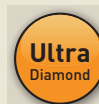
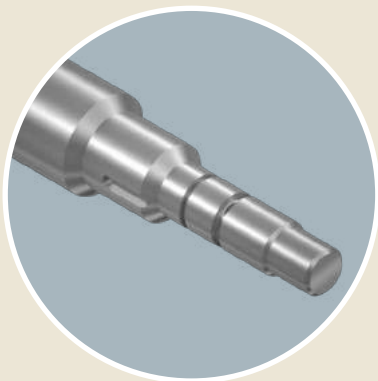


New

## Grooving Systems PCD, CVD-D, UltraDiamond, CBN



Tool and  
Mold Forming



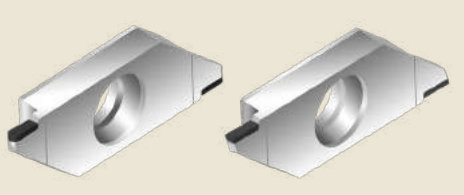
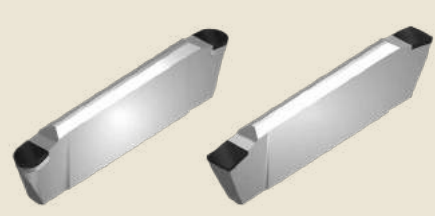
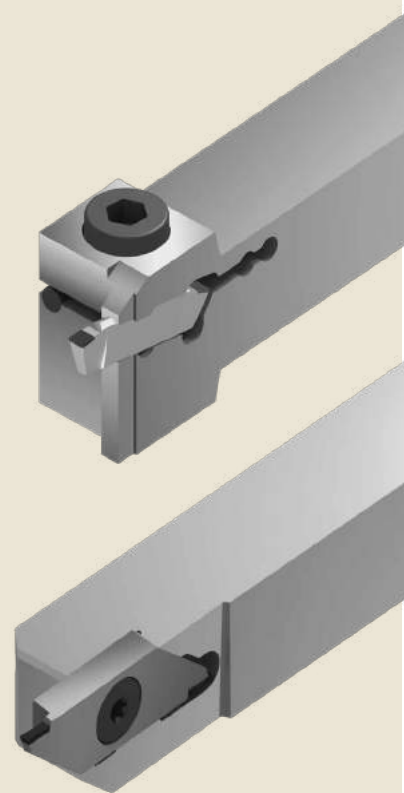
Automotive  
Mechanical Engineering



Medical Technology  
Microtechnology



Aerospace

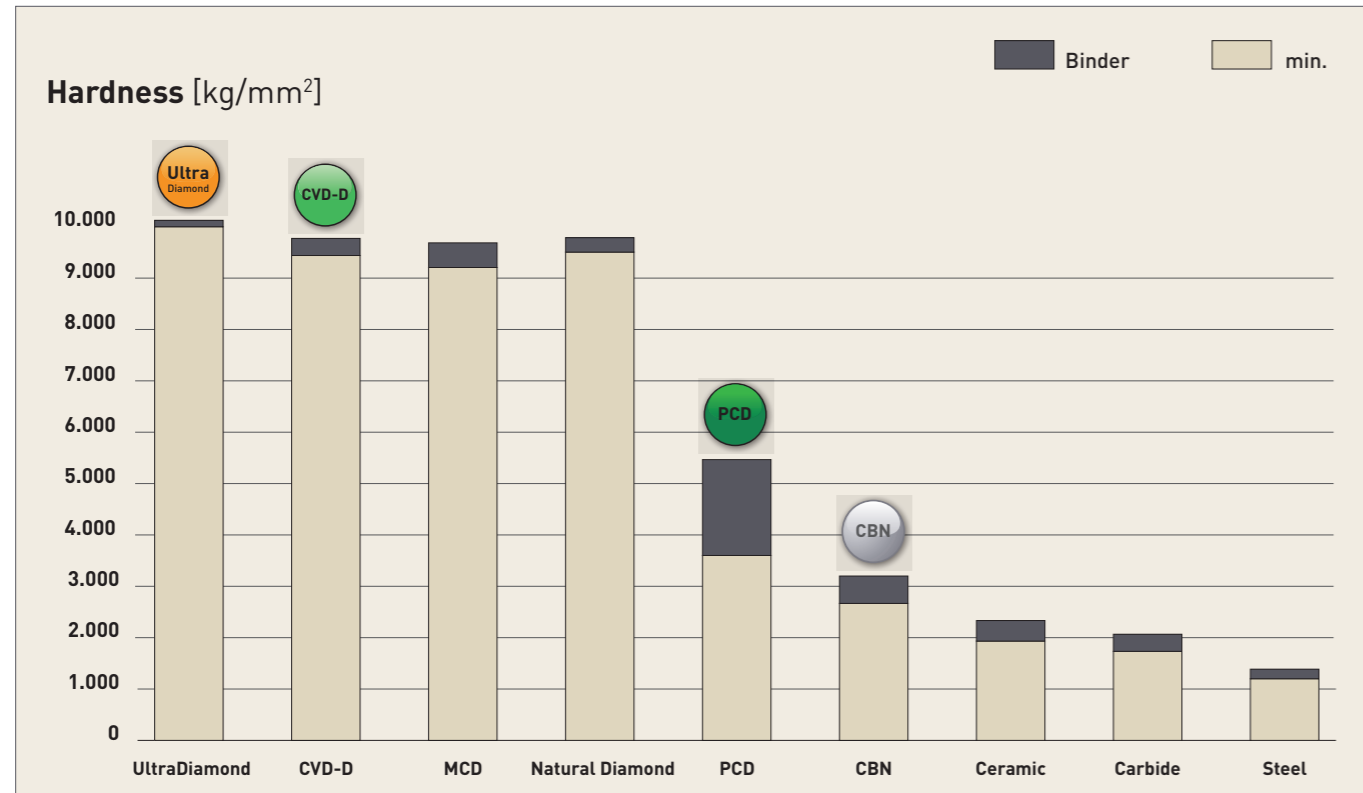


# PASSION FOR DIAMOND...

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 a random orientation in a metal matrix. It is produced by sintering selected diamond particles under high pressure and high temperatures.

Graphite serves as a catalyst allowing the PDC crystals to intergrow. PCD has a high thermal conductivity and good heat dissipation away from the cutting edge. In addition, PCD has the highest bending fracture strength of all cutting materials.

PCD is very well suited for machining aluminum with a Si content of up to 12% and/or other abrasive fillers. The thermal hardness is about 750°C. The areas of application are like those of CVD thick-film diamond, but CVD thick film has a higher cost effectiveness with hard-brittle materials or aluminum from a Si content of 12%.

## CVD-Thickfilm Diamond (CVD-D)

The Star among Diamond Cutting Materials

For the machining of hard-brittle materials such as Ceramics, glass, glass-Ceramics, tungsten Carbide, MMC and fiber-reinforced composites such as CFRP and GFRP. 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, binderless CVD-D is one of the hardest man-made diamond cutting materials.

CVD-D is characterized by high hardness as well as 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.

With the correct use of CVD-D, the tool life can be increased by up to 10 times (and even more) compared to PCD!

## Binderless Diamond (UltraDiamond)

The hardest Mono 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.

## Polycrystalline Cubic Boron Nitride (CBN)

Chemically resistant and stable at high temperatures

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

CBN is now considered the second hardest material after diamond cutting materials!

The applications of CBN take place in the automotive industry, aerospace, tool and die and mold making as well as in mechanical engineering. The wide range as cutting and abrasive material includes hardened steels, cast irons, chilled Cast Iron, sintered materials, stellites, nickel- and cobalt-based superalloys. In many applications, cubic boron nitride is preferred to diamond cutting materials because it is absolutely stable in air at temperatures up to 1,400°C. Diamond, on the other hand, begins to decompose at a temperature of approx. 750°C.

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

# Our Cutting Materials

and their main applications at a glance

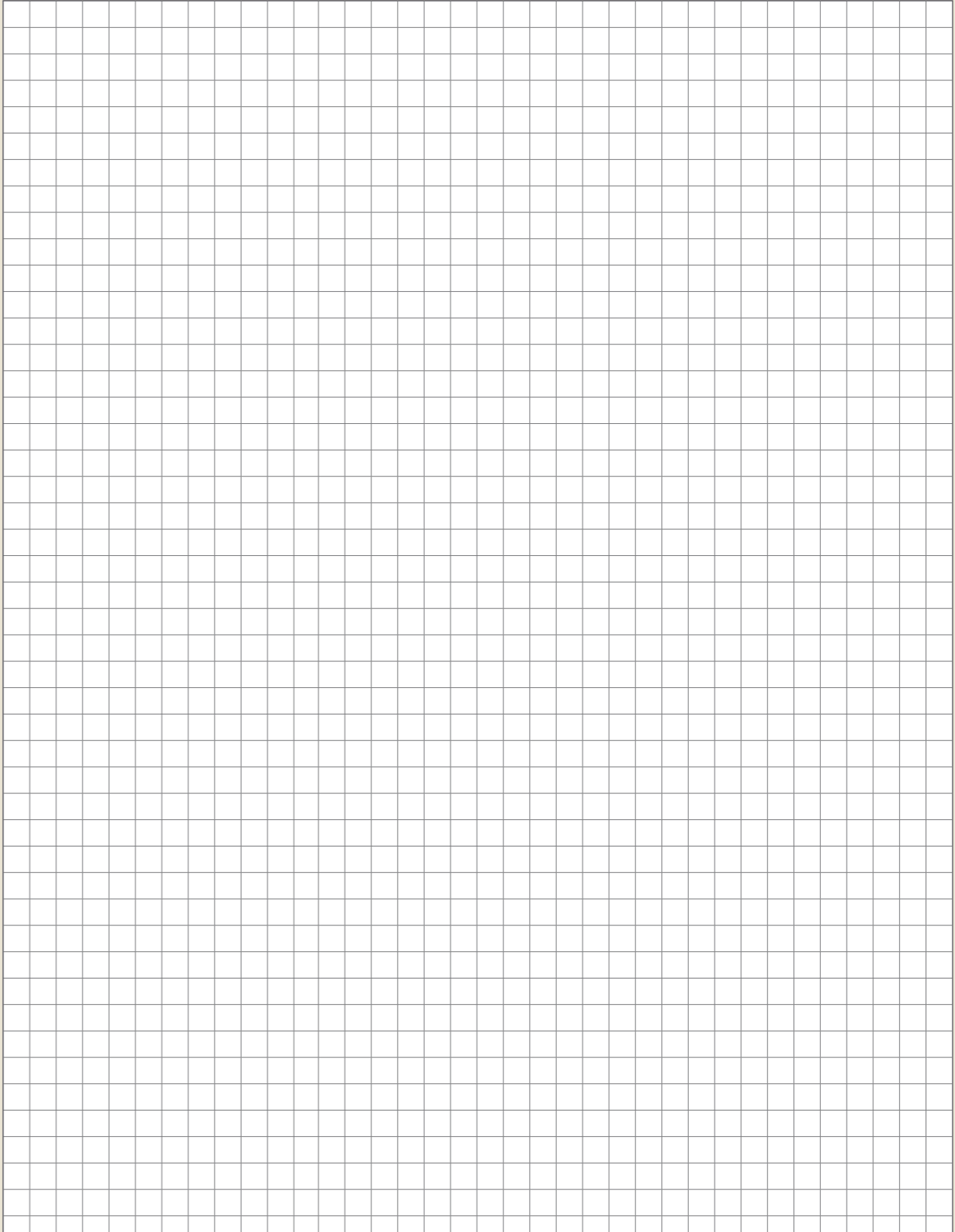
We want to offer you the ideal solution for your application. Therefore, we have developed four main cutting material, specially adapted to the requirements of the different materials.

Below you will find an overview of the different groups.

 <b>PCD</b>	<b>PCD</b> is ideally suited for the machining of * <b>Aluminum &lt;10% Si   Brass   Copper, Copper Alloys   Graphite   Magnesium   PEEK   Tungsten alloy</b>	 ECO-Line	 MICRO-Line
 <b>CVD-D</b>	<b>CVD-D</b> is ideally suited for the machining of * <b>Acrylic (PMMA)   Aluminum &gt;10% Si   Carbide   Ceramics   Composites (GFRP/CFRP)   Copper, Copper Alloys   Glass, Glass Ceramic   Magnesium   Plastic   Silver, Gold, Platinum   Titanium   Zirconium</b>	 ECO-Line	 MICRO-Line
 <b>UltraDiamond</b>	<b>UltraDiamond</b> is ideally suited for the machining of * <b>Acrylic (PMMA)   Carbide   Ceramic   Glass, Glass Ceramic</b>		 MICRO-Line
 <b>H</b>	<b>CBN-H</b> is ideally suited for the machining of * <b>Steel, hardened up to 72 HRC Sinter Steel, hardened</b>	 ECO-Line	 MICRO-Line
 <b>X</b>	<b>CBN-X</b> is ideally suited for the machining of * <b>Powder metallurgical Steel, hardened Special Alloys such as ASP, CPM, Hardox Tool Steel, hardened up to 72 HRC</b>	 ECO-Line	 MICRO-Line
 <b>K</b>	<b>CBN-K</b> is ideally suited for the machining of * <b>Grey Cast Iron (GCI) Ductile Cast Iron (DCI)</b>	 ECO-Line	 MICRO-Line

\* all other applications can be found in the complete cutting material assignment from page 8.

## Your Notes

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# Our Cutting Material Assignment

about the materials

Benefit from over 25 years of application experience with ultra-hard cutting materials.

In the table you will find our cutting material recommendation for each material.

Green ✓

First choice

Orange ✓

Possible alternative

ISO	Material	PCD	CVD-D	Ultra Diamond	CBN-H	CBN-X	CBN-K
H	Powder metallurgical Steel, hardened				✓	✓	
	Special Alloys (ASP,CPM,Hardox)				✓	✓	
	Steel, hardened up to 72 HRC				✓	✓	
	Tool Steel, hardened up to 72 HRC				✓	✓	
P	Sintered Steel					✓	✓
	Sintered Steel, hardened				✓	✓	
K	Grey Cast Iron (GCI)						✓
	Ductile Cast Iron (DCI)					✓	✓
	Shell Chilled Cast Iron				✓	✓	
S	Ni-, Co-, Fe- and Cr-Alloys				✓	✓	
	Titanium Alloys				✓	✓	
M	Stainless Steel, hardened				✓	✓	
N	Acrylic (PMMA)		✓	✓			
	Aluminum, < 10% Si	✓	✓				
	Aluminum, > 10% Si		✓	✓			
	Glass, Glass Ceramic	✓	✓				
	Graphite		✓	✓			
	Carbide G-Grade, < 15% Co		✓				
	Carbide G-Grade, > 15% Co		✓	✓			
	Carbide K-Grade, < 15% Co		✓				
	Carbide K-Grade, > 15% Co	✓					



You cannot find your material in the table?

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

Phone: 888.554.7264

Mail: sales@tysontool.com

ISO	Material	PCD	CVD-D	Ultra Diamond	CBN-H	CBN-X	CBN-K
N	Carbide (Green)			✓			
	Carbide with Ni Binder		✓	✓			
	Ceramics	✓					
	Ceramics (Green)	✓	✓				
	Plastics	✓	✓				
	Copper, Copper Alloys		✓	✓			
	Magnesium	✓	✓				
	Brass	✓	✓				
	MMC		✓	✓			
	PEEK		✓				
	Silver, Gold, Platinum	✓	✓				
	Composite such as CFG/GFRP		✓	✓			
	Tungsten alloy	✓	✓				
	Zirconium		✓	✓			

# Internal Grooving and Special Grooving Systems

your individual request for special tools

On request, we can manufacture internal grooving systems / special grooving systems equipped with our cutting materials.



- ✓ PCD Grooving Insert
- ✓ CVD-D Grooving Insert
- ✓ UltraDiamond Grooving Insert
- ✓ CBN Grooving Insert



ECO-Line Indexable Insert 2-edge tipped



You will find the material assignment from page 8. MICRO-Line Indexable Insert 2-edge tipped

## Long Chips from Grooving and Hard Grooving?

We can also laser cut 3D chip breaker onto our grooving tools, to create controlled chip breakage.

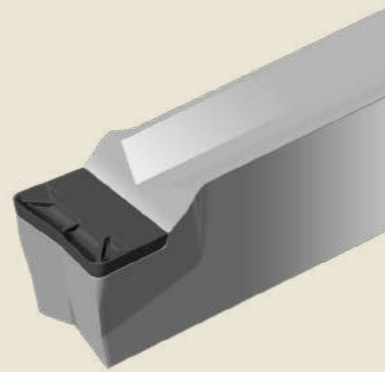
With DTS chip breakers you are able to control the chip breakage of the following materials:

- ✓ Aluminum
- ✓ Brass lead-free
- ✓ Copper
- ✓ Plastics
- ✓ Steel hardened
- ✓ Tool Steel

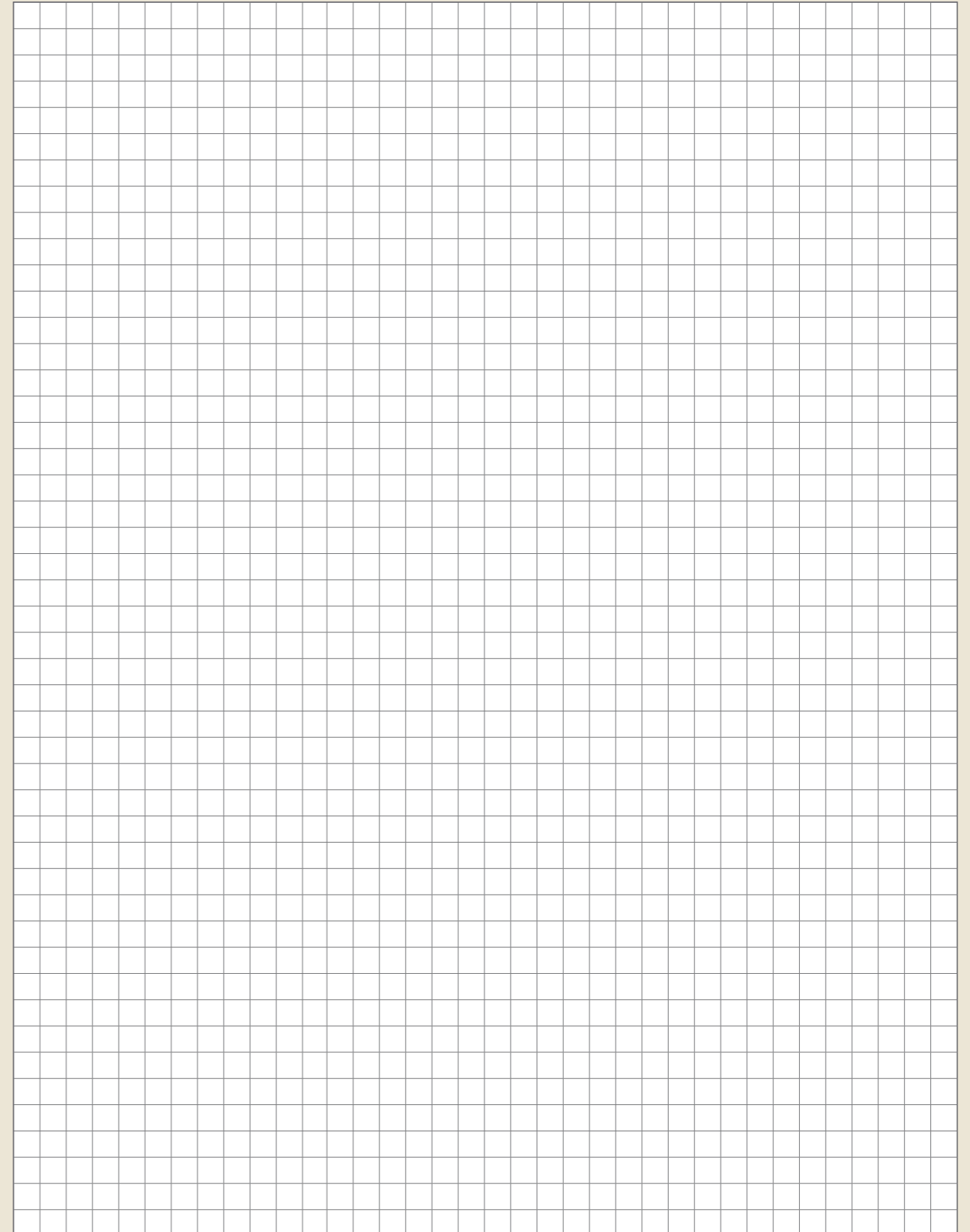
Further advantages of chip breakers:

- Cutting pressure is reduced by approximately 40%
- No scratching of the finished surfaces from chips

Special and profile grooving tools are available upon request.

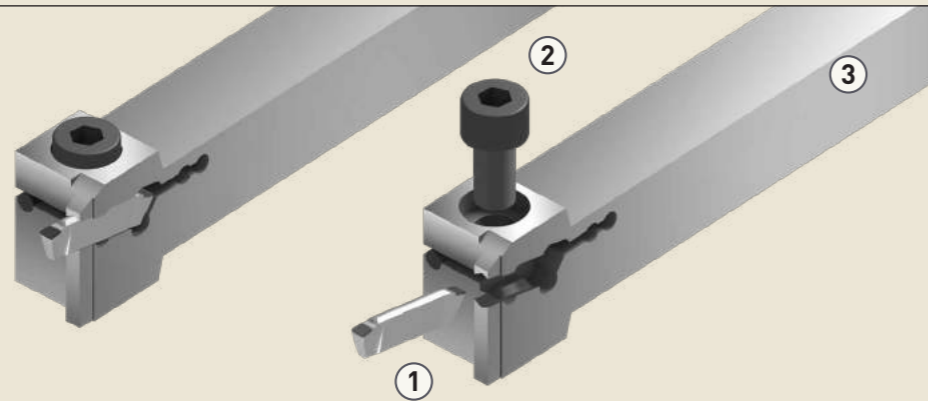


## Your Notes



## Grooving System ECO-Line

Overview and Applications

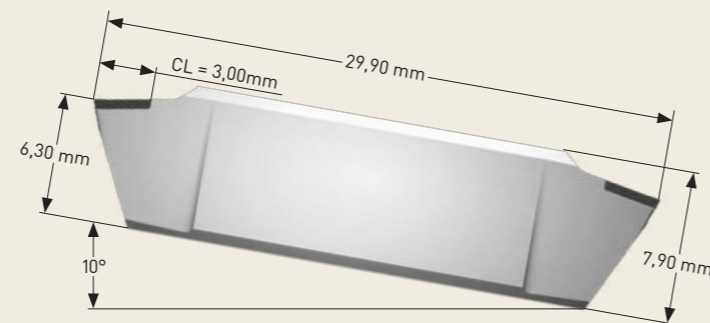


### ECO-Line Tool Holder System

- ① Precision machined base body
- ② Screw for clamping the insert
- ③ Low vibration tool holder

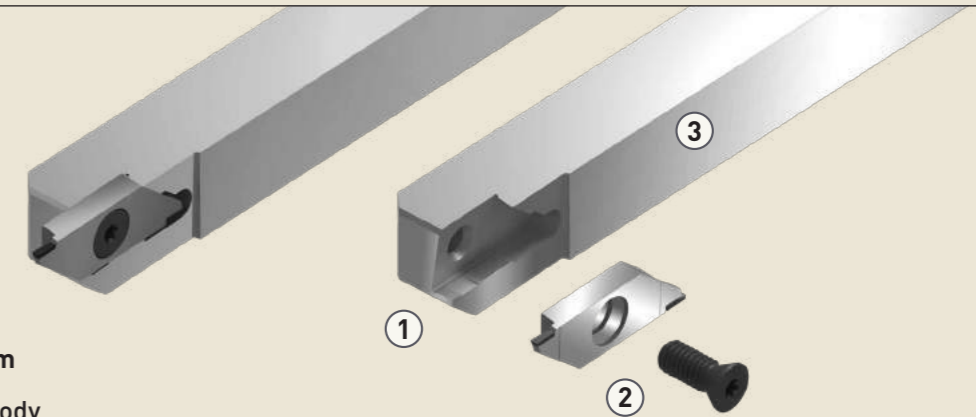
### ECO-Line - Indexable Grooving Insert

- Laser cut diamond or CBN cutting edge
- High vacuum brazed
- Precision machined carbide base body
- Two cutting edges (Z2)
- In cutting materials: PCD / CVD-D / CBN



## Grooving System MICRO-Line

Overview and Applications

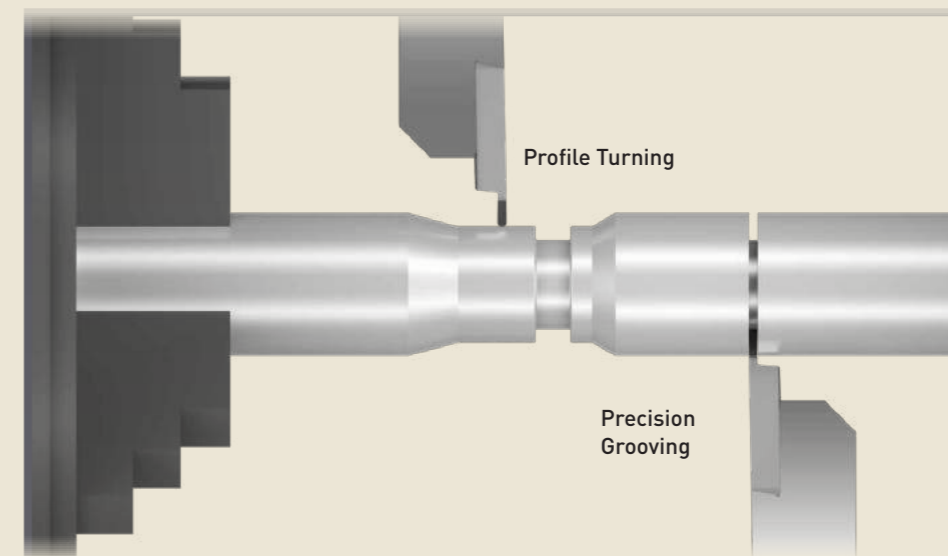
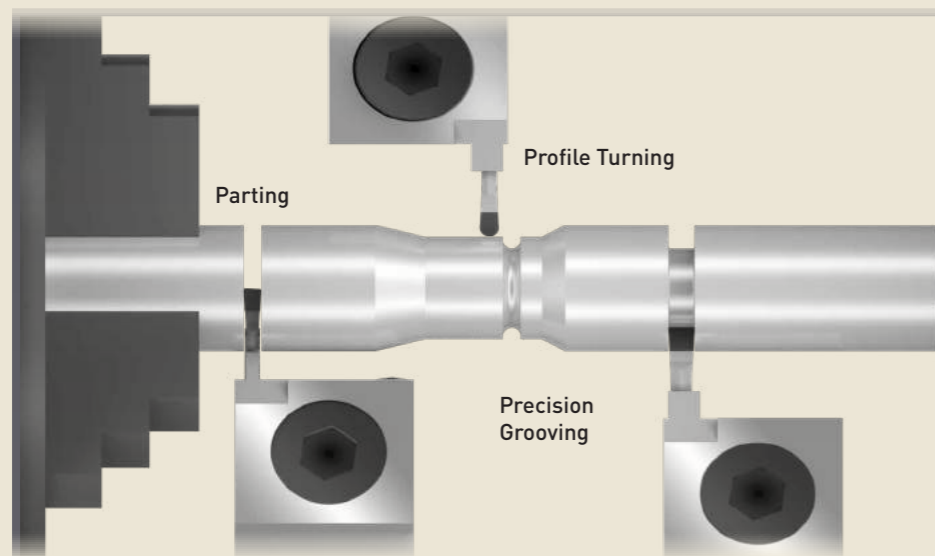


### MICRO-Line Tool Holder System

- ① Precision machined base body
- ② Screw for directly clamping the insert
- ③ Precision machined, low vibration tool holder

### MICRO-Line - Indexable Grooving Insert

- Laser cut diamond or CBN cutting edge
- High vacuum brazed
- Precision machined carbide base body
- Precision machined center bore
- Tangential clamping provides the best stability
- Two cutting edges (Z2)
- In cutting materials: PCD / CVD-D / UltraDiamond / CBN



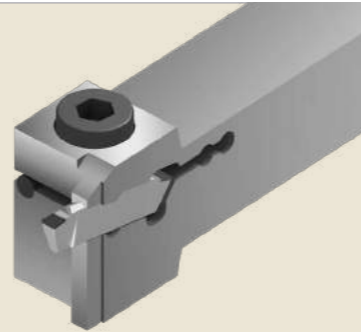
# Corner and Full Radius Grooving Inserts

for Grooving, Profile Turning and Parting

## ECO-Line System | Toolholder

### Benefits:

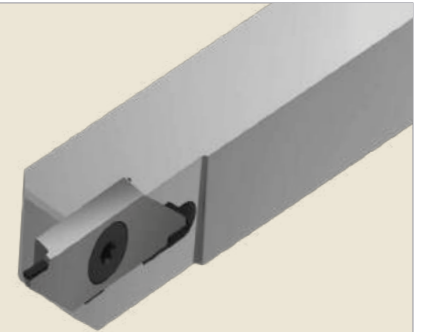
- Designed for grooving with diamond and CBN cutting materials
- Right and left holders in different dimensions from stock
- Two grooving depths available in stock: 12,00mm and 25,00mm
- For continuous and interrupted cuts



## MICRO-Line System | Tool Holder

### Benefits:

- Designed for grooving with diamond and CBN cutting materials
- Right side and left side tool holders in different dimensions in stock
- Grooving depth up to 3,80 mm
- For continuous and interrupted cuts
- Stable and precise guiding of the grooving insert
- Easy and quick change of the grooving insert



## ECO-Line EST and RST System | Corner and Full Radius Grooving Inserts

### Benefits:

- Corner grooving insert, width 2,00 mm to 4,00 mm, tolerance +/- 0,01 mm in stock
- Radii from 0,10 mm to 0,20 mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request also with chip breakers)
- Full radius grooving insert, width 2,00 mm to 6,00 mm, tolerance +/- 0,01 mm in stock
- Full radius from 1,00 mm to 3,00 mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request also with chip breakers)
- Cutting edge length 3,00 mm



ECO-EST

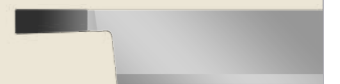


ECO-RST

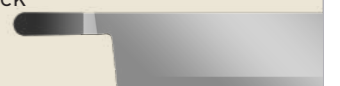
## MICRO-Line EST and RST System | Corner and Full Radius Grooving Inserts

### Benefits:

- Corner grooving insert, width 1,00 mm to 2,00 mm, tolerance +/- 0,01 mm in stock
- Radii from 0,05 mm to 0,20 mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request also with chip breakers)
- Full radius grooving insert, width 2,00 mm to 6,00 mm, tolerance +/- 0,01 mm in stock
- Full radius from 0,50 mm to 1,00 mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request also with chip breakers)
- Cutting edge length 3,00 mm



MICRO-EST



MICRO-RST

## ECO-Line AST | Parting Inserts

### Benefits:

- Parting insert left, width 2,00mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request auch mit Spanleitstufen)
- Parting insert right, width 2,00mm, tolerance +/- 0,01 mm in stock
- Tipped with 2 cutting edges (on request also with chip breaker)



ECO-AST-left



ECO-AST-right

You can get the following materials for our grooving systems:

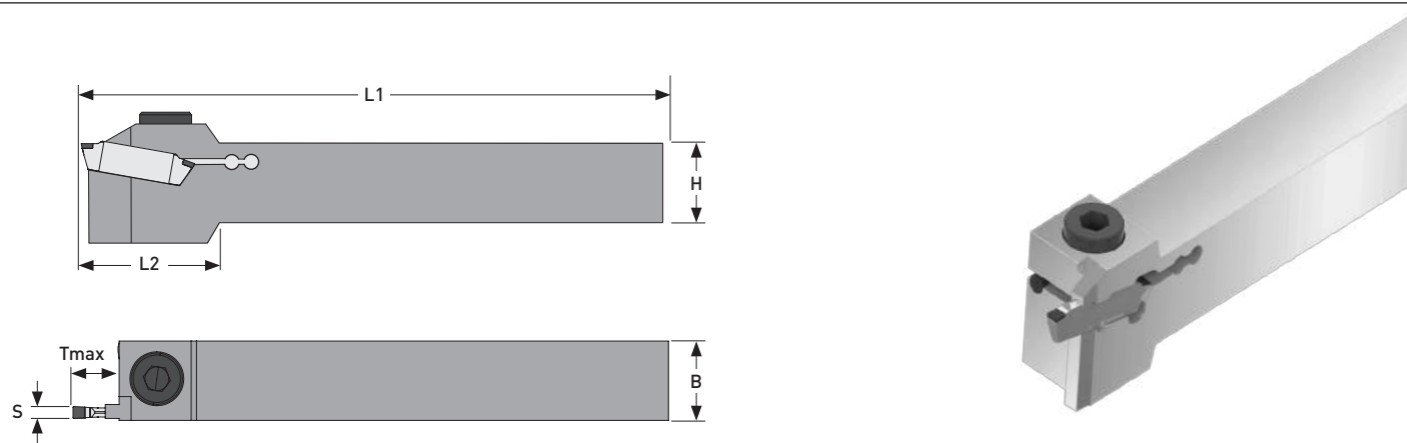


You can get the following materials for our grooving systems:



# Grooving Holder System ECO-Line

Clamping Holder



ECO-Line	Grooving holder shank 16x16 for Tmax 12 - 25 available in grooving widths 2,00 - 6,00						
B	H	S	L1	L2	Tmax	Version	Item No.
16,00	16,00	2,00-3,00	125,00	35,00	12,00	right	ST7060-1210
16,00	16,00	2,00-3,00	125,00	35,00	12,00	left	ST7060-1211
20,00	20,00	2,00-3,00	150,00	35,00	12,00	right	ST7060-1220
20,00	20,00	2,00-3,00	150,00	35,00	12,00	left	ST7060-1221
25,00	25,00	2,00-3,00	150,00	-	12,00	right	ST7060-1230
25,00	25,00	2,00-3,00	150,00	-	12,00	left	ST7060-1231
20,00	20,00	4,00-5,00	150,00	35,00	12,00	right	ST7060-1420
20,00	20,00	4,00-5,00	150,00	35,00	12,00	left	ST7060-1421
25,00	25,00	4,00-5,00	150,00	-	12,00	right	ST7060-1430
25,00	25,00	4,00-5,00	150,00	-	12,00	left	ST7060-1431
20,00	20,00	6,00	150,00	35,00	12,00	right	ST7060-1620
20,00	20,00	6,00	150,00	35,00	12,00	left	ST7060-1621
25,00	25,00	6,00	150,00	-	12,00	right	ST7060-1630
25,00	25,00	6,00	150,00	-	12,00	left	ST7060-1631
20,00	20,00	2,00-3,00	150,00	45,00	25,00	right	ST7060-3220
20,00	20,00	2,00-3,00	150,00	45,00	25,00	left	ST7060-3221
25,00	25,00	2,00-3,00	150,00	-	25,00	right	ST7060-3230
25,00	25,00	2,00-3,00	150,00	-	25,00	left	ST7060-3231
20,00	20,00	4,00-5,00	150,00	45,00	25,00	right	ST7060-3420
20,00	20,00	4,00-5,00	150,00	45,00	25,00	left	ST7060-3421
25,00	25,00	4,00-5,00	150,00	-	25,00	right	ST7060-3430
25,00	25,00	4,00-5,00	150,00	-	25,00	left	ST7060-3431
20,00	20,00	6,00	150,00	45,00	25,00	right	ST7060-3620
20,00	20,00	6,00	150,00	45,00	25,00	left	ST7060-3621
25,00	25,00	6,00	150,00	-	25,00	right	ST7060-3630
25,00	25,00	6,00	150,00	-	25,00	left	ST7060-3631

Clamping Screw 01-SP9090-0801  
Clamping Key 01-SP9095-0160

### Application range:

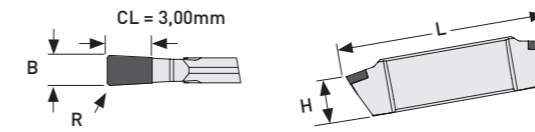
- **PCD** Aluminum < 10% Si, Brass, Graphite coarse-grained, Plastics, Zinc ...
- **CVD-D** Aluminum > 10% Si, Carbide > 8% Co, Copper, GFRP/CFRP, Glass materials, Graphite fine-grained, Titanium (Finishing) ...
- **CBN-H** Steel hardened up to 72 HRC ...
- **CBN-X** Tool Steel up to 72 HRC, Stellite, powder metallurgical Steel, Stainless Steel hardened, Ni-, Co-, Fe- and Cr-Alloys ...
- **CBN-K** Grey Cast Iron (GCI), Ductile Cast Iron (DCI) ...

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

# Grooving Indexable Insert System ECO-Line

for Grooving, Profile Turning and Parting

## ECO-EST

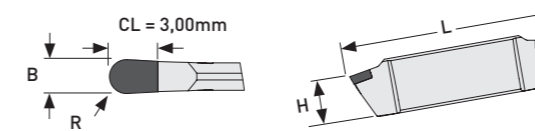


2-cutting edge corner grooving inserts

New	Name	B	R	L	H	PCD	CVD-D	CBN-H	CBN-X	CBN-K
						Item No.	Item No.	Item No.	Item No.	Item No.
	EST-B2	2,00	0,20	29,90	7,90	ST1050-0200	ST2050-0200	ST5050-0200	ST5950-0200	ST5550-0200
	EST-B3	3,00	0,20	29,90	7,90	ST1050-0300	ST2050-0300	ST5050-0300	ST5950-0300	ST5550-0300
	EST-B4	4,00	0,20	29,90	7,90	ST1050-0400	ST2050-0400	ST5050-0400	ST5950-0400	ST5550-0400

We are glad to offer you any special geometries on request.

## ECO-RST

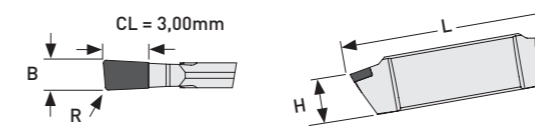


2-cutting edge full radius grooving inserts

New	Name	B	R	L	H	PCD	CVD-D	CBN-H	CBN-X	CBN-K
						Item No.	Item No.	Item No.	Item No.	Item No.
	RST-B2	2,00	1,00	29,90	7,90	ST1050-1200	ST2050-1200	ST5050-1200	ST5950-1200	ST5550-1200
	RST-B3	3,00	1,50	29,90	7,90	ST1050-1300	ST2050-1300	ST5050-1300	ST5950-1300	ST5550-1300
	RST-B4	4,00	2,00	29,90	7,90	ST1050-1400	ST2050-1400	ST5050-1400	ST5950-1400	ST5550-1400
	RST-B5	5,00	2,50	29,90	7,90	ST1050-1500	ST2050-1500	ST5050-1500	ST5950-1500	ST5550-1500
	RST-B6	6,00	3,00	29,90	7,90	ST1050-1600	ST2050-1600	ST5050-1600	ST5950-1600	ST5550-1600

We are glad to offer you any special geometries on request.

## ECO-AST



2-cutting edge parting Inserts

New	Name	B	R	L	H	PCD	CVD-D	CBN-H	CBN-X	CBN-K
						Item No.	Item No.	Item No.	Item No.	Item No.
	AST-B2R	2,00	0,20	29,90	7,90	ST1050-0290	ST2050-0290	ST5050-0290	ST5950-0290	ST5550-0290
	AST-B2L	2,00	0,20	29,90	7,90	ST1050-0291	ST2050-0291	ST5050-0291	ST5950-0291	ST5550-0291

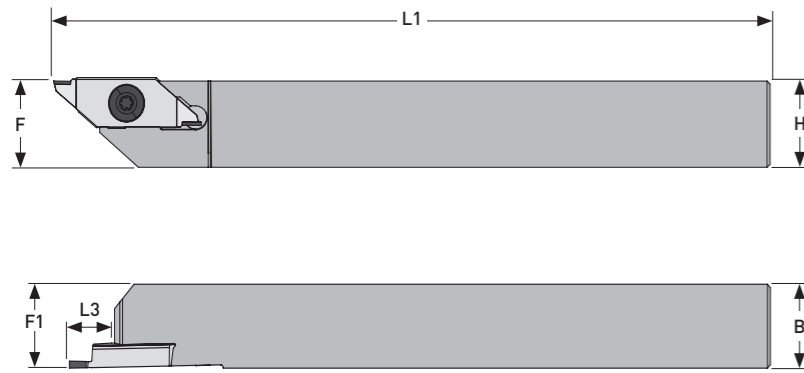
We are glad to offer you any special geometries on request.

Subject to technical changes.



# Grooving Holder System MICRO-Line

Clamping Holder



MICRO-Line	B	H	L1	L3	F	F1	Version	Item No.
<b>New</b>	8,00	8,00	125,00	8,00	10,00	10,00	right	ST7060-0010
	8,00	8,00	125,00	8,00	10,00	10,00	left	ST7060-0015
	10,00	10,00	125,00	8,00	10,00	10,00	right	ST7060-0020
	10,00	10,00	125,00	8,00	10,00	10,00	left	ST7060-0025
	12,00	12,00	125,00	8,00	12,00	12,00	right	ST7060-0030
	12,00	12,00	125,00	8,00	12,00	12,00	left	ST7060-0035
	16,00	16,00	125,00	8,00	16,00	16,00	right	ST7060-0040
	16,00	16,00	125,00	8,00	16,00	16,00	left	ST7060-0045
	20,00	20,00	125,00	8,00	20,00	20,00	right	ST7060-0050
	20,00	20,00	125,00	8,00	20,00	20,00	left	ST7060-0055

Clamping Screw	01-SP9090-0410
Clamping Key	01-SP9091-0110

### Application range:

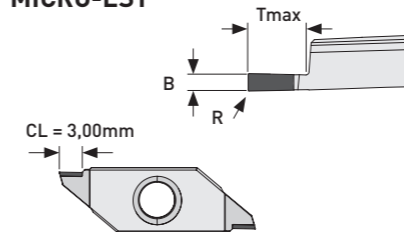
- PCD Aluminum < 10% Si, Brass, Graphite coarse-grained, Plastics, Zinc ...
- CVD-D Aluminum < 10% Si, Brass, Brass lead-free, Composites (CFRP, GFRP, MMC), Graphite ...
- U-Diamond Acrylic, Carbide < 10% Binder, Ceramics, Zircon, ...
- CBN-H Steel hardened up to 72 HRC
- CBN-X Tool Steel up to 72 HRC, Tool Steel low alloyed, Stellite, powder metallurgical Steel ...
- CBN-K Grey Cast Iron (GCI), Ductile Cast Iron (DCI) ...

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

# Grooving Indexable Insert System MICRO-Line

for Grooving and Profile Turning

## MICRO-EST

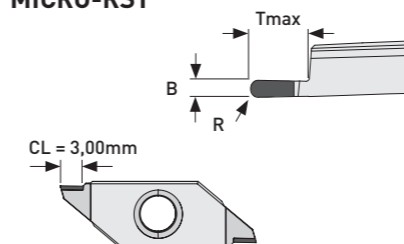


2-edge grooving and profile turning inserts  
Figure shows right version

New	Name	Version	B	R	Tmax	PCD	CVD-D	U-Diamond	CBN-H	CBN-X	CBN-K
						Item No.	Item No.	Item No.	Item No.	Item No.	Item No.
	EST-B1	right	1,00	0,05	2,70	ST1050-2100	ST2050-2100	ST1950-2100	ST5050-2100	ST5950-2100	ST5550-2100
	EST-B1	left	1,00	0,05	2,70	ST1050-2101	ST2050-2101	ST1950-2101	ST5050-2101	ST5950-2101	ST5550-2101
	EST-B1	right	1,00	0,10	2,70	ST1050-2102	ST2050-2102	ST1950-2102	ST5050-2102	ST5950-2102	ST5550-2102
	EST-B1	left	1,00	0,10	2,70	ST1050-2103	ST2050-2103	ST1950-2103	ST5050-2103	ST5950-2103	ST5550-2103
	EST-B1,5	right	1,50	0,05	3,80	ST1050-2150	ST2050-2150	ST1950-2150	ST5050-2150	ST1950-2150	ST5550-2150
	EST-B1,5	left	1,50	0,05	3,80	ST1050-2151	ST2050-2151	ST1950-2151	ST5050-2151	ST1950-2151	ST5550-2151
	EST-B1,5	right	1,50	0,10	3,80	ST1050-2152	ST2050-2152	ST1950-2152	ST5050-2152	ST1950-2152	ST5550-2152
	EST-B1,5	left	1,50	0,10	3,80	ST1050-2153	ST2050-2153	ST1950-2153	ST5050-2153	ST1950-2153	ST5550-2153
	EST-B2	right	2,00	0,05	3,80	ST1050-2200	ST2050-2200	ST1950-2200	ST5050-2200	ST5950-2200	ST5550-2200
	EST-B2	left	2,00	0,05	3,80	ST1050-2201	ST2050-2201	ST1950-2201	ST5050-2201	ST5950-2201	ST5550-2201
	EST-B2	right	2,00	0,10	3,80	ST1050-2202	ST2050-2202	ST1950-2202	ST5050-2202	ST5950-2202	ST5550-2202
	EST-B2	left	2,00	0,10	3,80	ST1050-2203	ST2050-2203	ST1950-2203	ST5050-2203	ST5950-2203	ST5550-2203
	EST-B2	right	2,00	0,20	3,80	ST1050-2204	ST2050-2204	ST1950-2204	ST5050-2204	ST5950-2204	ST5550-2204
	EST-B2	left	2,00	0,20	3,80	ST1050-2205	ST2050-2205	ST1950-2205	ST5050-2205	ST5950-2205	ST5550-2205

We are glad to offer you any special geometries on request.

## MICRO-RST



2-edge grooving and profile turning inserts  
Figure shows right version

New	Name	Version	B	R	Tmax	PCD	CVD-D	U-Diamond	CBN-H	CBN-X	CBN-K
						Item No.	Item No.	Item No.	Item No.	Item No.	Item No.
	RST-B1	right	1,00	0,50	2,70	ST1050-3100	ST2050-3100	ST1950-3100	ST5050-3100	ST5950-3100	ST5550-3100
	RST-B1	left	1,00	0,50	2,70	ST1050-3101	ST2050-3101	ST1950-3101	ST5050-3101	ST5950-3101	ST5550-3101
	RST-B1,5	right	1,50	0,75	3,80	ST1050-3150	ST2050-3150	ST1950-3150	ST5050-3150	ST5950-3150	ST5550-3150
	RST-B1,5	left	1,50	0,75	3,80	ST1050-3151	ST2050-3151	ST1950-3151	ST5050-3151	ST5950-3151	ST5550-3151
	RST-B2	right	2,00	1,00	3,80	ST1050-3200	ST2050-3200	ST1950-3200	ST5050-3200	ST5950-3200	ST5550-3200
	RST-B2	left	2,00	1,00	3,80	ST1050-3201	ST2050-3201	ST1950-3201	ST5050-3201	ST5950-3201	ST5550-3201

We are glad to offer you any special geometries on request.

Subject to technical changes.

# Cutting Parameters

for our Diamond Grooving Inserts – ECO-Line

$V_c \times 3.28 = \text{SFM}$

$A_p / 25.4 = \text{DOC inches}$

$F / 25.4 = \text{inch per revolution}$



You can use all our grooving inserts in continuous and interrupted cut.

**System ECO-Line Cutting Parameters Diamond**

Material		PCD		CVD-D				UltraDiamond					
		$V_c$	F	$V_c$	F	$V_c$	F	$V_c$	F	$V_c$	F		
		[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]		
Acrylic (PMMA)	min.	100	0,005	100	0,005	100	0,005	100	0,005				
	max.	3.000	0,25	2.000	0,10	3.000	0,20	2.000	0,15				
Aluminum <12%Si	min.	100	0,01	100	0,01								
	max.	5.000	0,50	2.000	0,30								
Aluminum >10%Si	min.					100	0,01	100	0,01				
	max.					3.000	0,30	1.500	0,25				
Aluminum >20%Si	min.					100	0,01	80	0,01				
	max.					1.500	0,25	800	0,15				
Brass	min.	100	0,01	100	0,01	100	0,008	100	0,008				
	max.	3.000	0,25	1.500	0,15	5.000	0,20	2.500	0,08				
Carbide G-Grade, >11%Co	min.	on request											
	max.	on request											
Carbide G-Grade, <11%Co	min.	on request											
	max.	on request											
Carbide K-Grade, >15%Co	min.	on request											
	max.	on request											
Carbide K-Grade, <15%Co	min.	on request											
	max.	on request											
Carbide with Ni Binder	min.	on request											
	max.	on request											
Carbide, Green	min.	on request											
	max.	on request											
Ceramics	min.	on request											
	max.	on request											
Ceramics, Green	min.	on request											
	max.	on request											
Composites wie CFRP/GFRP	min.					100	0,01	80	0,008				
	max.					500	0,2	250	0,12				
Copper/Copper Alloys	min.					100	0,01	100	0,01				
	max.					2.000	0,25	1.000	0,15				
Glas, Glass Ceramic	min.	on request											
	max.	on request											
Graphite, coarse-grained	min.	100	0,01	100	0,01								
	max.	4.000	0,50	2.000	0,25								
Graphite, fine-grained	min.					100	0,01	100	0,01				
	max.					5.000	1,00	3.000	0,30				
Gold, Silver, Platinum	min.					50	0,005	30	0,004				
	max.					1.500	0,30	800	0,20				
Magnesium	min.	100	0,01	100	0,01	100	0,008	100	0,008				
	max.	2.000	0,25	1.000	0,15	3.000	0,25	2.000	0,15				
MMC Composites	min.					100	0,02	80	0,01				
	max.					600	0,25	300	0,15				
PEEK	min.	100	0,01	80	0,01								
	max.	300	0,50	220	0,40								
Plastics	min.					100	0,01	100	0,01				
	max.					2.000	0,40	1.500	0,30				
Zircon	min.					50	0,008	30	0,004				
	max.					160	0,05	100	0,02				

# Cutting Parameters

for our CBN Grooving Inserts – ECO-Line

$V_c \times 3.28 = \text{SFM}$

$A_p / 25.4 = \text{DOC inches}$

$F / 25.4 = \text{inch per revolution}$



You can use all our grooving inserts in continuous and interrupted cut.

**System ECO-Line Cutting Parameters CBN**

Material		CBN-H		CBN-X				CBN-K					
		$V_c$	F	$V_c$	F	$V_c$	F	$V_c$	F	$V_c$	F		
		[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]		
Steel hardened up to 55 HRC	min.	100	0,01	80	0,01								
	max.	220	0,08	160	0,06								
Steel hardened up to 62HRC	min.	80	0,01	60	0,01								
	max.	200	0,08	140	0,06								
Steel hardened up to 72 HRC	min.	60	0,01	60	0,01								
	max.	160	0,06	120	0,04								
Tool Steel hardened up to 72 HRC	min.					80	0,01	40	0,008				
	max.					180	0,05	120	0,04				
Powder metallurgical Steel up to 72 HRC	min.					60	0,01	40	0,008				
	max.					160	0,05	140	0,04				
Carbide-Steel Composite > 20% Co*	min.	on request											
	max.	on request											
Ductile Cast Iron (DCI)	min.									100	0,01	80	0,01
	max.									800	0,10	240	0,06
Grey Cast Iron (GCI)	min.									200	0,01	100	0,01
	max.									2.000	0,20	600	0,06
Hard/Soft Machining	min.	80	0,01	60	0,01								
	max.	280	0,08	140	0,05								
Ni-, Co-, Fe- and Cr-Alloys	min.					80	0,01	60	0,01				
	max.					360	0,06	180	0,05				
Sintered Steel	min.									100	0,01	80	0,08
	max.									300	0,10	160	0,05
Sintered Steel hardened	min.	100	0,008	80	0,008								
	max.	250	0,06	160	0,04								
Stellite (Co-Chrom-Alloys)	min.					80	0,01	60	0,01				
	max.					180	0,08	140	0,05				
Stainless Steel hardened	min.					80	0,01	60	0,01				
	max.					250	0,06	140	0,04				
Titanium Alloys	min.					80	0,008	60	0,008				
	max.					200	0,06	160	0,035				

\*for machining carbides we recommend the use of CVD-D cutting edges

# Cutting Parameters

for our Diamond Grooving Inserts – MICRO-Line

**V<sub>c</sub> X 3.28 = SFM**

**Ap / 25.4 = DOC inches**

**F / 25.4 = inch per revolution**



You can use all our grooving inserts in continuous and interrupted cut.

**System MICRO-Line Cutting Parameters Diamond**

Material		PCD		CVD-D				UltraDiamond					
		V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F		
		[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]		
Acrylic (PMMA)	min.	100	0,005	100	0,005	100	0,005	100	0,005	100	0,005	100	0,005
	max.	3.000	0,25	2.000	0,10	3.000	0,20	2.000	0,15	3.000	0,20	2.000	0,15
Aluminium <12%Si	min.	100	0,005	100	0,005								
	max.	5.000	0,30	2.000	0,15								
Aluminum >10%Si	min.					100	0,005	100	0,005				
	max.					3.000	0,25	1.500	0,15				
Aluminum >20%Si	min.					100	0,005	80	0,005				
	max.					1.500	0,18	800	0,12				
Brass	min.	100	0,008	100	0,005	100	0,005	100	0,005				
	max.	3.000	0,15	1.500	0,15	5.000	0,12	2.500	0,10				
Carbide G-Grade, >11%Co	min.	on request											
	max.	on request											
Carbide G-Grade, <11%Co	min.	on request											
	max.	on request											
Carbide K-Grade, >15%Co	min.	on request											
	max.	on request											
Carbide K-Grade, <15%Co	min.	on request											
	max.	on request											
Carbide with Ni Binder	min.	on request											
	max.	on request											
Carbide, Green	min.	on request											
	max.	on request											
Ceramics	min.	on request											
	max.	on request											
Ceramics, Green	min.	on request											
	max.	on request											
Composites such as GFRP / CFRP	min.					100	0,01	80	0,008				
	max.					800	0,15	500	0,10				
Copper / Copper Alloys	min.					100	0,01	100	0,01				
	max.					2.000	0,25	1.000	0,15				
Glass Ceramic	min.									50	0,005	30	0,003
	max.									160	0,015	100	0,01
Graphite, coarse-grained	min.	100	0,01	100	0,008								
	max.	4.000	0,15	2.000	0,10								
Graphite, fine-grained	min.					100	0,01	100	0,008				
	max.					5.000	0,22	3.000	0,12				
Gold, Silver, Platinum	min.					50	0,005	30	0,004	50	0,005	30	0,004
	max.					1.500	0,20	800	0,15	1.500	0,20	800	0,15
Magnesium	min.	100	0,008	100	0,005	100	0,008	100	0,008				
	max.	2.000	0,15	1.000	0,10	3.000	0,12	2.000	0,10				
MMC Composites	min.					100	0,01	80	0,008				
	max.					600	0,15	300	0,10				
PEEK	min.	100	0,01	80	0,01								
	max.	300	0,50	220	0,40								
Plastics	min.					100	0,01	100	0,01				
	max.					2.000	0,30	1.500	0,20				
Zircon	min.					50	0,008	30	0,004				
	max.					160	0,05	100	0,02				

# Cutting Parameters

for our CBN Grooving Inserts – MICRO-Line

**V<sub>c</sub> X 3.28 = SFM**

**Ap / 25.4 = DOC inches**

**F / 25.4 = inch per revolution**



You can use all our grooving inserts in continuous and interrupted cut.

**System MICRO-Line Cutting Parameters CBN**

Material		CBN-H		CBN-X				CBN-K					
		V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F	V <sub>c</sub>	F		
		[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]	[m/min]	[mm/rev]		
Steel hardened up to 55 HRC	min.	100	0,007	80	0,007								
	max.	220	0,060	160	0,040								
Steel hardened up to 62HRC	min.	80	0,007	60	0,007								
	max.	200	0,060	140	0,040								
Steel hardened up to 72 HRC	min.	60	0,007	60	0,007								
	max.	180	0,040	120	0,030								
Tool Steel hardened up to 72 HRC	min.					80	0,007	40	0,006				
	max.					180	0,035	120	0,028				
Powder metallurgical Steel up to 72 HRC	min.					60	0,007	40	0,006				
	max.					160	0,040	140	0,030				
Carbide-Steel Composite > 20% Co*	min.	on request											
	max.	on request											
Ductile Cast Iron (DCI)	min.									100	0,007	80	0,007
	max.									800	0,070	240	0,040
Grey Cast Iron (GCI)	min.									200	0,007	100	0,007
	max.									2.000	0,140	600	0,040
Hard/Soft Machining	min.	80	0,007	60	0,007								
	max.	280	0,060	140	0,035								
Ni-, Co-, Fe- and Cr-Alloys	min.					80	0,007	60	0,007				
	max.					360	0,040	180	0,035				
Sintered Steel	min.									100	0,007	80	0,060
	max.									300	0,07	160	0,040
Sintered Steel hardened	min.	100	0,006	80	0,006								
	max.	250	0,040	160	0,030								
Stellite (Co-Chrom-Alloys)	min.					80	0,007	60	0,007				
	max.					180	0,060	140	0,040				
Stainless Steel hardened	min.					80	0,007	60	0,007				
	max.					250	0,040	140	0,030				
Titanium Alloys	min.					80	0,006	60	0,006				
	max.					200	0,040	160	0,025				

\*for machining carbides we recommend the use of CVD-D cutting edges

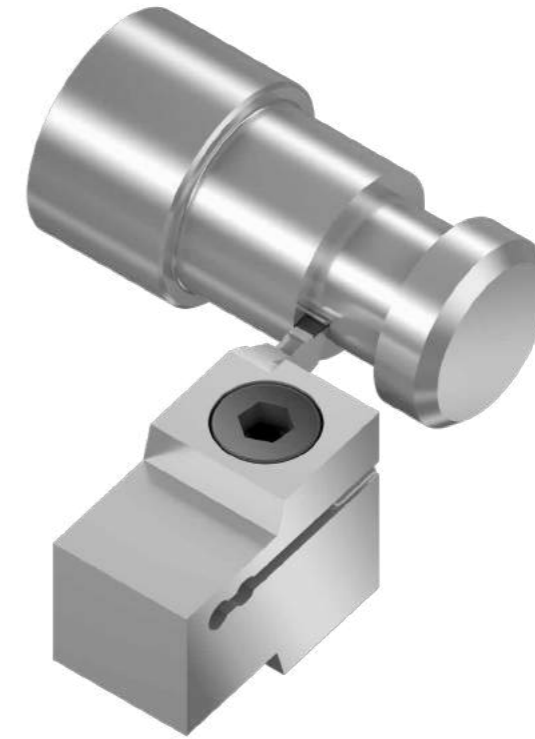
## Cooling According to Cutting Situation

		Dry	Air	Emulsion	Oil
<b>H</b>	●	4. Choice	3. Choice	1. Choice	2. Choice
	◐	1. Choice	2. Choice		
	◑	1. Choice	2. Choice		
<b>X</b>	●	4. Choice	3. Choice	1. Choice	2. Choice
	◐	2. Choice	1. Choice		
	◑	2. Choice	1. Choice		
<b>K</b>	●	3. Choice	2. Choice	1. Choice	
	◐	2. Choice	1. Choice		
	◑	1. Choice	2. Choice		
<b>PCD</b>	●		3. Choice	1. Choice	2. Choice
	◐		3. Choice	1. Choice	2. Choice
	◑				
<b>CVD-D</b>	●		3. Choice	1. Choice	2. Choice
	◐		3. Choice	1. Choice	2. Choice
	◑				
<b>Ultra Diamond</b>	●		3. Choice	1. Choice	2. Choice
	◐		3. Choice	1. Choice	2. Choice
	◑				

● continuous cut  
 ◐ light interrupted cut  
 ◑ heavy interrupted cut

## Formulas

Grooving



$V_f$	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 <sup>3</sup> /min
$a_p$	Cutting depth	mm

► Cutting speed

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

► Spindle speed

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

► Feed per revolution

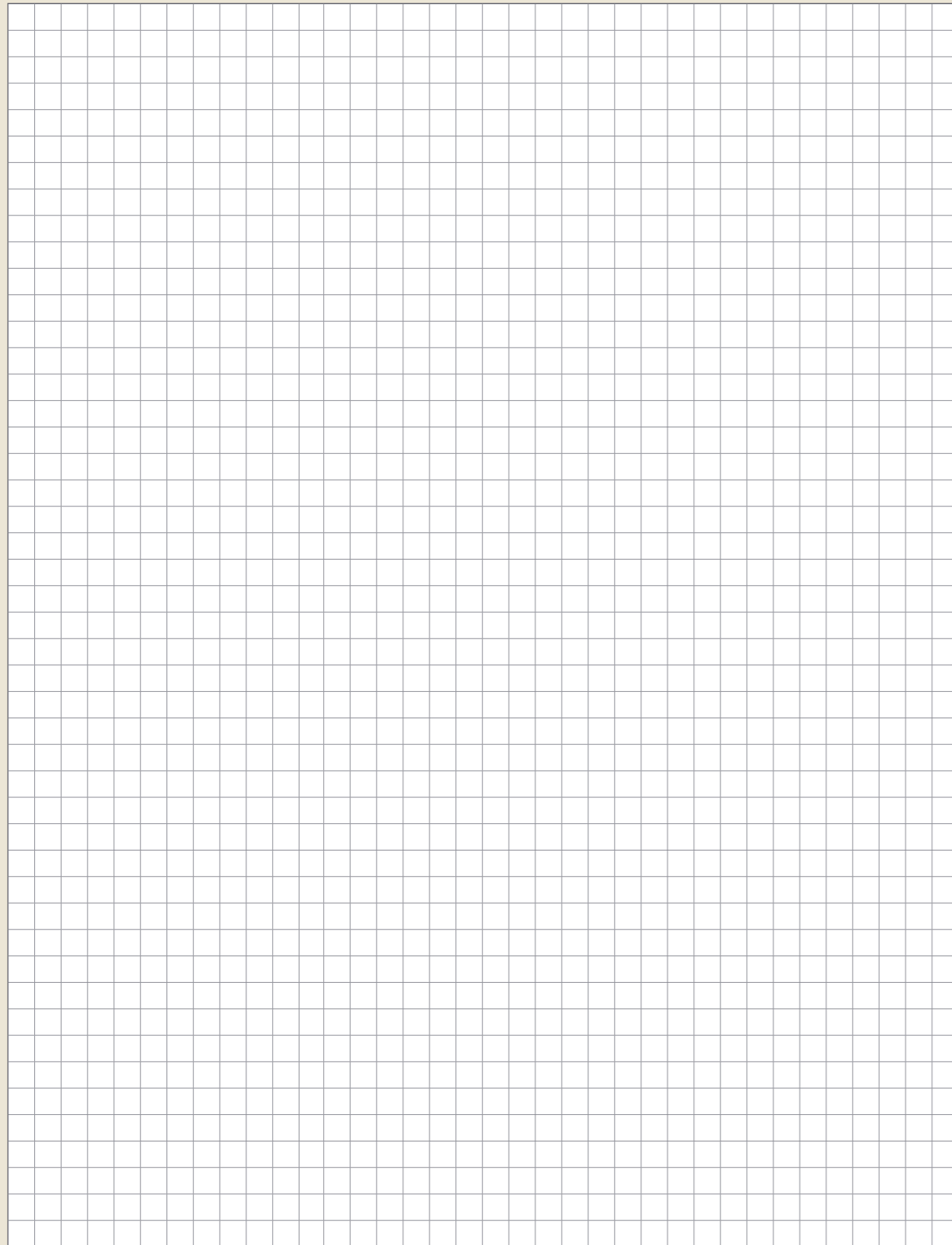
$$f_n = \frac{V_f}{n} \quad [\text{mm/rev}]$$

► Cutting time

$$t_c = \frac{l_m}{f_n \times n} \quad [\text{min}]$$

► Stock removal rate

$$Q = v_c \times a_p \times f_n \quad [\text{cm}^3/\text{min}]$$



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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:

- ▶ 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 tools, sparks may also occur, make sure that no fire can occur.



PASSION FOR DIAMOND

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