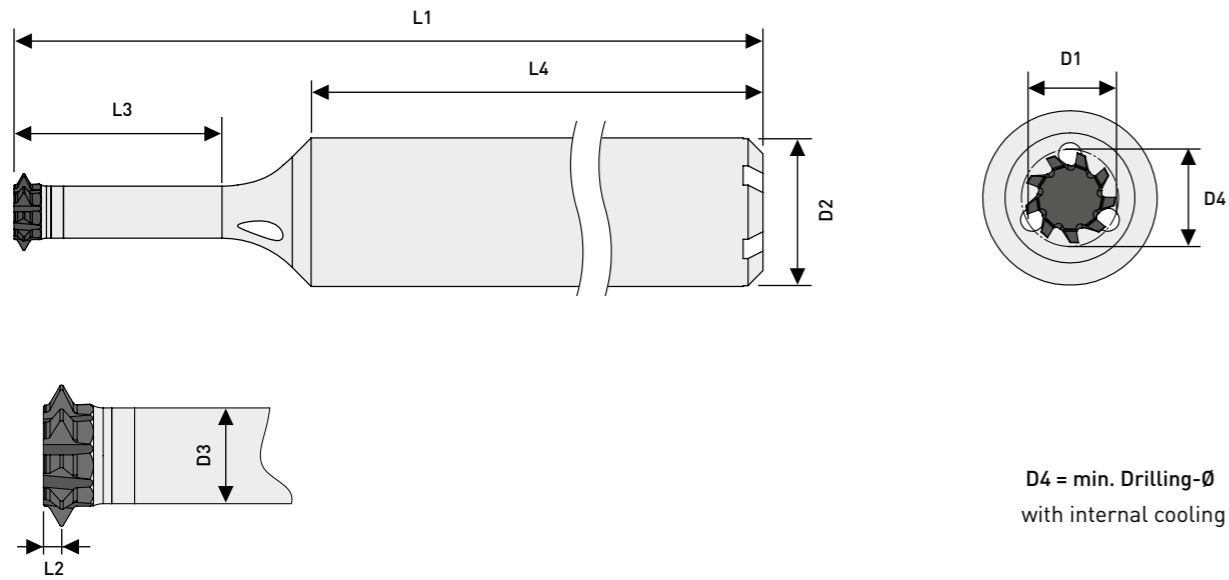
Scan me!

Subject to technical changes.

Solid Thread Milling Cutter- GW-Line

Diamond tipped | M3 bis M8

Your Notes




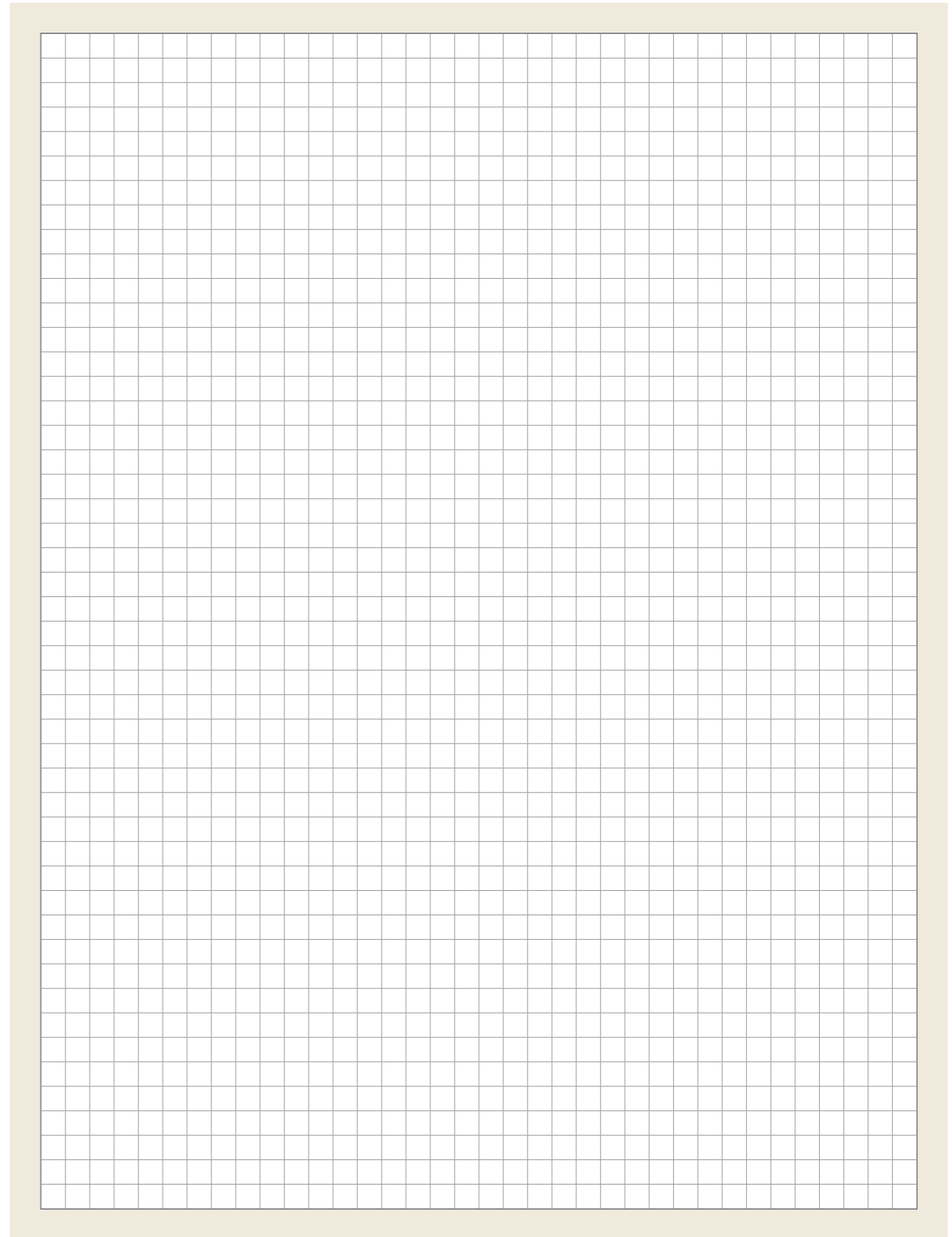
D4 = min. Drilling-Ø
with internal cooling



M	P	D1	D2	D3	D4	L1	L2	L3	L4	Teeth Count Z	Item No.
M3	0,50	2,35	6h5	1,50	2,50	40,00	0,40	7,50	28,00	7	GW1040-0030
M4	0,70	3,15	6h5	2,10	3,30	40,00	0,40	8,50	28,00	8	GW1040-0040
M5	0,80	4,05	6h5	3,00	4,20	40,00	0,40	10,50	28,00	9	GW1040-0050
M6	1,00	4,85	6h5	3,40	5,00	50,00	0,50	12,50	32,00	10	GW1040-0060
M8	1,25	6,65	8h5	4,90	6,80	50,00	0,50	16,50	32,00	11	GW1040-0080

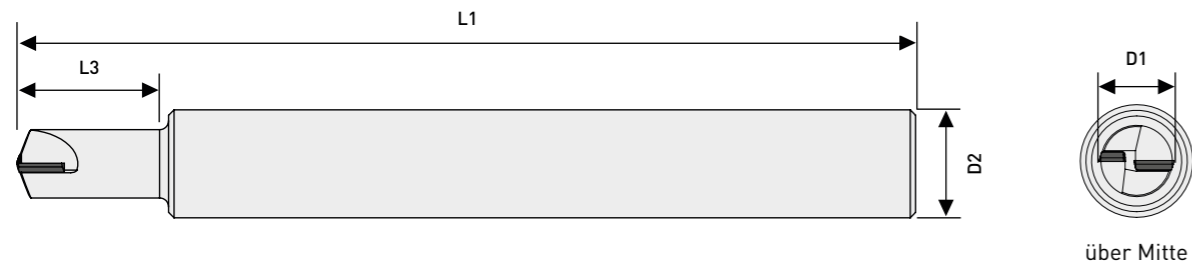
Application range:

-  **PCD** Acrylic, Glass Materials, Carbide, Ceramics, PEEK, Composites (CFK, GFK, MMC), sintered ceramic materials, all highly abrasive difficult-to-machine materials ...

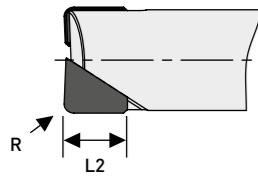


Corner End Mills - STPlus-Line

Diamond tipped - for machining brittle-hard Materials | Ø0,90 - 5,00



über Mitte



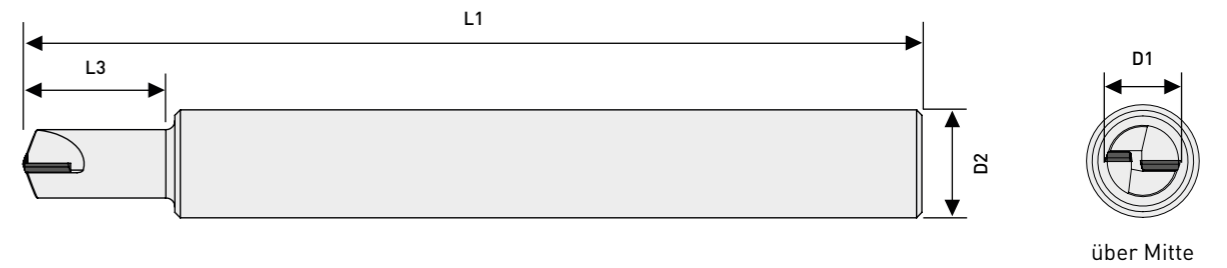
Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank



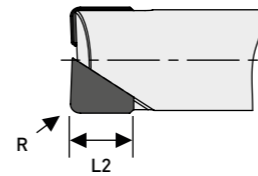
D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.	Item No.
0,90	50,00	2,00	2,00	1	0,020	6h5	FS2050-8500	FS1150-8500
1,00	50,00	2,00	2,50	1	0,050	6h5	FS2050-8502	FS1150-8502
	50,00	2,00	2,50	1	0,100	6h5	FS2050-8504	FS1150-8504
	50,00	2,00	4,50	1	0,050	6h5	FS2050-8506	FS1150-8506
1,50	50,00	2,00	3,00	2	0,050	6h5	FS2050-8508	FS1150-8508
	50,00	2,00	3,00	2	0,100	6h5	FS2050-8510	FS1150-8510
2,00	50,00	2,00	4,00	2	0,100	6h5	FS2050-8512	FS1150-8512
	50,00	2,00	4,00	2	0,200	6h5	FS2050-8514	FS1150-8514
3,00	50,00	2,50	6,00	2	0,100	6h5	FS2050-8516	FS1150-8516
	50,00	2,50	6,00	2	0,300	6h5	FS2050-8518	FS1150-8518
4,00	50,00	2,50	8,00	2	0,100	6h5	FS2050-8520	
	50,00	2,50	8,00	2	0,300	6h5	FS2050-8522	
5,00	50,00	3,00	10,00	2	0,200	6h5	FS2050-8524	
	50,00	3,00	10,00	2	0,500	6h5	FS2050-8526	

Corner End Mills - STPlus-Line

Diamond tipped - for machining brittle-hard Materials | Ø6,00 - 12,00



über Mitte



Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.	Item No.
6,00	50,00	3,00	15,00	2	0,200	6h5	FS2050-8528	
	50,00	3,00	15,00	2	0,300	6h5	FS2050-8530	
	50,00	3,00	15,00	2	0,500	6h5	FS2050-8532	
8,00	60,00	4,00	20,00	2	0,300	8h5	FS2050-8534	
	60,00	4,00	20,00	2	0,500	8h5	FS2050-8536	
10,00	60,00	5,00	25,00	2	0,300	10h5	FS2050-8538	
	60,00	5,00	25,00	2	0,800	10h5	FS2050-8540	
12,00	70,00	5,00	25,00	2	1,000	12h5	FS2050-8542	

Application range:

- **CVD-D** Carbide >10% Co, Faserverbundwerkstoffe (GFK,CFK), Aluminium >10% Si, MMC (=Metal Matrix Composite), Kupfer, Graphit, Intermetallic, Titanium (Schichten) ...
- **UltraDia.** Carbides <12% Co, carbides with Ni binder, sintered ceramic materials, highly abrasive materials that are difficult to machine, glass materials ...

You will find further application ranges in the detailed overview from page 8.



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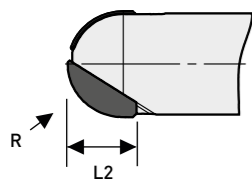
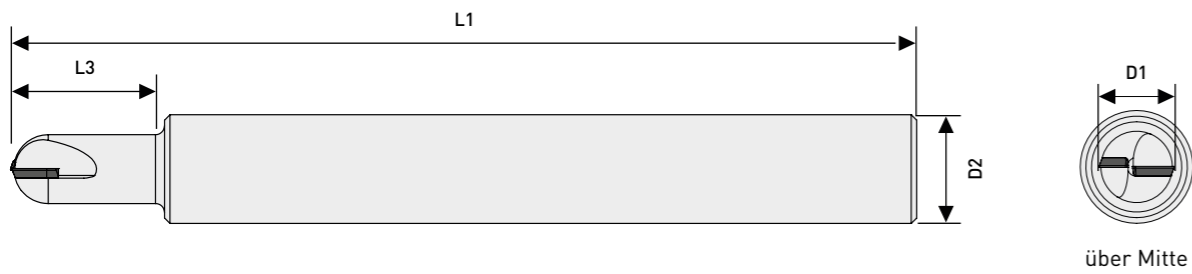
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Subject to technical changes.

Ball Nose End Mills - STPlus-Line

Diamond tipped - for machining brittle-hard Materials | Ø0,90 - 6,00

Your Notes





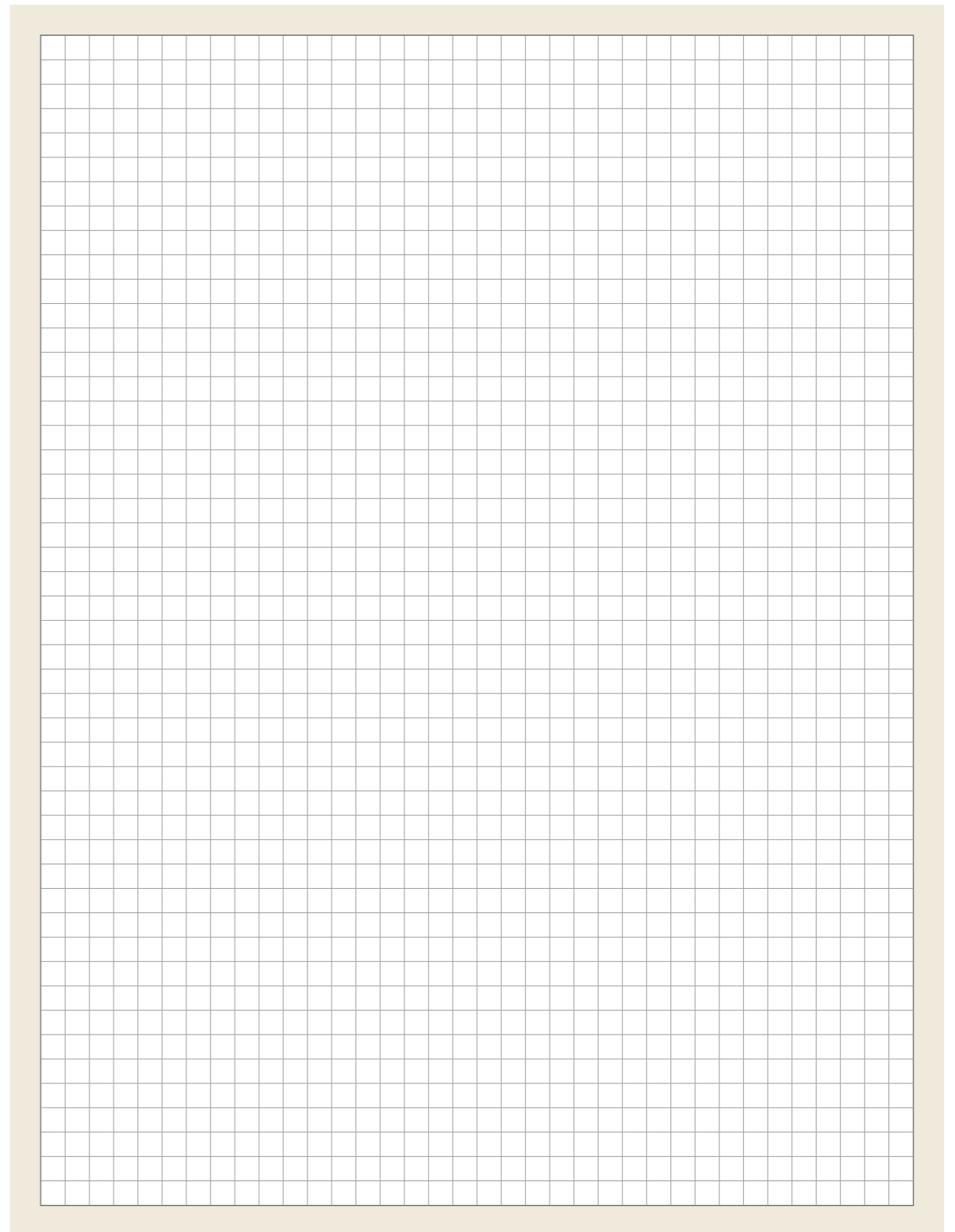
Radius tolerance: $\pm 0,004$ mm
 Length tolerance: $\pm 1,00$ mm
 Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.	Item No.
0,90	50,00	2,00	2,00	1	0,450	6h5	FS2050-9500	FS1150-9500
1,00	50,00	2,00	2,50	1	0,500	6h5	FS2050-9502	FS1150-9502
	50,00	2,00	3,50	1	0,500	6h5	FS2050-9504	FS1150-9504
	50,00	2,00	4,50	1	0,500	6h5	FS2050-9506	FS1150-9506
1,50	50,00	2,00	3,00	2	0,750	6h5	FS2050-9508	FS1150-9508
	50,00	2,00	5,00	2	0,750	6h5	FS2050-9510	FS1150-9510
2,00	50,00	2,00	4,00	2	1,000	6h5	FS2050-9512	FS1150-9512
	50,00	2,00	8,00	2	1,000	6h5	FS2050-9514	FS1150-9514
3,00	50,00	2,50	6,00	2	1,500	6h5	FS2050-9516	FS1150-9516
	50,00	2,50	12,00	2	1,500	6h5	FS2050-9518	FS1150-9518
4,00	50,00	2,50	8,00	2	2,000	6h5	FS2050-9520	
	50,00	2,50	16,00	2	2,000	6h5	FS2050-9522	
5,00	50,00	3,00	10,00	2	2,500	6h5	FS2050-9524	
	50,00	3,00	20,00	2	2,500	6h5	FS2050-9526	
6,00	50,00	3,00	12,00	2	3,000	6h5	FS2050-9528	
	50,00	3,00	24,00	2	3,000	6h5	FS2050-9530	

Application range:

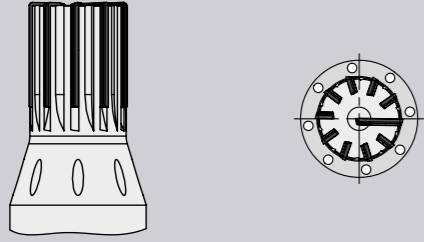
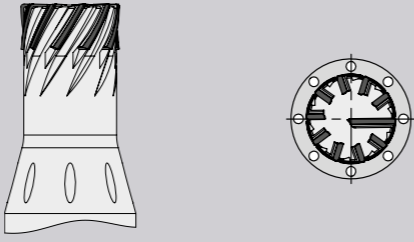
-  **CVD-D** Carbide >10% Co, Faserverbundwerkstoffe (GFK,CFK), Aluminium >10% Si, MMC (=Metal Matrix Composite), Kupfer, Graphit, Intermetallic, Titanium (Schichten) ...
-  **UltraDia.** Carbides <12% Co, carbides with Ni binder, sintered ceramic materials, highly abrasive materials that are difficult to machine, glass materials ...



Multi-Tooth - Corner End Mills - MZ-Line

CVD-D tipped - for machining brittle-hard Materials

Here you will find our variants of corner-tipped Multi-Tooth cutters with CVD-D tipped:

CVD-D Cutting Edge straight grooved	CVD-D Cutting Edge twist angle
	
<p>Ø1,00 mm – Ø10,00 mm up to 14 teeth</p>	<p>Ø3,00 mm – Ø6,00 mm up to 8 teeth</p>
<p>Benefits of the system:</p> <ul style="list-style-type: none"> ✓ Robust ✓ Precise ✓ Smooth running ✓ With internal cooling ✓ Very high feed rates possible ✓ For roughing and finishing ✓ Cutting edge over center ✓ Plunging possible 	<p>Benefits of the system:</p> <ul style="list-style-type: none"> ✓ Robust ✓ Precise ✓ Very smooth running ✓ Low cutting pressure ✓ With internal cooling ✓ Very high feed rates possible ✓ For roughing and finishing ✓ Cutting edge over center ✓ Helix milling and plunging possible

Application range:

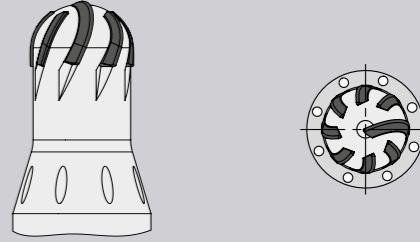
 all Multi Tooth cutter with internal cooling

- Ceramics
- Glass
- Glass Ceramic
- Carbide
- Aluminum with high Si content
- GFRP / CFRP / MMC
- Other high hardness and brittle materials

Multi-Tooth - Ball Nose End Mills - MZ-Line

CVD-D tipped - for machining brittle-hard Materials

Here you will find our variants of corner-tipped Multi-Tooth cutters with CVD-D tipped:

CVD-D Cutting Edge straight grooved	CVD-D Cutting Edge twist angle
	
<p>Ø1,00 mm – Ø6,00 mm up to 9 teeth</p>	<p>Ø3,00 mm – Ø6,00 mm up to 8 teeth</p>
<p>Benefits of the system:</p> <ul style="list-style-type: none"> ✓ Robust ✓ Precise ✓ Smooth running ✓ With internal cooling ✓ Very high feed rates possible ✓ For roughing and finishing ✓ Cutting edge over center ✓ Plunging possible 	<p>Benefits of the system:</p> <ul style="list-style-type: none"> ✓ Robust ✓ Precise ✓ Low cutting pressure ✓ Low cutting pressure ✓ With internal cooling ✓ Very high feed rates possible ✓ For roughing and finishing ✓ Cutting edge over center ✓ Helix milling and plunging possible

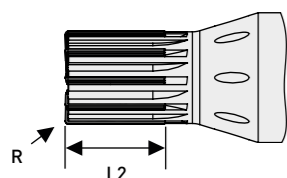
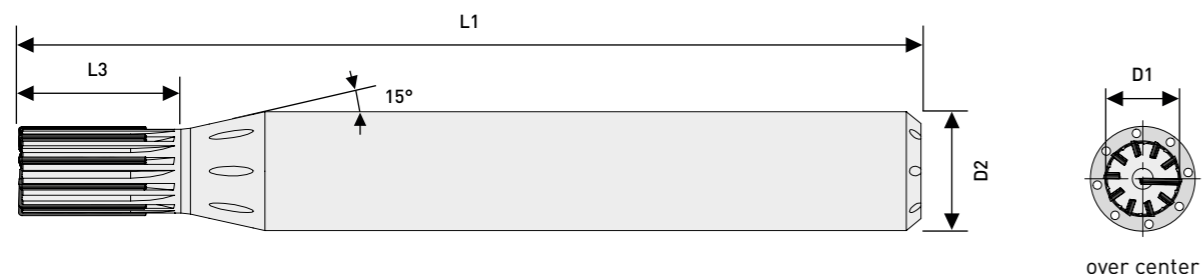
Application range:


 all Multi Tooth cutter with internal cooling

- Ceramics
- Glass
- Glass Ceramic
- Carbide
- Aluminum with high Si content
- GFRP / CFRP / MMC
- Other high hardness and brittle materials

Multi-Tooth - Corner End Mills - MZ-Line

CVD-D tipped - for machining brittle-hard Materials | Ø1,00 - 10,00




Internal cooling on request
Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank
with internal cooling 



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
1,00	45,00	3,00	3,00	1	0,030	6h5	FS2050-4500
1,50	45,00	3,00	3,00	2	0,030	6h5	FS2050-4502
2,00	45,00	3,00	3,00	3	0,030	6h5	FS2050-4505
3,00	50,00	3,00	4,50	5	0,050	6h5	FS2050-4515
	50,00	3,00	4,50	5	0,100	6h5	FS2050-4520
4,00	50,00	4,00	6,00	6	0,050	6h5	FS2050-4525
	50,00	4,00	6,00	6	0,100	6h5	FS2050-4530
5,00	50,00	5,00	7,50	7	0,050	8h5	FS2050-4535
	50,00	5,00	7,50	7	0,100	8h5	FS2050-4540
6,00	50,00	4,00	9,00	9	0,050	8h5	FS2050-4545
	50,00	4,00	9,00	9	0,150	8h5	FS2050-4550
8,00	60,00	6,00	12,00	12	0,100	12h5	FS2050-4555
	60,00	6,00	12,00	12	0,200	12h5	FS2050-4560
10,00	70,00	8,00	15,00	14	0,100	12h5	FS2050-4565
	70,00	8,00	15,00	14	0,200	12h5	FS2050-4570

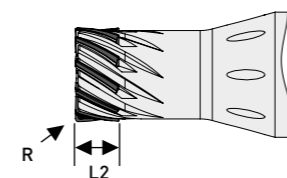
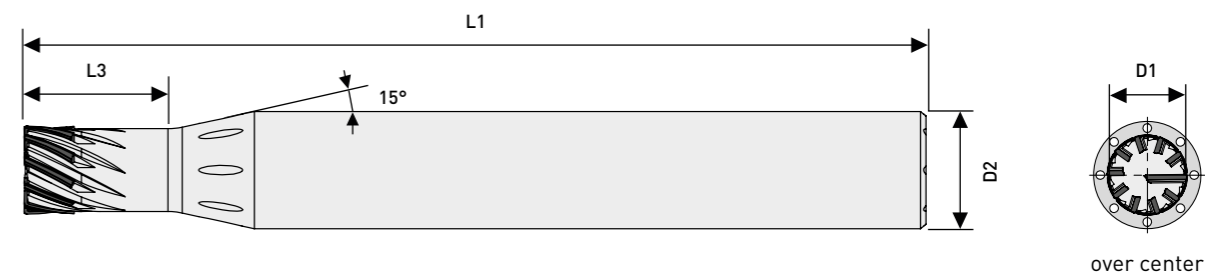
Application range:


-  **CVD-D** Carbide >10% Co, GFK, CFK, Aluminium >10% Si, Plastics allg., Kupfer, Graphit, Glaswerkstoffe, Titanium (Schichten) ...

You will find further application ranges in the detailed overview from page 8.

Multi-Tooth - Corner End Mills - MZ-Line

CVD-D tipped - with Angel of Twist for machining brittle-hard Materials | Ø2,00 - 6,00



Internal cooling on request
Radius tolerance: ± 0,004 mm
Length tolerance: ± 1,00 mm
Carbide shank
with internal cooling 



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
2,00	50,00	1,90	4,50	3	0,050	6h5	FS2050-4695
3,00	50,00	1,90	4,50	5	0,050	6h5	FS2050-4700
	50,00	1,90	4,50	5	0,100	6h5	FS2050-4705
4,00	50,00	2,50	6,00	5	0,050	6h5	FS2050-4710
	50,00	2,50	6,00	5	0,100	6h5	FS2050-4715
5,00	50,00	3,00	7,50	6	0,050	8h5	FS2050-4720
	50,00	3,00	7,50	6	0,100	8h5	FS2050-4725
	70,00	9,00	20,00	5	0,050	8h5	FS2050-4727
6,00	70,00	9,00	20,00	5	0,100	8h5	FS2050-4728
	50,00	3,00	9,00	8	0,050	8h5	FS2050-4730
	50,00	3,00	9,00	8	0,150	8h5	FS2050-4735
8,00	70,00	9,00	20,00	5	0,050	8h5	FS2050-4737
	70,00	9,00	20,00	5	0,150	8h5	FS2050-4738
	70,00	12,00	20,00	7	0,100	12h5	FS2050-4742
10,00	70,00	12,00	20,00	7	0,200	12h5	FS2050-4743
	70,00	15,00	20,00	7	0,100	12h5	FS2050-4752
70,00	15,00	20,00	7	0,200	12h5	FS2050-4753	



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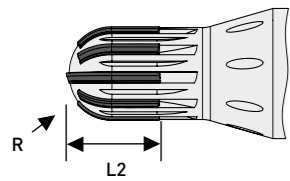
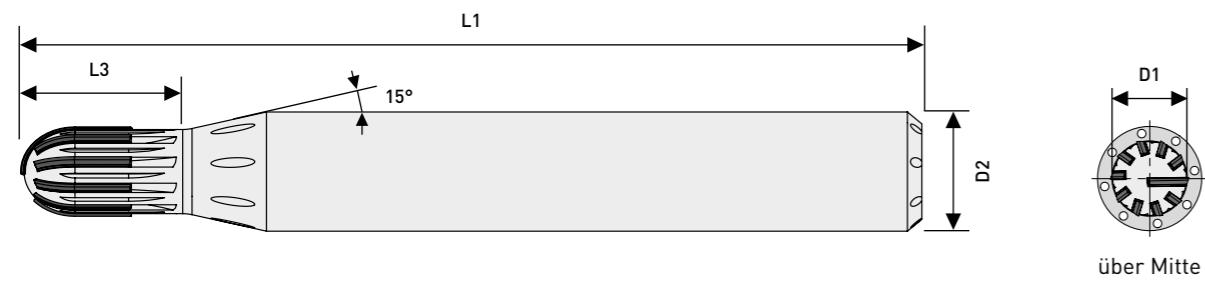



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Subject to technical changes.

Multi-Tooth - Ball Nose End Mills- MZ-Line

CVD-D tipped - for machining brittle-hard Materials | Ø1,00 - 6,00



Internal cooling on request
Radius tolerance: $\pm 0,004$ mm
Length tolerance: $\pm 1,00$ mm
Carbide shank
with internal cooling 



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
1,00	45,00	3,00	3,00	1	0,500	6h5	FS2050-5500
1,50	45,00	3,00	3,00	2	0,750	6h5	FS2050-5502
2,00	45,00	3,00	3,00	2	1,000	6h5	FS2050-5505
3,00	50,00	3,00	4,50	4	1,500	6h5	FS2050-5520
4,00	50,00	4,00	6,00	6	2,000	6h5	FS2050-5530
5,00	50,00	5,00	7,50	7	2,500	8h5	FS2050-5540
6,00	50,00	6,00	9,00	9	3,000	8h5	FS2050-5550

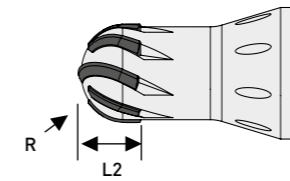
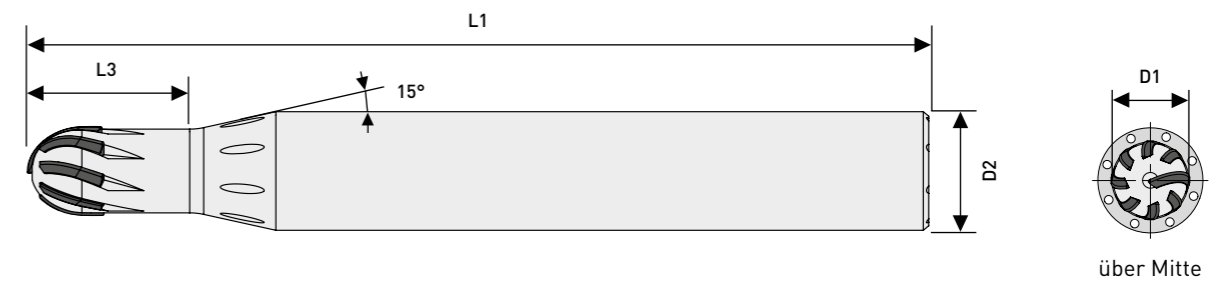
Application range:


- CVD-D** Carbide >10% Co, GFK, CFK, Aluminium >10% Si, Plastics allg., Kupfer, Graphit, Glaswerkstoffe, Titanium (Schichten) ...

You will find further application ranges in the detailed overview from page 8.

Multi-Tooth - Ball Nose End Mills - MZ-Line

CVD-D tipped - with Angel of Twist for machining brittle-hard Materials | Ø2,00 - 6,00



Internal cooling on request
Radius tolerance: $\pm 0,004$ mm
Length tolerance: $\pm 1,00$ mm
Carbide shank
with internal cooling 



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
2,00	50,00	1,20	4,50	2	1,000	6h5	FS2050-5700
3,00	50,00	1,90	4,50	4	1,500	6h5	FS2050-5720
4,00	50,00	2,50	6,00	5	2,000	6h5	FS2050-5730
5,00	50,00	3,00	7,50	6	2,500	8h5	FS2050-5740
6,00	50,00	4,00	9,00	8	3,000	8h5	FS2050-5750



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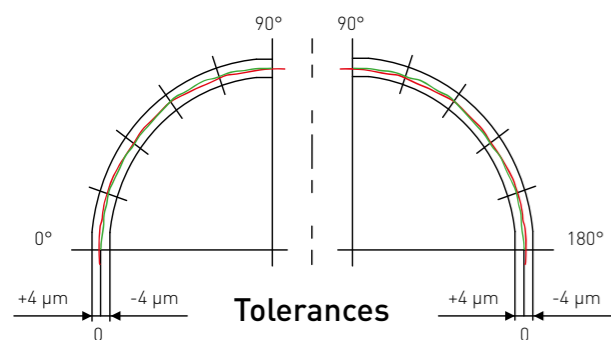
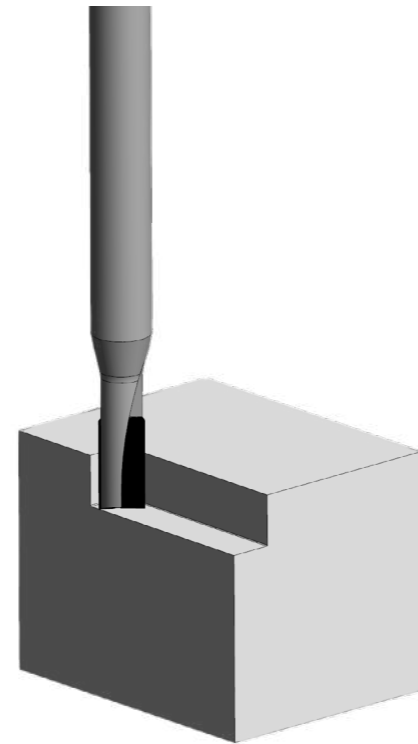
Corner End Mills - ST-Line

Diamond tipped

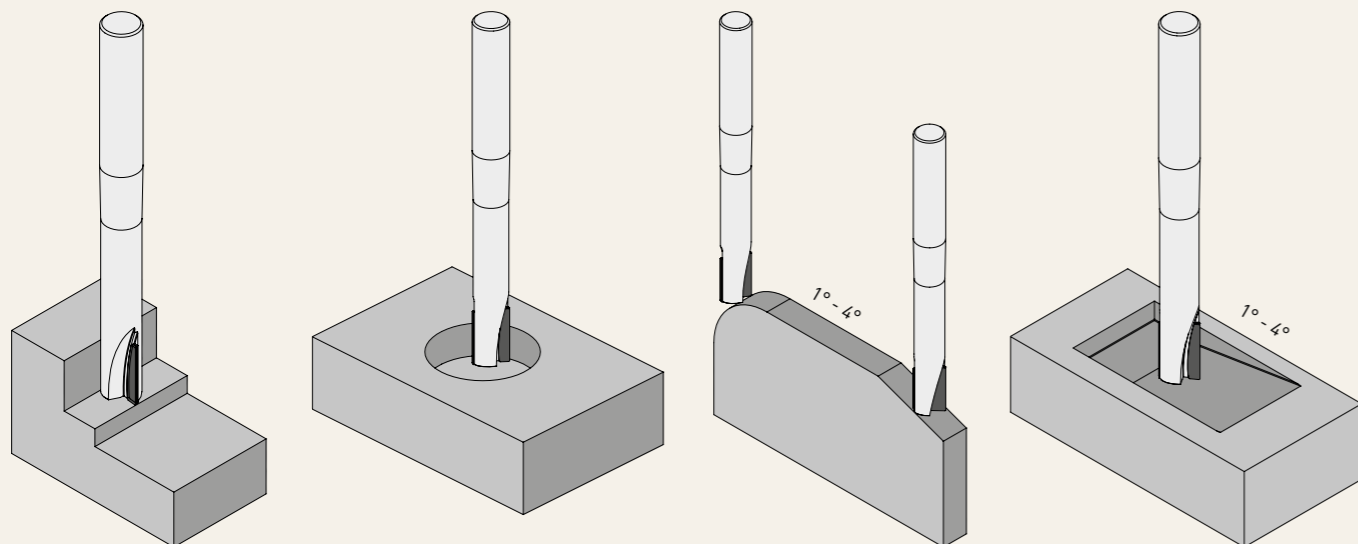
Our corner milling cutters tipped with diamond are used in series production and for milling brittle-hard materials..

Areas of application include:

- Milling of aluminum
- Milling of zinc
- Milling of brass
- Ceramic components
- Carbide components
- Components with the highest surface quality requirements
- Components with very tight tolerances
- Wherever very high tool life is required
- Abrasive materials



Machining options



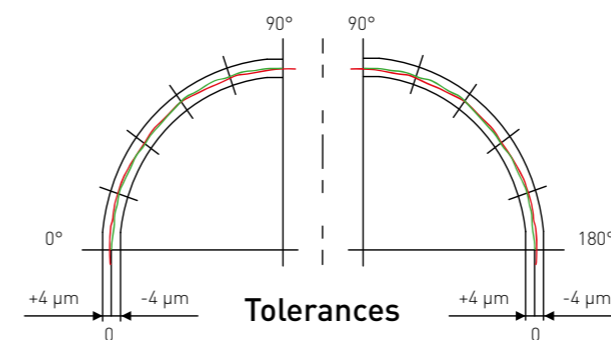
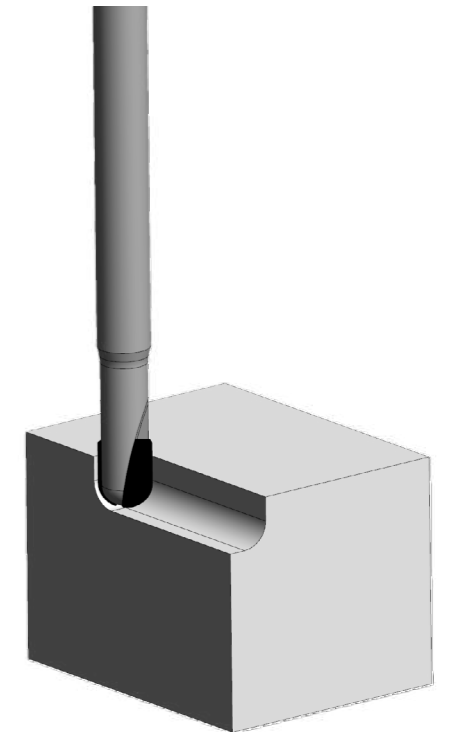
Ball Nose End Mills - ST-Line

Diamond tipped

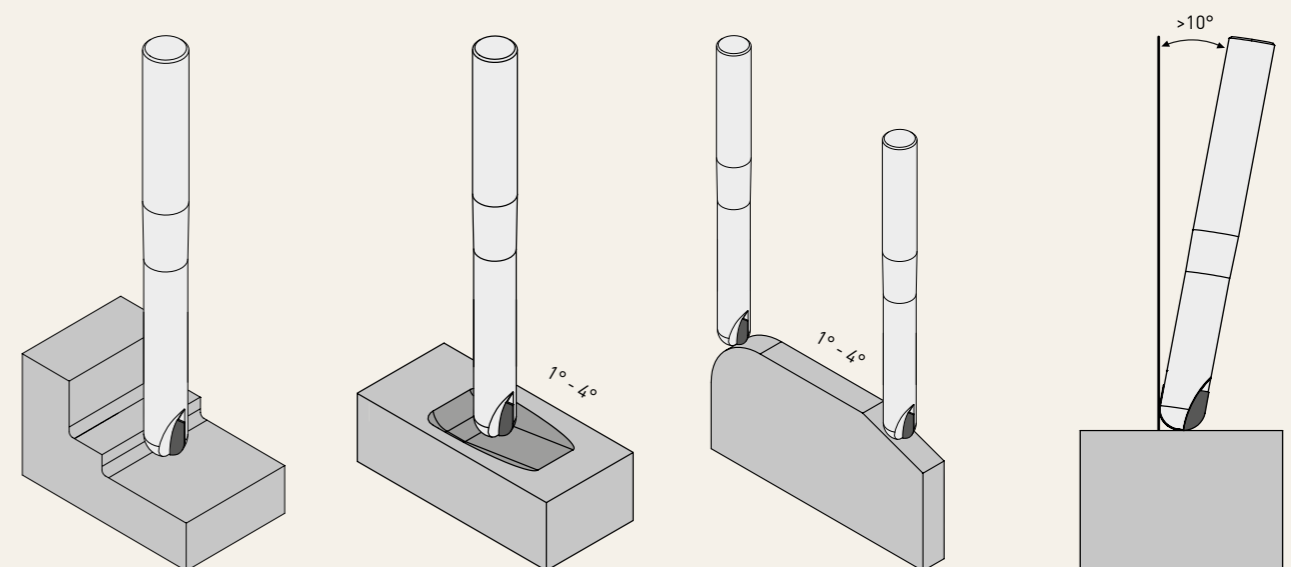
Our radius milling cutters tipped with diamond are used in series production and for profile milling of brittle-hard materials.

Areas of application include:

- Milling of aluminum
- Milling of zinc
- Milling of brass
- Ceramic components
- Carbide components
- Components with the highest surface quality requirements
- Components with very tight tolerances
- Wherever very high tool life is required
- Abrasive materials

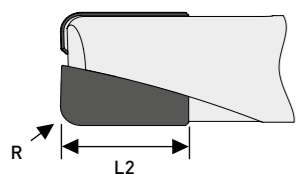
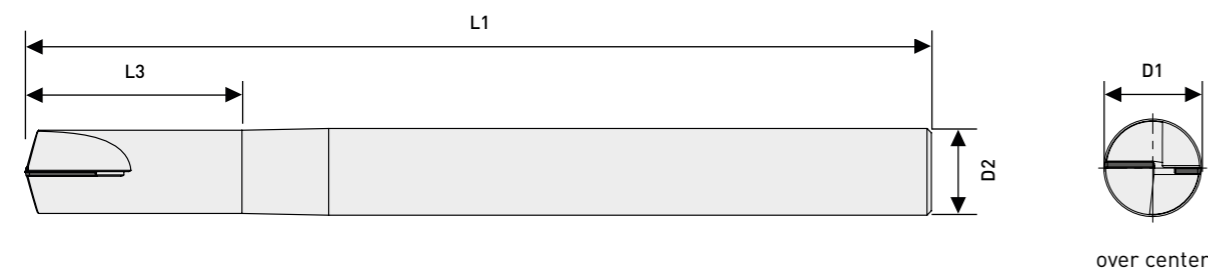


Machining options



Corner End Mills - ST-Line

Diamond edge tipped - PCD and CVD-D for general machining | Ø1,00 - 5,00



Radius tolerance: ± 0,004 mm
 Length tolerance: ± 1,00 mm
 Carbide shank

D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.	Item No.
1,00	38,00	3,00	4,00	1	0,050	4h5	FS1050-4009	FS2050-4009
	50,00	3,00	4,00	1	0,050	4h5	FS1050-4010	FS2050-4010
	50,00	2,00	5,00	1	0,100	6h5		FS2050-4011
	50,00	2,00	10,00	1	0,100	6h5		FS2050-4012
	50,00	2,00	20,00	1	0,100	6h5		FS2050-4013
1,50	38,00	2,00	3,00	2	0,005	4h5		FS2050-4018
	38,00	3,00	4,00	2	0,050	4h5	FS1050-4019	FS2050-4019
	50,00	3,00	4,00	2	0,050	4h5	FS1050-4020	FS2050-4020
	50,00	2,00	5,00	2	0,150	6h5		FS2050-4021
	50,00	2,00	10,00	2	0,150	6h5		FS2050-4022
2,00	50,00	2,00	20,00	2	0,150	6h5		FS2050-4023
	38,00	2,00	3,00	2	0,005	4h5		FS2050-4027
	38,00	4,00	6,00	2	0,005	4h5		FS2050-4028
	38,00	3,00	6,00	2	0,050	4h5	FS1050-4029	FS2050-4029
	50,00	3,00	5,00	2	0,100	4h5	FS1050-4030	FS2050-4030
	50,00	3,50	8,00	2	0,100	4h5	FS1050-4040	FS2050-4040
	50,00	3,00	5,00	2	0,150	6h5		FS2050-4041
	50,00	3,00	10,00	2	0,150	6h5		FS2050-4042
50,00	3,00	20,00	2	0,150	6h5		FS2050-4043	

D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.	Item No.
2,50	38,00	5,00	7,00	2	0,005	4h5		FS2050-4048
	38,00	4,00	6,00	2	0,100	4h5	FS1050-4049	FS2050-4049
	50,00	4,00	6,00	2	0,100	4h5	FS1050-4050	FS2050-4050
3,00	50,00	4,00	10,00	2	0,100	4h5	FS1050-4060	FS2050-4060
	38,00	3,00	5,00	2	0,005	4h5		FS2050-4068
	38,00	6,00	9,00	2	0,005	4h5		FS2050-4069
	50,00	5,00	8,00	2	0,100	6h5	FS1050-4070	FS2050-4070
	50,00	5,00	8,00	2	0,200	6h5	FS1050-4071	FS2050-4071
	50,00	5,00	8,00	2	0,500	6h5	FS1050-4072	FS2050-4072
	60,00	5,00	12,00	2	0,100	6h5	FS1050-4080	FS2050-4080
	75,00	4,00	10,00	2	0,300	6h5		FS2050-4081
4,00	75,00	4,00	15,00	2	0,300	6h5		FS2050-4082
	75,00	4,00	20,00	2	0,300	6h5		FS2050-4083
	38,00	6,00	10,00	2	0,010	4h5		FS2050-4089
	60,00	5,00	10,00	2	0,100	6h5	FS1050-4090	FS2050-4090
	60,00	5,00	10,00	2	0,300	6h5	FS1050-4091	FS2050-4091
	60,00	5,00	10,00	2	0,500	6h5	FS1050-4092	FS2050-4092
	65,00	5,00	16,00	2	0,100	6h5	FS1050-4100	FS2050-4100
	75,00	5,00	10,00	2	0,300	6h5		FS2050-4101
	75,00	5,00	20,00	2	0,300	6h5		FS2050-4102
5,00	75,00	5,00	30,00	2	0,300	6h5		FS2050-4103
	50,00	6,00	12,00	2	0,010	6h5		FS2050-4109
	60,00	6,00	12,00	2	0,200	6h5	FS1050-4110	FS2050-4110
	60,00	6,00	12,00	2	0,500	6h5	FS1050-4111	FS2050-4111
	70,00	6,00	16,00	2	0,200	6h5	FS1050-4120	FS2050-4120
	80,00	6,00	25,00	2	0,200	6h5	FS1050-4130	FS2050-4130
	75,00	6,00	15,00	2	0,500	6h5		FS2050-4131
	75,00	6,00	25,00	2	0,500	6h5		FS2050-4132
	75,00	6,00	35,00	2	0,500	6h5		FS2050-4133

Application range:

- PCD** Aluminum <10% Si, Graphite, Brass, Copper alloys, Bronze, Ceramics green body, Titanium (roughing)
- CVD-D** Aluminum >10% Si, CFRP/MMS, GFRP, Fine graphite, Glass materials, Carbide >10% Co, Copper, Titanium (finishing)...

You will find further application ranges in the detailed overview from page 8.



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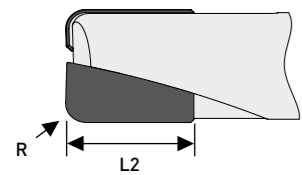
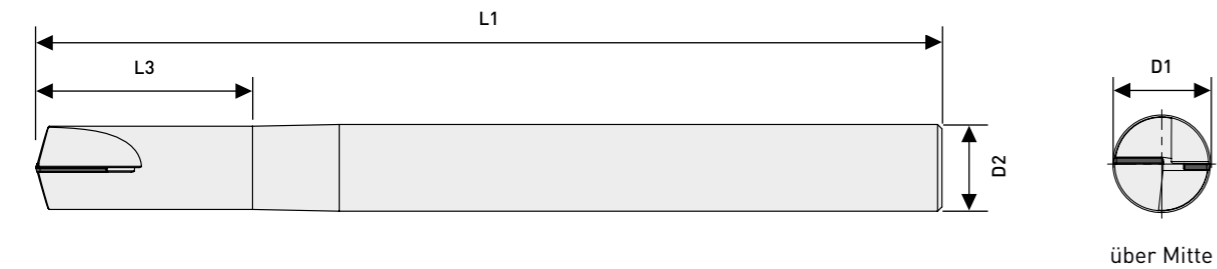


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Subject to technical changes.

Corner End Mills - ST-Line

Diamond edge tipped - PCD and CVD-D for general machining | Ø6,00 - 20,00



Radius tolerance: $\pm 0,004$ mm
Length tolerance: $\pm 1,00$ mm
Carbide shank

D1	L1	L2	L3	Teeth Count Z	R	D2	Diamond	
							PCD	CVD-D
							Item No.	Item No.
6,00	50,00	8,00	15,00	2	0,010	6h5		FS2050-4139
	65,00	6,00	15,00	2	0,200	6h5	FS1050-4140	FS2050-4140
	65,00	6,00	15,00	2	0,500	6h5	FS1050-4141	FS2050-4141
	65,00	6,00	15,00	2	1,000	6h5	FS1050-4142	FS2050-4142
	75,00	8,00	20,00	2	0,200	6h5	FS1050-4150	FS2050-4150
	85,00	10,00	30,00	2	0,200	6h5	FS1050-4160	FS2050-4160
	100,00	6,00	20,00	2	0,300	6h5		FS2050-4161
	100,00	6,00	30,00	2	0,300	6h5		FS2050-4162
	100,00	6,00	40,00	2	0,300	6h5		FS2050-4163
8,00	70,00	8,00	20,00	2	0,300	8h5	FS1050-4170	FS2050-4170
	70,00	8,00	20,00	2	0,500	8h5	FS1050-4171	FS2050-4171
	70,00	8,00	20,00	2	1,000	8h5	FS1050-4172	FS2050-4172
	85,00	16,00	40,00	2	0,300	8h5	FS1050-4180	FS2050-4180
	100,00	7,00	25,00	2	1,000	8h5		FS2050-4181
	100,00	7,00	40,00	2	1,000	8h5		FS2050-4182
	100,00	7,00	60,00	2	1,000	8h5		FS2050-4183

D1	L1	L2	L3	Teeth Count Z	R	D2	Diamond	
							PCD	CVD-D
							Item No.	Item No.
10,00	75,00	8,00	25,00	2	0,300	10h5	FS1050-4189	FS2050-4189
	75,00	8,00	25,00	2	0,500	10h5	FS1050-4190	FS2050-4190
	75,00	8,00	25,00	2	1,000	10h5	FS1050-4191	FS2050-4191
	105,00	16,00	50,00	2	0,300	10h5	FS1050-4192	FS2050-4192
	105,00	16,00	50,00	2	0,500	10h5	FS1050-4193	FS2050-4193
	105,00	16,00	50,00	2	1,000	10h5	FS1050-4200	FS2050-4200
12,00	80,00	8,00	30,00	2	0,500	12h5	FS1050-4210	FS2050-4210
	80,00	8,00	30,00	2	1,000	12h5	FS1050-4211	FS2050-4211
	105,00	16,00	60,00	2	0,500	12h5	FS1050-4212	FS2050-4212
	105,00	16,00	60,00	2	1,000	12h5	FS1050-4220	FS2050-4220
16,00	105,00	20,00	30,00	2	0,500	16h5	FS1050-4229	FS2050-4229
	105,00	20,00	30,00	2	1,000	16h5	FS1050-4230	FS2050-4230
20,00	105,00	20,00	30,00	2	1,000	20h5	FS1050-4240	FS2050-4240

Application range:

- PCD** Aluminum <10% Si, Graphite, Brass, Copper alloys, Bronze, Ceramics green body, Titanium (roughing)
- CVD-D** Aluminum >10% Si, CFRP/MMS, GFRP, Fine graphite, Glass materials, Carbide >10% Co, Copper, Titanium (finishing)

You will find further application ranges in the detailed overview from page 8.



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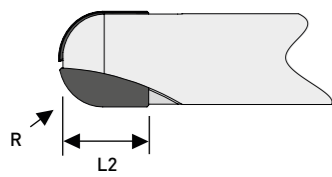
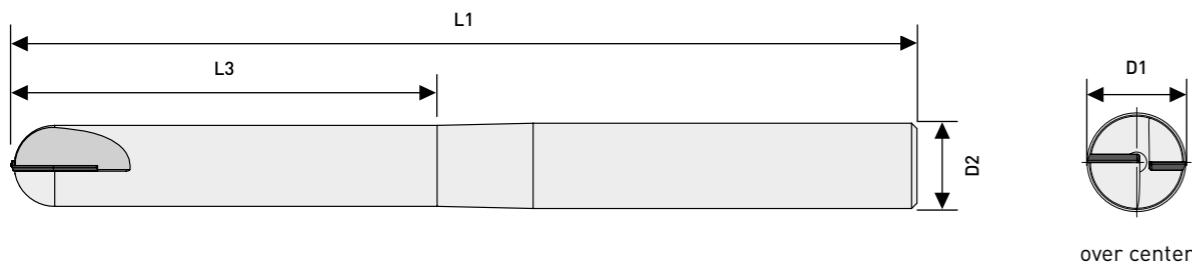
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Ball Nose End Mills - ST-Line


Diamond edge tipped - PCD and CVD-D for general machining | Ø6,00 - 12,00

Your Notes





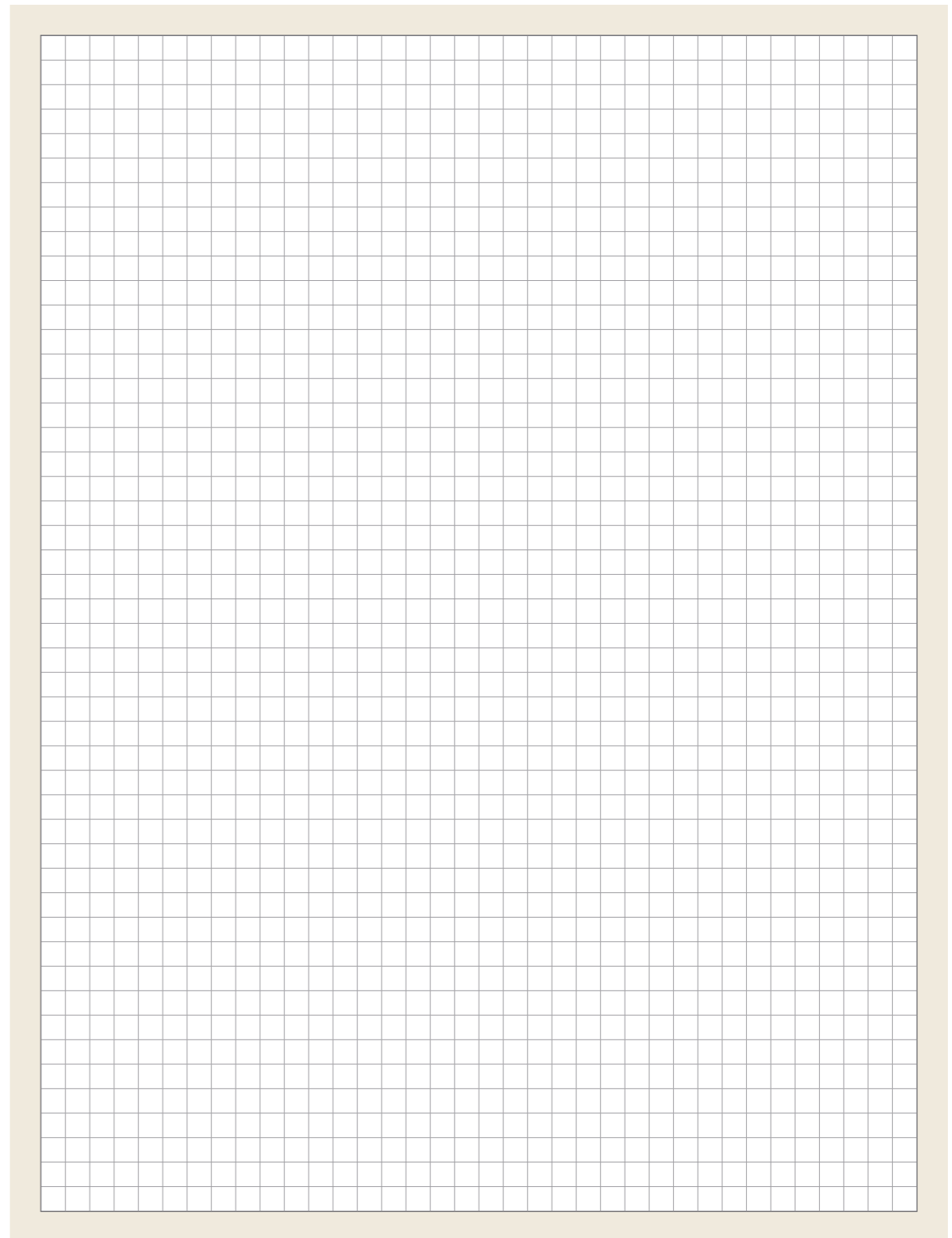
Radius tolerance: ± 0,004 mm
 Length tolerance: ± 1,00 mm
 Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No. 	Item No. 
6,00	50,00	6,00	15,00	2	3,000	6h5	FS1050-5128	FS2050-5128
	50,00	6,00	20,00	2	3,000	6h5	FS1050-5129	FS2050-5129
	65,00	6,00	15,00	2	3,000	6h5	FS1050-5130	FS2050-5130
	75,00	6,00	20,00	2	3,000	6h5	FS1050-5140	FS2050-5140
	100,00	6,00	20,00	2	3,000	6h5		FS2050-5141
	100,00	6,00	30,00	2	3,000	6h5		FS2050-5142
	100,00	6,00	40,00	2	3,000	6h5		FS2050-5143
8,00	63,00	8,00	20,00	2	4,000	8h5	FS1050-5149	FS2050-5149
	70,00	8,00	20,00	2	4,000	8h5	FS1050-5150	FS2050-5150
	85,00	8,00	40,00	2	4,000	8h5	FS1050-5160	FS2050-5160
	100,00	7,00	25,00	2	4,000	8h5		FS2050-5161
	100,00	7,00	40,00	2	4,000	8h5		FS2050-5162
	100,00	7,00	60,00	2	4,000	8h5		FS2050-5163
10,00	75,00	10,00	25,00	2	5,000	10h5	FS1050-5170	FS2050-5170
	90,00	10,00	40,00	2	5,000	10h5	FS1050-5180	FS2050-5180
12,00	85,00	12,00	30,00	2	6,000	12h5	FS1050-5190	FS2050-5190
	100,00	12,00	45,00	2	6,000	12h5	FS1050-5200	FS2050-5200

Application range:

-  **PCD** Aluminum <10% Si, Graphite, Brass, Copper alloys, Bronze, Ceramics green body, Titanium (roughing)
-  **CVD-D** Aluminum >10% Si, CFRP/MMS, GFRP, Fine graphite, Glass materials, Carbide >10% Co, Copper, Titanium (finishing)

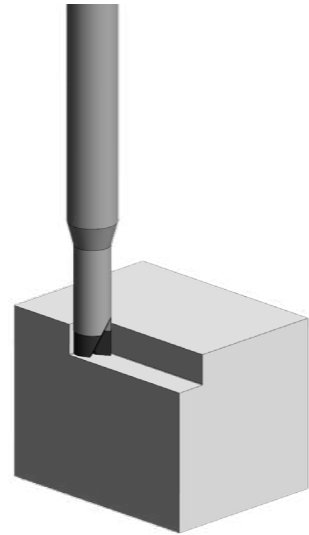


Solid CBN Corner End Mills - CBN-Line

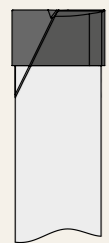
Our CBN Corner End Mills are used for the milling of hardened materials.

Application range for example:

- Steel, hardened up to 72HRC
- Tool Steel hardened
- PM Steel, hardened up to 72HRC
- Components with the highest surface requirements
- Components with very low tolerances



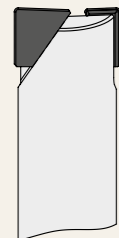
CBN Corner End Mills and their advantages in overview:



Cutting Edge made of Solid CBN, brazed, straight toothed

- ✓ Best surfaces during finishing
- ✓ Very good heat dissipation
- ✓ Very stable
- ✓ Highest speeds possible
- ✓ From Ø 0,30 mm up to Ø 6,00 mm

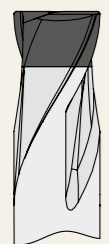
from page 36



Cutting Edge made of CBN, corner tipped, straight toothed

- ✓ Best surfaces
- ✓ Good heat dissipation
- ✓ High speeds possible
- ✓ From Ø 6,00 mm up to Ø 12,00 mm

from page 38



Cutting Edge made of Solid CBN, brazed with helix

- ✓ Best surfaces
- ✓ Ideally suited for roughing and finishing
- ✓ Very good heat dissipation
- ✓ Very stable
- ✓ Highest speeds possible
- ✓ From Ø 0,30 mm up to Ø 6,00 mm

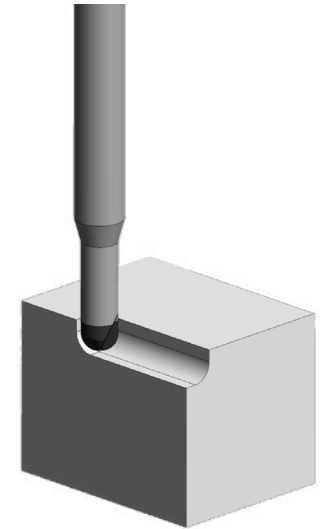
from page 39

Solid CBN Ball Nose End Mills - CBN-Line

Our CBN Ball Nose End Mills is used for milling hardened materials.
hardened materials.

Application range for example:

- Steel, hardened to 72HRC
- Tool Steel, Cold- and Hot Work Steel hardened
- PM Steel, hardened to 72HRC
- Bauteile with sehr hohen Oberflächenanforderungen
- Bauteile with sehr geringen Tolerances



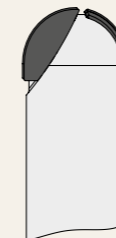
CBN Ball Nose End Mills and their advantages in the overview:



Cutting Edge made of Solid CBN, brazed, straight toothed

- ✓ Best surfaces during finishing
- ✓ Very good heat dissipation
- ✓ Very stable
- ✓ Highest speeds possible
- ✓ From Ø 0,20 mm up to Ø 6,00 mm

from page 42



Cutting Edge made of CBN, corner tipped, straight toothed

- ✓ Best surfaces
- ✓ Good heat dissipation
- ✓ High speeds possible
- ✓ From Ø 6,00 mm up to Ø 12,00 mm

from page 43



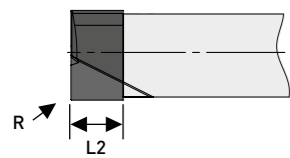
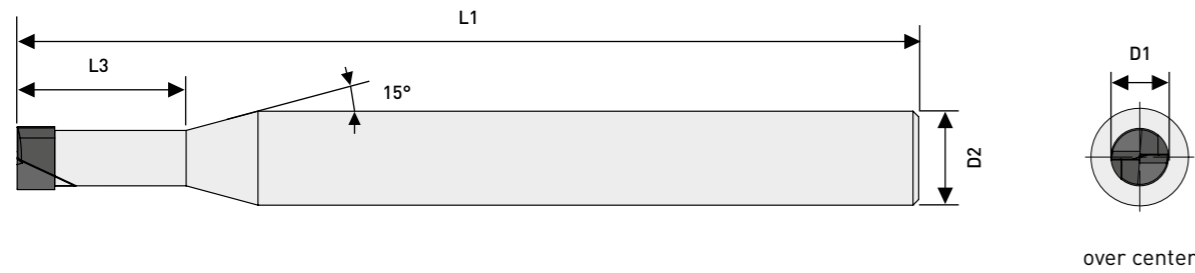
Cutting Edge made of Solid CBN, brazed with helix

- ✓ Best surfaces
- ✓ Ideally suited for roughing and finishing
- ✓ Very good heat dissipation
- ✓ Very stable
- ✓ Highest speeds possible
- ✓ From Ø 0,20 mm up to Ø 6,00 mm

from page 44

Corner End Mills - CBN-Line

Solid CBN tipped | Ø0,30 - 6,00



Internal cooling on request
 Radius tolerance: ± 0,004 mm
 Length tolerance: ± 1,00 mm
 Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
0,30	48,00	0,30	0,90	2	0,03	4h5	FS5940-0204
	48,00	0,30	0,90	2	0,05	4h5	FS5940-0210
0,40	48,00	0,40	1,20	2	0,03	4h5	FS5940-0216
	48,00	0,40	1,20	2	0,05	4h5	FS5940-0222
0,50	48,00	0,50	1,50	2	0,03	4h5	FS5940-0236
	48,00	0,50	1,50	2	0,05	4h5	FS5940-0246
1,00	48,00	1,00	2,00	2	0,03	4h5	FS5940-0262
	48,00	1,00	2,00	2	0,05	4h5	FS5940-0276
	48,00	1,00	2,00	2	0,10	4h5	FS5940-0290
	48,00	1,00	2,00	2	0,20	4h5	FS5940-0304
1,50	48,00	1,50	4,50	2	0,03	4h5	FS5940-0318
	48,00	1,50	4,50	2	0,05	4h5	FS5940-0322
2,00	48,00	1,50	6,00	2	0,03	4h5	FS5940-0334
	48,00	1,50	6,00	2	0,05	4h5	FS5940-0338
	48,00	1,50	6,00	2	0,10	4h5	FS5940-0342
	48,00	1,50	6,00	2	0,20	4h5	FS5940-0346
	48,00	1,50	6,00	2	0,30	4h5	FS5940-0350

Application range:

- **CBN** Steel hardened to 72HRC, Tool Steel hardened to 72HRC, VHM >20%Co, Stellite, Inconel, Cast, Titanium, schwer zerspanbare Steels ...

You will find further application ranges in the detailed overview from page 8.



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
3,00	48,00	2,00	9,00	2	0,20	6h5	FS5940-0020
	48,00	2,00	9,00	2	0,30	6h5	FS5940-0022
	48,00	2,00	9,00	2	0,40	6h5	FS5940-0024
4,00	48,00	2,00	12,00	2	0,03	6h5	FS5940-0026
	48,00	2,00	12,00	2	0,20	6h5	FS5940-0028
	48,00	2,00	12,00	2	0,30	6h5	FS5940-0030
	48,00	2,00	12,00	2	0,50	6h5	FS5940-0032
6,00	58,00	2,00	20,00	2	0,03	6h5	FS5940-0042
	58,00	2,00	20,00	2	0,20	6h5	FS5940-0044
	58,00	2,00	20,00	2	0,30	6h5	FS5940-0046
	58,00	2,00	20,00	2	0,50	6h5	FS5940-0048



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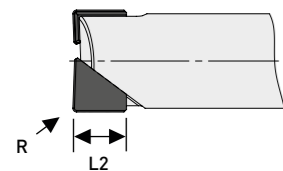
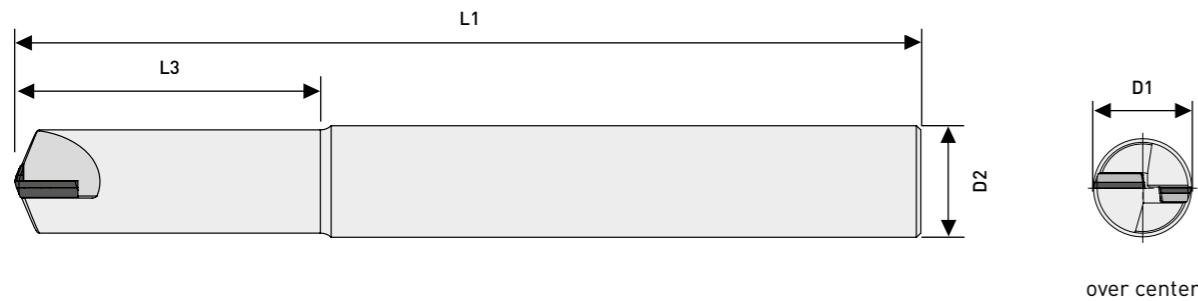


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Subject to technical changes.

Corner End Mills - CBN-Line

CBN edge tipped | Ø4,00 - 12,00



Blade tolerance: - 0,010
 Radius tolerance: ± 0,005
 Shank tolerance: - 0,003mm
 Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
4,00	50,00	6,00	11,00	2	0,500	6h5	FS5950-0034
	50,00	6,00	11,00	2	1,000	6h5	FS5950-0035
5,00	57,00	6,00	21,00	2	0,500	6h5	FS5950-0036
	57,00	6,00	21,00	2	1,000	6h5	FS5950-0037
6,00	50,00	7,00	11,00	2	0,500	6h5	FS5950-0038
	50,00	7,00	11,00	2	1,000	6h5	FS5950-0039
	50,00	4,00	15,00	2	0,200	6h5	FS5950-0045
	50,00	4,00	15,00	2	0,300	6h5	FS5950-0046
8,00	60,00	4,00	20,00	2	0,300	8h5	FS5950-0050
	60,00	4,00	20,00	2	0,500	8h5	FS5950-0051
10,00	60,00	5,00	25,00	2	0,300	10h5	FS5950-0052
	60,00	5,00	25,00	2	0,800	10h5	FS5950-0053
12,00	70,00	5,00	25,00	2	1,000	12h5	FS5950-0054

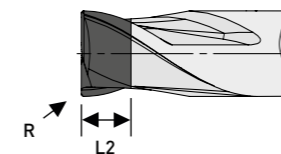
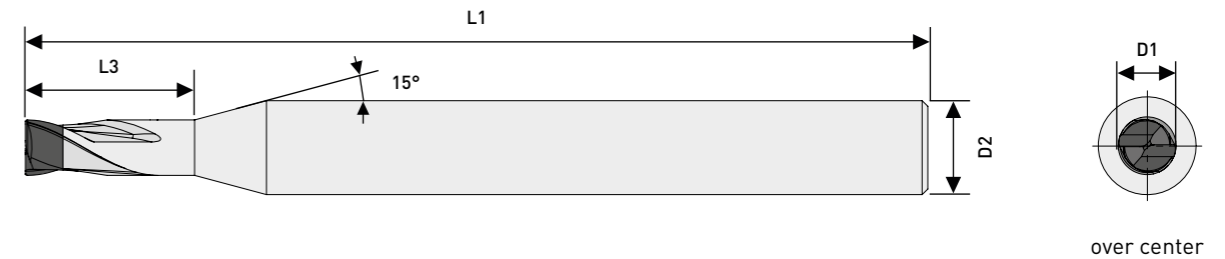
Application range:

- **CBN** Steel hardened to 72HRC, Tool Steel hardened to 72HRC, VHM >20%Co, Stellite, Inconel, Cast, Titanium, schwer zerspanbare Steels ...

You will find further application ranges in the detailed overview from page 8.

Corner End Mills - CBN-Line

Solid CBN tipped - with twist angle | Ø0,30 - 0,50



Blade tolerance: - 0,010
 Radius tolerance: ± 0,005
 Shank tolerance: - 0,003mm
 Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
0,30	48,00	0,30	0,90	2	0,03	4h5	FS5940-2202
	48,00	0,30	0,90	2	0,05	4h5	FS5940-2206
	48,00	0,50	1,00	3	0,02	4h5	FS5940-2210
	48,00	0,50	1,00	3	0,05	4h5	FS5940-2214
0,40	48,00	0,40	1,20	2	0,03	4h5	FS5940-2218
	48,00	0,40	1,20	2	0,10	4h5	FS9540-2222
	48,00	0,50	1,20	3	0,05	4h5	FS5940-2226
	48,00	0,50	1,20	3	0,05	4h5	FS5940-2230
0,50	48,00	0,50	1,50	2	0,03	4h5	FS5940-2234
	48,00	0,50	1,50	2	0,10	4h5	FS5940-2238
	48,00	0,50	1,50	3	0,02	4h5	FS5940-2242
	48,00	0,50	1,50	3	0,10	4h5	FS5940-2246
0,60	48,00	0,60	1,80	3	0,02	4h5	FS5940-2250
	48,00	0,60	1,80	3	0,10	4h5	FS5940-2254
0,70	48,00	0,70	2,10	3	0,02	4h5	FS5940-2258
	48,00	0,70	2,10	3	0,10	4h5	FS5940-2262



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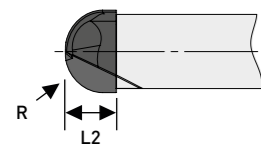
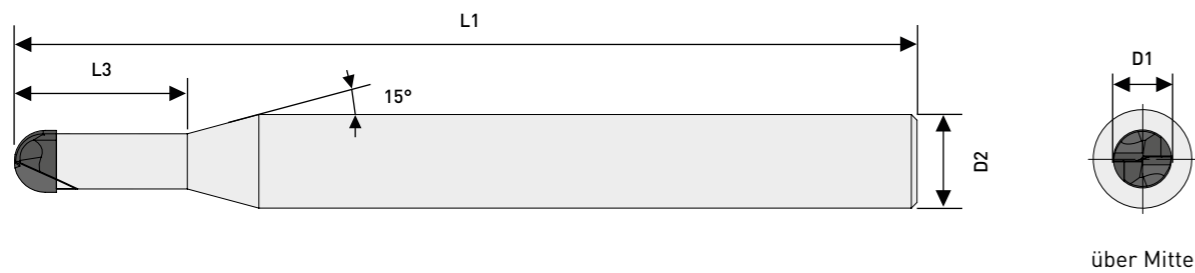


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Subject to technical changes.

Ball Nose End Mills - CBN-Line

Solid CBN tipped | Ø0,20 - 6,00



Blade tolerance: - 0,010
Radius tolerance: ± 0,005
Shank tolerance: - 0,003mm
Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
0,20	48,00	0,20	0,60	2	0,10	4h5	FS5940-1202
0,30	48,00	0,30	0,90	2	0,10	4h5	FS5940-1206
0,40	48,00	0,40	1,20	2	0,20	4h5	FS5940-1210
0,50	48,00	0,50	1,50	2	0,25	4h5	FS5940-1214
0,60	48,00	0,60	1,80	2	0,30	4h5	FS5940-1218
0,80	48,00	0,80	2,40	2	0,40	4h5	FS5940-1222
1,00	48,00	1,00	3,00	2	0,50	4h5	FS5940-1226
1,50	48,00	1,50	4,50	2	0,75	4h5	FS5940-1238
2,00	48,00	1,50	6,00	2	1,00	4h5	FS5940-1250
3,00	48,00	2,00	9,00	2	1,50	6h5	FS5940-1028
4,00	48,00	2,50	12,00	2	2,00	6h5	FS5940-1030
6,00	48,00	3,50	20,00	2	3,00	6h5	FS5940-1034

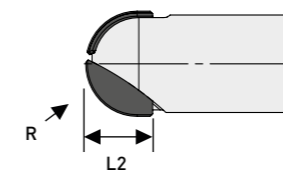
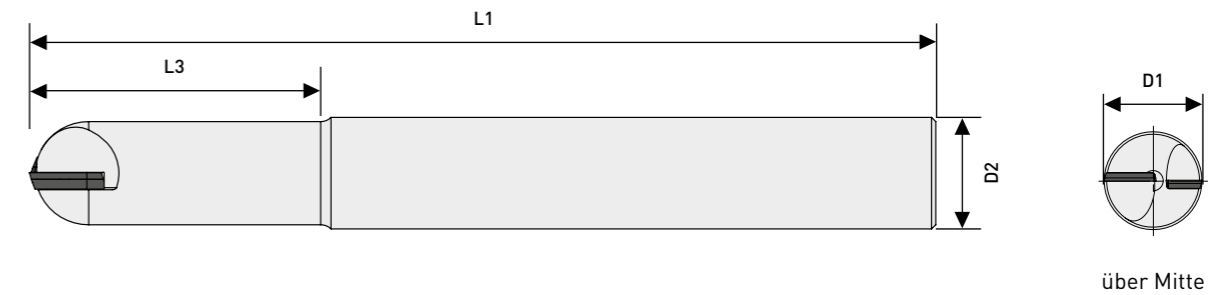
Application range:

- **CBN** Steel hardened to 72 HRC, Tool Steel hardened to 72 HRC, Solid carbide >20% Co, Stellite, Inconel, Cast, Titanium, difficult-to-machine steels

You will find further application ranges in the detailed overview from page 8.

Ball Nose End Mills - CBN-Line

CBN edge tipped | Ø6,00 - 12,00



Blade tolerance: - 0,010
Radius tolerance: ± 0,005
Shank tolerance: - 0,003mm
Carbide shank



D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
6,00	50,00	4,00	12,00	2	3,00	6h5	FS5950-1035
8,00	63,00	5,00	20,00	2	4,00	8h5	FS5950-1036
10,00	90,00	6,00	25,00	2	5,00	10h5	FS5950-1038
12,00	85,00	7,00	30,00	2	6,00	12h5	FS5950-1040



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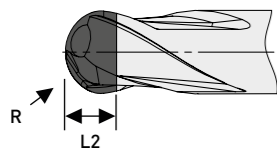
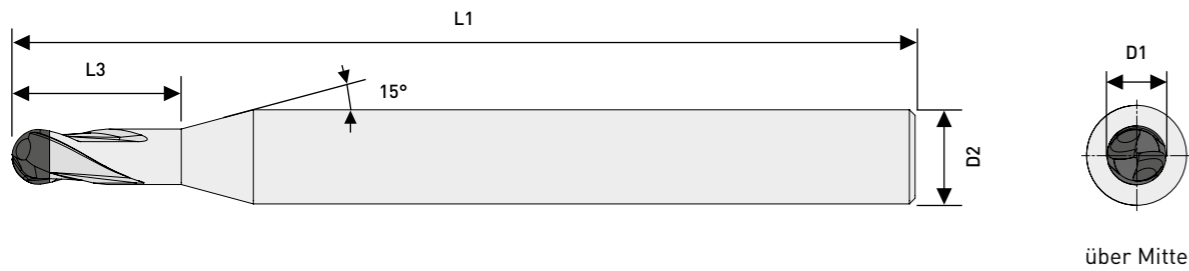


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Subject to technical changes.

Ball Nose End Mills - CBN-Line

Solid CBN tipped - with twist angle | Ø0,20 - 6,00



Blade tolerance: - 0,010
 Radius tolerance: ± 0,005
 Shank tolerance: - 0,003mm
 Carbide shank

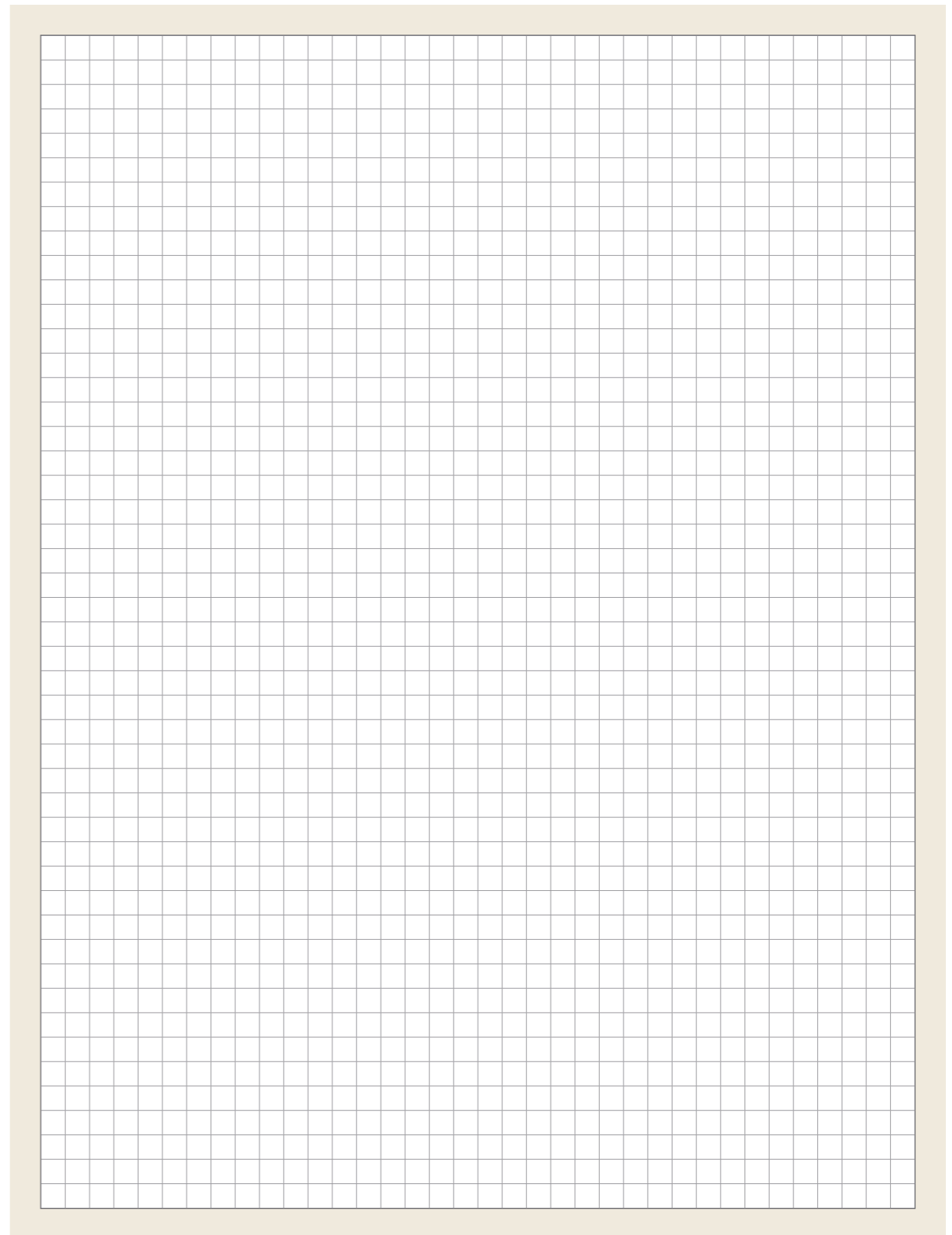


D1	L1	L2	L3	Teeth Count Z	R	D2	Item No.
0,20	48,00	0,20	0,60	2	0,10	4h5	FS5940-3202
0,30	48,00	0,30	0,90	2	0,15	4h5	FS5940-3206
0,40	48,00	0,40	1,20	2	0,20	4h5	FS5940-3210
0,50	48,00	0,50	1,50	2	0,25	4h5	FS5940-3214
0,60	48,00	0,60	1,80	2	0,30	4h5	FS5940-3218
0,80	48,00	0,80	2,40	2	0,40	4h5	FS5940-3222
1,00	48,00	1,00	3,00	2	0,50	4h5	FS5940-3226
1,50	48,00	1,50	4,50	2	0,75	4h5	FS5940-3246
2,00	48,00	2,00	6,00	2	1,00	4h5	FS5940-3258
1,00	48,00	1,00	2,00	3	0,50	6h5	FS5940-3016
1,50	48,00	1,50	3,00	3	0,75	6h5	FS5940-3024
2,00	48,00	1,50	4,00	3	1,00	6h5	FS5940-3032
3,00	48,00	2,00	9,00	2	1,50	6h5	FS5940-3034
3,00	48,00	2,00	6,00	3	1,50	6h5	FS5940-3036
4,00	48,00	2,50	12,00	2	2,00	6h5	FS5940-3038
6,00	58,00	3,50	20,00	2	3,00	6h5	FS5940-3042

Application range:

- **CBN** Steel hardened to 72 HRC, Tool Steel hardened to 72 HRC, Solid carbide >20% Co, Stellite, Inconel, Cast, Titanium, difficult-to-machine steels

Your Notes

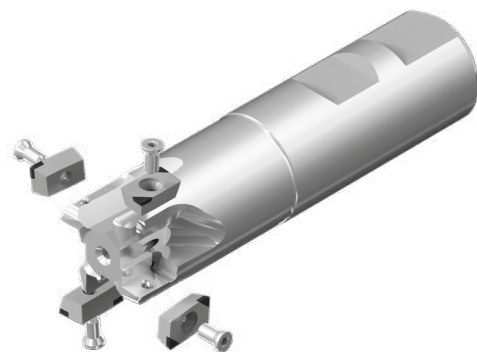


End Mills with indexable inserts

for PCD, CVD-D and CBN

Highly economical milling system from Ø10 - 25mm, developed for use with Diamond and CBN inserts.

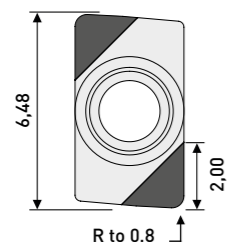
The system can be clamped in collet, Weldon and especially in Hydraulic Expansion chucks.



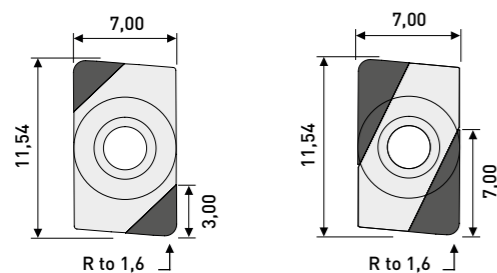
Due to multiple cutting edges, the inserts are particularly economical in use.

Short and long cutting edges available

AOEX 04...



AOEX 07...



Corner Radius:

- R 0,20 mm
- R 0,50 mm
- R 0,40 mm
- R 0,80 mm
- R 1,00 mm
- R 1,20 mm
- R 1,60 mm
- R 2,00 mm
- Special versions possible

Available cutting materials for the machining of...



Aluminium, Brass
Carbide, Copper
Ceramic,
Other non-ferrous material



Plastics, Carbide
GFK / CFK
Other non-ferrous material



Steel, hardened



Grey Cast Iron
Ductile Cast Iron

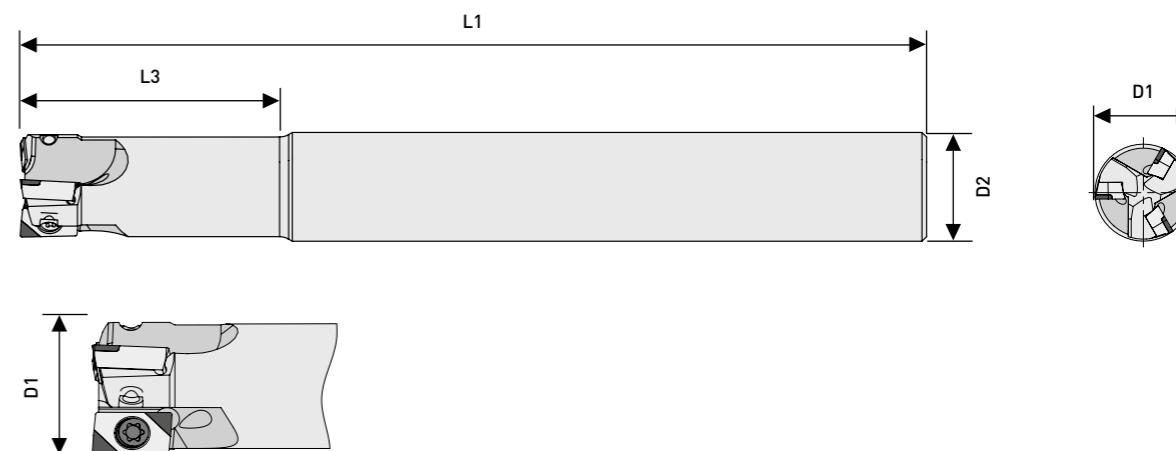


Tool Steel, hardened
Carbide/Steel-Composite
Stellite, Inconel
Ni-, Co-, Fe- and Cr-Alloys

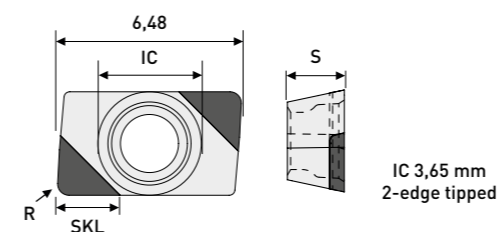
Face and Corner End Mills

for indexable inserts AOEX | Ø10,00 - 14,00

Diamond Tooling Systems



D1	D2	L1	L3	Teeth Count Z	n max	Item No.	Item No.	Item No.
10,00	10h6	100,00	28,00	2	36.000	FW7060-0050	01-SP9090-0186	01-SP9091-0090
12,00	12h6	100,00	30,00	3	36.000	FW7060-0055	01-SP9090-0188	01-SP9091-0090
14,00	12h6	120,00	32,00	3	36.000	FW7060-0060	01-SP9090-0188	01-SP9091-0090



Iso Code	SKL	S	R	Item No.	Item No.	Item No.	Item No.	Item No.
AOEX 040202	2,00	2,38	0,20	MI1010-0020	MI2010-0020	MI5010-0020	MI5510-0020	MI5910-0020
AOEX 040204	2,00	2,38	0,40	MI1010-0025	MI2010-0025	MI5010-0025	MI5510-0025	MI5910-0025
AOEX 040205	2,00	2,38	0,50	MI1010-0026	MI2010-0026	MI5010-0026	MI5510-0026	MI5910-0026
AOEX 040208	2,00	2,38	0,80	MI1010-0030	MI2010-0030	MI5010-0030	MI5510-0030	MI5910-0030
AOEX 040210	2,00	2,38	1,00	MI1010-0031	MI2010-0031	MI5010-0031	MI5510-0031	MI5910-0031

Application range:

- **PCD** Aluminum < 10% Si, Brass, Graphite coarse-grained, Plastics, Zinc ...
- **CVD-D** Aluminium > 10% Si, carbides, GRP, CFRP, fine-grained graphite, copper, glass materials, Titanium (finishing) ...
- **CBN-H** General hardened Steels to 72 HRC ...
- **CBN-K** Grey Cast Iron (GG), Ductile Cast Iron (GGG) ...
- **CBN-X** Tool Steels to 72 HRC, Stellite, Powder Metallurgy Steels, Stainless Steel Hardened, Ni, Co, Fe, and Cr Alloys ...

Subject to technical changes.

Cutting Parameters

for our End Mills - UltraDiamond Corner End Mills

UltraDiamond Corner End Mills												
Material	Ø0,90 - 1,50						Ø2,00 - 3,00					
	n [min ⁻¹]		F _z [mm]		a _p [mm]		n [min ⁻¹]		F _z [mm]		a _p [mm]	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
Acrylic (PMMA)	15.000	120.000	0,002	0,02	0,01	0,30	12.000	120.000	0,002	0,03	0,01	0,50
Gold, Silver	15.000	120.000	0,002	0,02	0,01	0,10	10.000	120.000	0,002	0,05	0,01	0,30
Carbide <10% Co	on request											
Carbide Nickel Binder												
Platin	15.000	120.000	0,002	0,02	0,01	0,10	10.000	120.000	0,002	0,05	0,01	0,30
Titanium	12.000	60.000	0,002	0,01	0,01	0,10	10.000	30.000	0,003	0,01	0,01	0,20
Tungsten Copper	12.000	100.000	0,002	0,012	0,01	0,10	8.000	100.000	0,002	0,03	0,01	0,30
Zirkonium	on request											

UltraDiamond Corner End Mills															
											Cooling				
											Dry	Air	Emulsion	Oil	MMS
													1. Choice	2. Choice	3. Choice
													1. Choice	2. Choice	3. Choice
											on request				
													1. Choice	2. Choice	3. Choice
													1. Choice		2. Choice
													1. Choice	2. Choice	3. Choice
											on request				



If you have any further technical questions, please do not hesitate to contact us by phone or e-mail!

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Mail: info@Diamond-toolingsystems.com

Cutting Data

for our end mills - UltraDiamant radius end mills

UltraDiamond Ball Nose End Mills												
Material	Ø0,90 - 1,50						Ø2,00 - 3,00					
	n [min ⁻¹]		F _z [mm]		a _p [mm]		n [min ⁻¹]		F _z [mm]		a _p [mm]	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
Acryl (PMMA)	15.000	120.000	0,002	0,02	0,01	0,20	12.000	120.000	0,002	0,03	0,01	0,50
Gold, Silber	15.000	120.000	0,002	0,02	0,01	0,08	10.000	120.000	0,002	0,05	0,01	0,20
Carbide <10% Co	on request											
Carbide Nickel Binder												
Platin	15.000	120.000	0,002	0,02	0,01	0,08	10.000	120.000	0,002	0,05	0,01	0,20
Titanium	12.000	60.000	0,002	0,01	0,01	0,05	10.000	30.000	0,003	0,01	0,01	0,10
Tungsten Copper	12.000	100.000	0,002	0,012	0,01	0,08	8.000	100.000	0,002	0,03	0,01	0,20
Zirkonium	on request											

UltraDiamond Ball Nose End Mills															
											Cooling				
											Dry	Air	Emulsion	Oil	MQL
													1. Choice	2. Choice	3. Choice
													1. Choice	2. Choice	3. Choice
											on request				
													1. Choice	2. Choice	3. Choice
													1. Choice		2. Choice
													1. Choice	2. Choice	3. Choice
											on request				



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Cutting Parameters

for our Insert and Weldon End Mills - PCD / CVD-D

Material	Insert Milling Cutter / Weldon End Mills											
	CBN-H						CBN-X					
	V_c [m/min]		a_p [mm]		F_z [mm]		V_c [m/min]		a_p [mm]		F_z [mm]	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
Grey Cast Iron (GG)												
Carbide-Steel-Composite	on request											
Ductile Cast Iron (GGG)												
Steel to 55 HRC	80	400	0,01	1,00	0,005	0,20						
Steel to 60 HRC	80	360	0,01	0,80	0,008	0,18						
Steel to 72 HRC	80	340	0,01	0,50	0,006	0,15						
Tool Steel to 72HRC							60	360	0,01	0,60	0,005	0,15

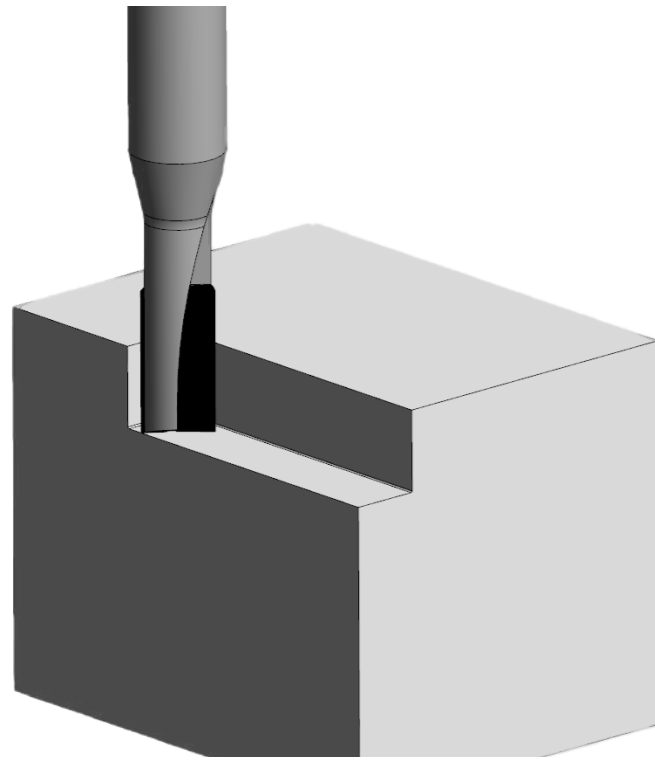
Material	Insert Milling Cutter / Weldon End Mills																
	CBN-K						CBN-X										
	V_c [m/min]		a_p [mm]		F_z [mm]		V_c [m/min]		a_p [mm]		F_z [mm]		Cooling				
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	Dry	Air	Emulsion	Oil	MMS
Grey Cast Iron (GG)	300	2.000	0,01	2,00	0,01	0,40							3. Choice	1. Choice	2. Choice		
Carbide-Steel-Composite	on request																
Ductile Cast Iron (GGG)	200	1.200	0,01	2,00	0,01	0,30							3. Choice	1. Choice	2. Choice		
Steel to 55 HRC													2. Choice	1. Choice			3. Choice
Steel to 60 HRC													2. Choice	1. Choice			3. Choice
Steel to 72 HRC													2. Choice	1. Choice			3. Choice
Tool Steel to 72HRC													2. Choice	1. Choice			3. Choice



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V_f	Feed rate	mm/min
f_n	Feed per revolution	mm/rev
n	Spindle speed	rev/min
v_c	Cutting speed	m/min
D_c	Cutter diameter	mm
t_c	Cutting Time	min
l_m	Cutting length	mm
Q	Stock removal rate	cm ³ /min
a_p	Cutting depth	mm
a_e	Cutting width	mm

► Cutting speed

$$V_c = \frac{D_c \times \pi \times n}{1000} \quad [\text{m/min}]$$

► Spindle speed

$$n = \frac{v_c \times 1000}{\pi \times D_c} \quad [\text{U/min}]$$

► Feed per tooth

$$f_z = \frac{V_f}{n \times Z} \quad [\text{mm/Z}]$$

► Feed per revolution

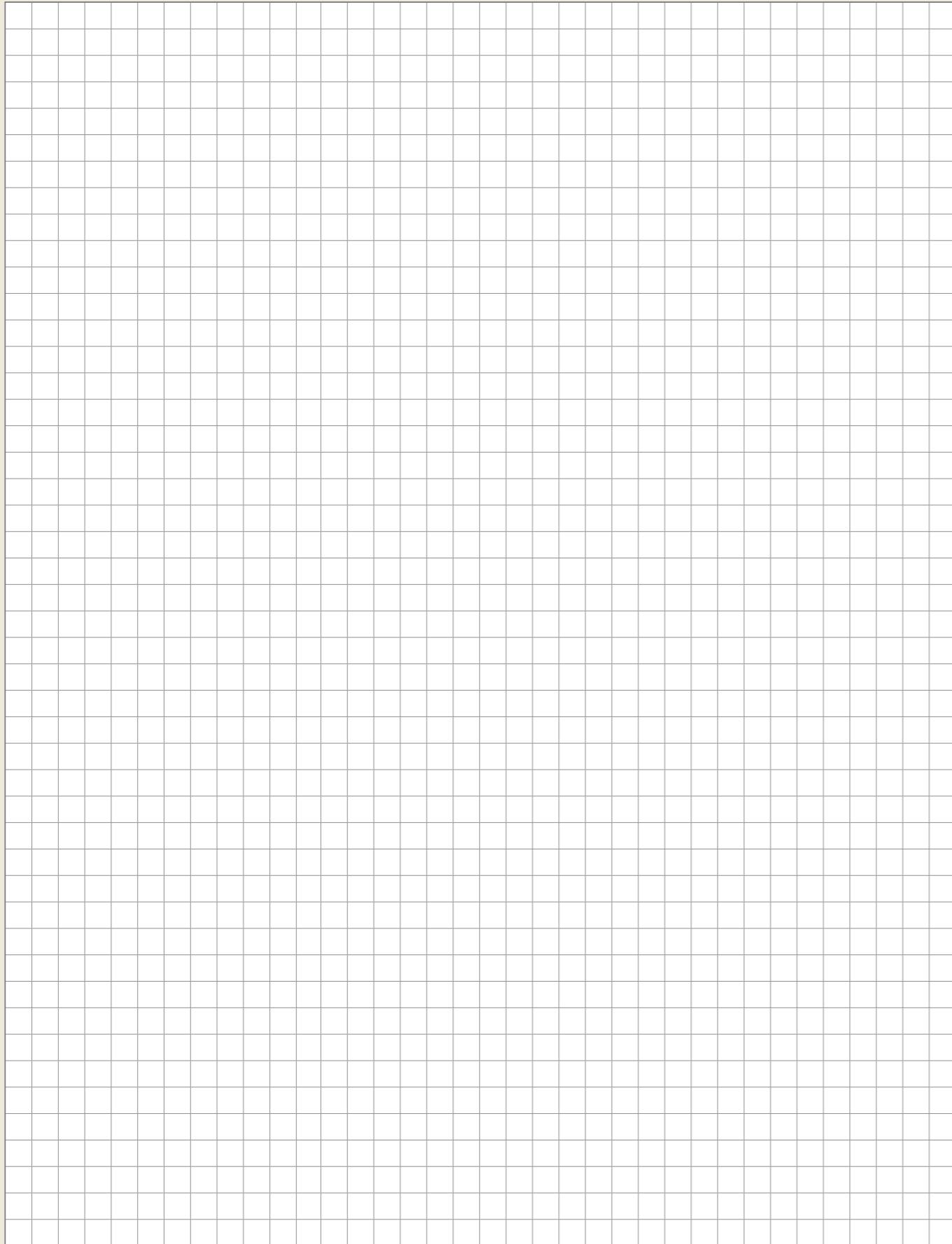
$$V_f = n \times Z \times f_z \quad [\text{mm/min}]$$

► Machine performance

$$P = \frac{a_p \times a_e \times V_f}{1800} \quad [\text{kW}]$$

► Stock removal rate

$$Q = \frac{a_p \times a_e \times V_f}{1000} \quad [\text{cm}^3/\text{min}]$$



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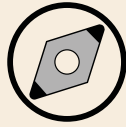
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We reserve the right to make production-related technical changes and changes to the delivery program. The cutting values given are guide values which must be adjusted according to the process environment.

Safety Instructions:

- ▶ DTS tools equipped with ultra-hard cutting edges are very sharp laser cut tools.
- ▶ Careful handling of the tools during unpacking and their use is recommended.
- ▶ Wearing protective gloves reduces the risk of injury.
- ▶ Material chipping and tool breakage may occur during machining, wearing safety glasses is recommended.
- ▶ Balanced holders are recommended for speeds above 10,000 rpm.
- ▶ We do not accept any responsibility for tools that have been modified, reground or used incorrectly and beyond their normal service life.
- ▶ Protective goggles are recommended when using DTS tools, sparks may also occur, make sure that no fire can occur.

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