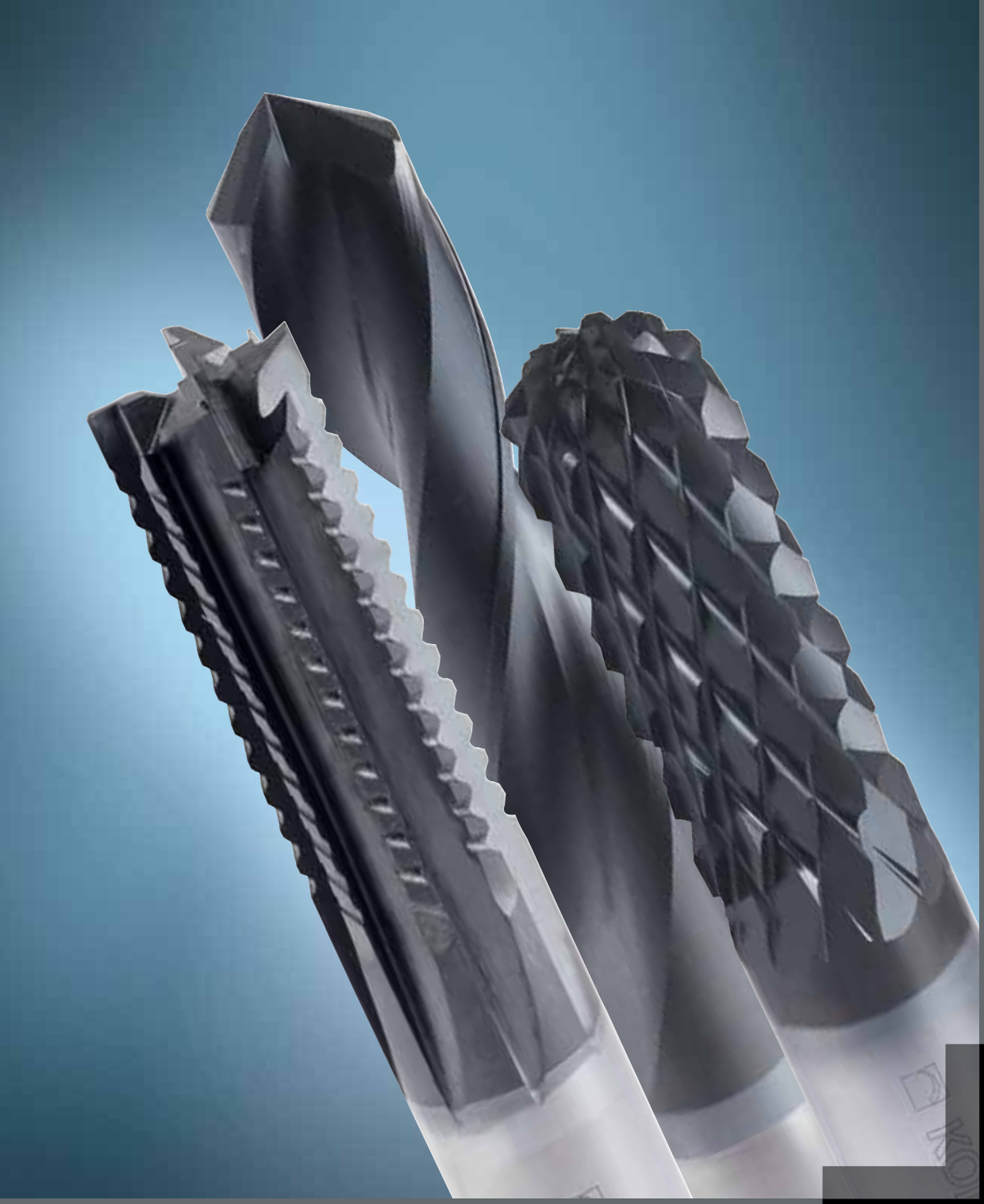
KOMET GROUP



Lightweight construction
Focus COMPOSITE MATERIALS

TOOLS + IDEAS®

In an era of increasing awareness of the issues surrounding energy, energy conservation and energy efficiency, the lightweight construction segment is becoming more and more important. At a rapid pace, composite materials are carving out ever larger market shares.

Outstanding material properties, however, also present challenges for the manufacturers of precision tools. The extremely high strength and complex make-up of these materials are placing new demands on the tools that work them: the high degree of abrasiveness means that conventional tools in drilling and milling setups last only a few metres.

In light of this requirement, the KOMET GROUP has developed a brand new class of tools distinguished by their innovative geometry, suitability for new machining strategies involving very high cutting parameters and also by the use of intelligent cutting materials. These new solutions range from single-edge to multi-tooth milling cutters and from drills with a new chamfer geometry to indexable tools having a special insert arrangement.

Cutting materials have also followed the trend: KOMET RHOBEST® diamond coatings and PCD solutions are demonstrating that they are fully equipped for the task.

Classification of composite materials and typical applications

FIBROUS COMPOSITE MATERIALS

Fibrous composites are inhomogeneous materials that are essentially an assembly of three components – fibres and matrices or binders.

Typical fibres include carbon fibre (CFRP), glass fibre (GFRP) or aramid fibre (AFRP). With respect to their tensile strength, they are categorised into HT (high tenacity), UT (ultra high tenacity) and IM (intermediate modulus). Depending on the properties desired, the fibres differ in length, thickness and relative orientation (unidirectional, bidirectional, multidirectional).

As matrices, there are currently more than 100 different resins/polymers available on the market, which is just a hint at how varied these materials are. "Cold" cutting is generally recommended for duroplastics (90%) and thermoplastics (PEEK, PEI, PPS, etc.), while elastomers (PUR) should be cut at "high speed".

Applications:
Aerospace, automotive, medical industry, sports industry, wind farms, transport, building/architecture

HYBRIDS

Hybrids are material combinations of at least three layers of metals, polymers and fibrous composites.

Application:
Aircraft construction

HONEYCOMBS

These materials are usually three-layer composite constructions with a honeycomb-shaped core made, for example, of aluminium, polycarbonate or polypropylene and are therefore characterised by their extremely lightweight and highly stiff properties.

Applications:
Satellite engineering, packaging industry, exhibition stand, model and aircraft construction

METAL MATRIX COMPOSITE MATERIAL

Metal matrix composites (MMC) have at least two constituent materials, usually a ceramic or organic component bonded in a metal matrix.

Applications:
Engine building, cylinder liners, connecting rods

The non-homogeneous nature of these new lightweight materials imposes exacting and individual requirements on the machining process. Not only does the KOMET GROUP offer a standard product range, it is an expert partner for its customers – with absolute focus on problem-solving.

Thanks to full process control in-house – from carbide/cutting material selection, consolidated expertise and many years of experience in grinding through to final coating – the KOMET GROUP is your single source of smart and viable machining solutions.

The standard product range presented here enables you to order the right tool for your applications and feasibility tests with zero fuss.

All other specifications including inch measurements can be created for you on request and tailored to your individual requirements.

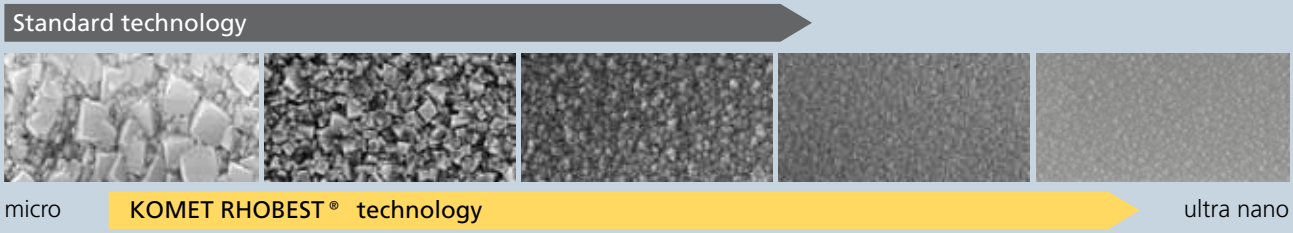
We would be delighted to collaborate with you to develop new machining strategies. We offer a modern machining environment to conduct tests in-house or we can visit you to coordinate further. Interested? Simply contact our experts in lightweight construction at www.kometgroup.com

Nano technology in lightweight construction

Since 1994, RHOBEST has been developing and continually adapting the nanocrystalline diamond coating to the tools used in specific machining processes.

In 2011, this nanotechnology became part of the KOMET GROUP. With KOMET RHOBEST® diamond coating technology, the surfaces and properties of tools for machining composite materials can be individually tailored to meet the requirements of the particular application.

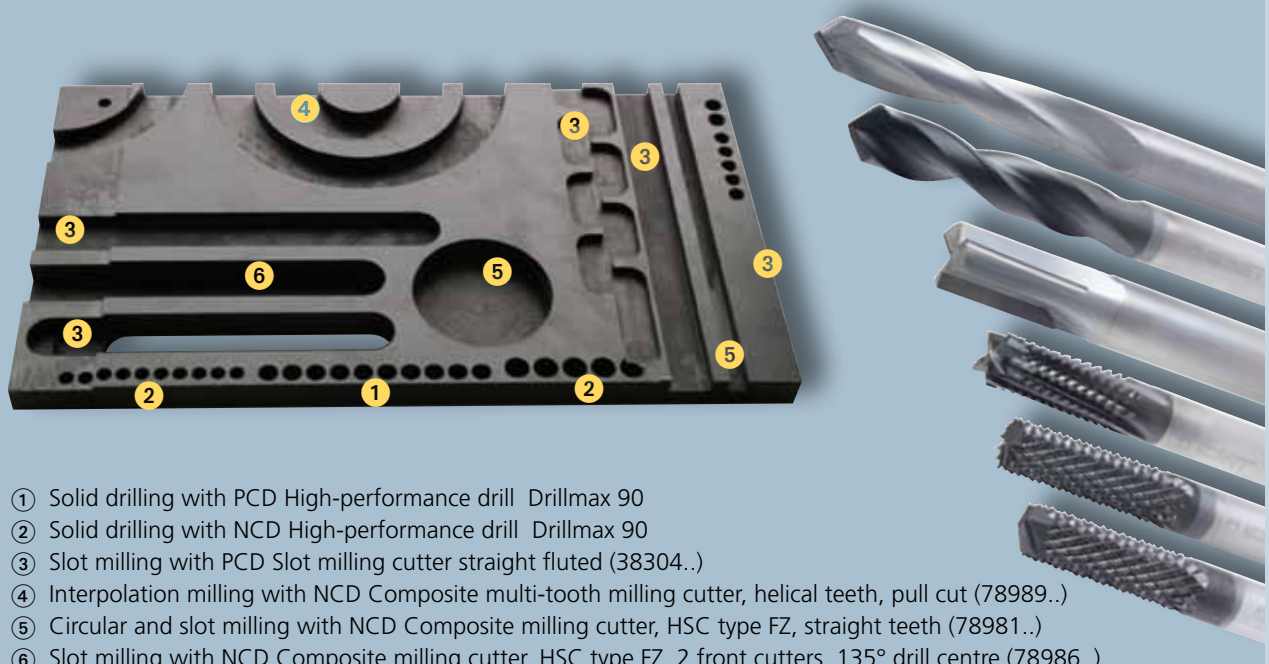
KOMET RHOBEST® diamond coating technology has made it possible to manufacture ultrananocrystalline, highly pure and extremely hard diamond coatings that join with the tool surface to form a compact and stable unit.



Thanks to this nanostructure, the geometry and surface of the optimised tool are retained, thin coatings are compact, wear-resistant and high-performing. The sharpness of the tool – an important prerequisite for the machining of fibrous composite materials – is preserved.

With KOMET RHOBEST® diamond-coated tools, we meet the requirements for machining new lightweight materials – absence of burr and fibre, a smooth, flat cutting edge, suitability for painting and bonding, short machining times and long tool life.

Machining CFRP material



① Solid drilling with PCD High-performance drill Drillmax 90
② Solid drilling with NCD High-performance drill Drillmax 90
③ Slot milling with PCD Slot milling cutter straight fluted (38304..)
④ Interpolation milling with NCD Composite multi-tooth milling cutter, helical teeth, pull cut (78989..)
⑤ Circular and slot milling with NCD Composite milling cutter, HSC type FZ, straight teeth (78981..)
⑥ Slot milling with NCD Composite milling cutter, HSC type FZ, 2 front cutters, 135° drill centre (78986..)

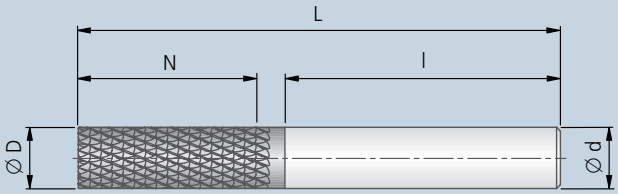
Tool selection

Material				Tool	Page
CFRP	GFRP	CFRP/Al stacks	Honey-combs		
●	●			 NCD Composite milling cutter, HSC type FZ, flat head **78980..**	6
●	●			 NCD Composite milling cutter, HSC type FZ, burr style **78981..**	6
●	●			 NCD Composite milling cutter, HSC type FZ, ball nose **78982..**	6
●	●			 NCD Composite milling cutter, HSC type GZ, ball nose **78983..**	6
●	●			 NCD Composite milling cutter, HSC type FZ, 2 front cutters **78984..**	7
●	●			 NCD Composite milling cutter, HSC type GZ, 2 front cutters **78985..**	7
●	●			 NCD Composite milling cutter, HSC type FZ, 2 front cutters, 135° drill centre **78986..**	7
●	●			 NCD Composite milling cutter, HSC type GZ, 2 front cutters, 135° drill centre **78987..**	7
●	●	●	●	 NCD Composite multi-tooth milling cutter straight teeth **78988..**	8
●	●	●	●	 NCD Composite multi-tooth milling cutter helical teeth, pull cut **78989..**	8
●	●	◐	◐	 PCD Compression milling cutter staggered cut with dual right and left helix **38300..**	8
●	●	●	●	 PCD Slot milling cutter straight fluted **38304..**	8
●	●	◐	●	 PCD High-performance drill Drillmax 5×D	9
●	●	●	◐	 PCD High-performance drill Drillmax 90 5×D	9
●	●	●	◐	 NCD High-performance drill Drillmax 90 5×D / 7×D	10

● main area of application, ◐ suitable in some cases. Other materials and combinations on request.

NCD Composite milling cutter, HSC

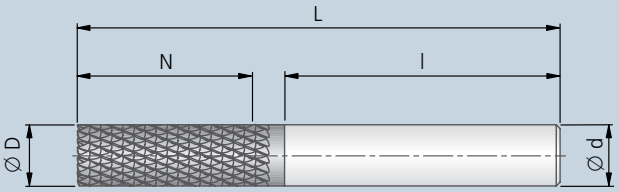
- milling and trimming
- type FZ (fine-tooth)
- flat head
- shank to DIN 6535 HA
- cutting material: diamond



78980.. type FZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
4	4 × 28	40	15	78980040000400
4	4 × 28	75	15	78980075000400
6	6 × 25	50	18	78980050000600
6	6 × 36	75	18	78980075000600
8	8 × 36	63	25	78980063000800
8	8 × 36	75	25	78980075000800
10	10 × 40	72	30	78980072001000

NCD Composite milling cutter, HSC

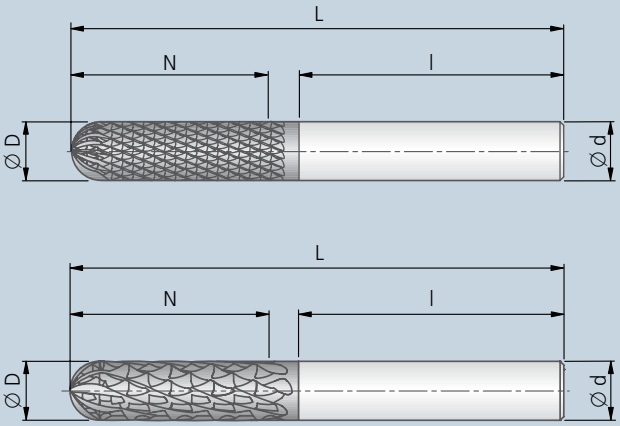
- milling and trimming
- type FZ (fine-tooth)
- burr style
- shank to DIN 6535 HA
- cutting material: diamond



78981.. type FZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
1,6	3 × 25	38	8	78981038000160
2	3 × 25	38	8	78981038000200
3	3 × 20	38	12	78981038000300
4	4 × 20	40	15	78981040000400
4	4 × 28	75	15	78981075000400
6	6 × 25	50	18	78981050000600
6	6 × 36	75	18	78981075000600
8	8 × 36	63	25	78981063000800
8	8 × 36	75	25	78981075000800
10	10 × 40	72	30	78981072001000
12	12 × 45	83	32	78981083001200

NCD Composite milling cutter, HSC

- slot milling and plunge milling
- type FZ (fine-tooth), type GZ (coarse-tooth)
- ball nose
- shank to DIN 6535 HA
- cutting material: diamond



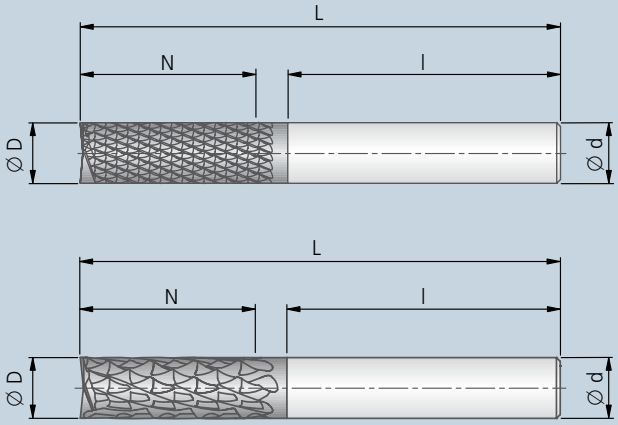
78982.. type FZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
4	4 × 28	50	16	78982050000400
6	6 × 36	60	19	78982060000600
8	8 × 36	63	25	78982063000800
10	10 × 40	72	30	78982072001000
12	12 × 45	83	32	78982083001200

78983.. type GZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
4	4 × 28	50	16	78983050000400
6	6 × 36	60	19	78983063000600
8	8 × 36	63	25	78983060000800
10	10 × 40	72	30	78983072001000
12	12 × 45	83	32	78983083001200

Recommended application areas see page 12.

NCD Composite milling cutter, HSC

- **plunge milling and trimming**
- type FZ (fine-tooth), type GZ (coarse-tooth)
- 2 front cutters
- shank to DIN 6535 HA
- cutting material: diamond

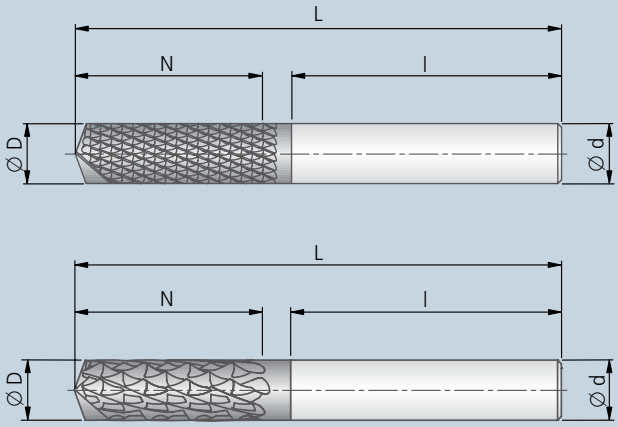


78984.. type FZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
1,6	3 × 25	38	8	78984038000160
2	3 × 25	38	8	78984038000200
3	3 × 20	38	12	78984038000300
4	4 × 28	50	16	78984050000400
4	4 × 28	75	15	78984075000400
6	6 × 36	60	19	78984060000600
6	6 × 36	75	30	78984075000600
8	8 × 36	63	25	78984063000800
8	8 × 36	75	35	78984075000800
10	10 × 40	72	30	78984072001000
12	12 × 45	83	32	78984083001200

78985.. type GZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
1,6	3 × 25	38	8	78985038000160
2	3 × 25	38	8	78985038000200
3	3 × 20	38	12	78985038000300
4	4 × 28	50	16	78985050000400
4	4 × 28	75	15	78985075000400
6	6 × 36	60	19	78985060000600
6	6 × 36	75	30	78985075000600
8	8 × 36	63	25	78985063000800
8	8 × 36	75	35	78985075000800
10	10 × 40	72	30	78985072001000
12	12 × 45	83	32	78985083001200

NCD Composite milling cutter, HSC

- **trimming, slot milling, plunge milling and shoulder milling**
- type FZ (fine-tooth), type GZ (coarse-tooth)
- 2 front cutters, 135° drill centre
- shank to DIN 6535 HA
- cutting material: diamond

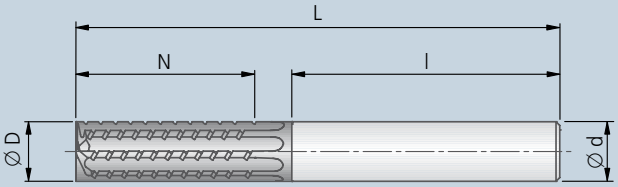


78986.. type FZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
3	3 × 20	38	12	78986038000300
4	4 × 28	50	16	78986050000400
4	4 × 28	75	15	78986075000400
6	6 × 36	60	19	78986060000600
6	6 × 36	75	18	78986075000600
8	8 × 36	63	25	78986063000800
8	8 × 36	75	25	78986075000800
10	10 × 40	72	30	78986072001000
12	12 × 45	83	32	78986083001200

78987.. type GZ				
Ø D_{h10}	Ø d_{h6} × l	L	N	Order No.
3	3 × 20	38	12	78987038000300
4	4 × 28	50	16	78987050000400
4	4 × 28	75	15	78987075000400
6	6 × 36	60	19	78987060000600
6	6 × 36	75	18	78987075000600
8	8 × 36	63	25	78987063000800
8	8 × 36	75	25	78987075000800
10	10 × 40	72	30	78987072001000
12	12 × 45	83	32	78987083001200

NCD Composite multi-tooth milling cutter

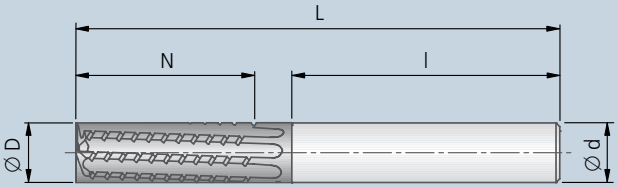
- straight teeth
- burr style, every second tooth exposed
- fine chip breaker
- shank to DIN 6535 HA
- cutting material: diamond



78988..					
Ø D_{h10}	Ø d_{h6} × l	L	N	No. of teeth Z	Order No.
3	3 × 28	60	12	4	78988060000300
4	4 × 28	60	16	6	78988060000400
6	6 × 36	60	20	8	78988060000600
6	6 × 36	75	28	8	78988075000600
8	8 × 36	63	22	8	78988063000800
8	8 × 36	75	32	8	78988075000800
10	10 × 40	72	32	8	78988072001000
12	12 × 45	83	32	8	78988083001200

NCD Composite multi-tooth milling cutter

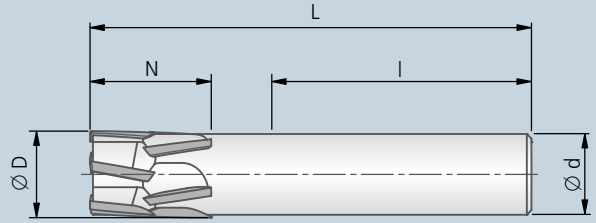
- helical teeth, pull cut
- burr style, every second tooth exposed
- fine chip breaker
- shank to DIN 6535 HA
- cutting material: diamond



78989..					
Ø D_{h10}	Ø d_{h6} × l	L	N	No. of teeth Z	Order No.
3	3 × 28	60	12	4	78989060000300
4	4 × 28	60	16	6	78989060000400
6	6 × 36	60	20	8	78989060000600
6	6 × 36	75	28	8	78989075000600
8	8 × 36	63	22	8	78989063000800
8	8 × 36	75	32	8	78989075000800
10	10 × 40	72	32	8	78989072001000
12	12 × 45	83	32	8	78989083001200

PCD Compression milling cutter

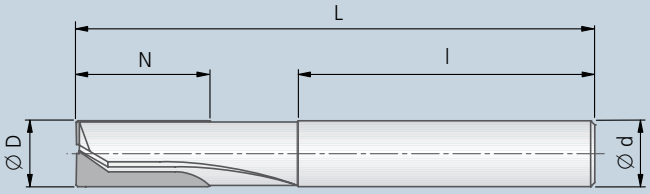
- staggered cut with dual right and left helix
- shank to DIN 6535 HA
- cutting material: PCD



38300..					
Ø D_{h10}	Ø d_{h6} × l	L	N	No. of teeth Z	Order No.
6	6 × 36	57	10	3	38300057000600
10	10 × 40	72	16	4	38300072001000
16	16 × 48	90	20	5	38300090001600

PCD Slot milling cutter

- straight fluted
- shank to DIN 6535 HA
- cutting material: PCD

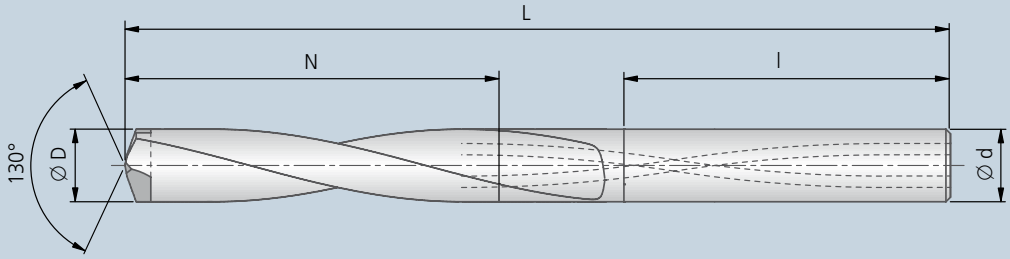


38304..					
Ø D_{h10}	Ø d_{h6} × l	L	N	No. of teeth Z	Order No.
6	6 × 36	57	12	2	38304057000600
8	8 × 36	63	16	3	38304063000800
10	10 × 40	72	20	4	38304072001000

Recommended application areas see page 12.

PCD High-performance drill Drillmax

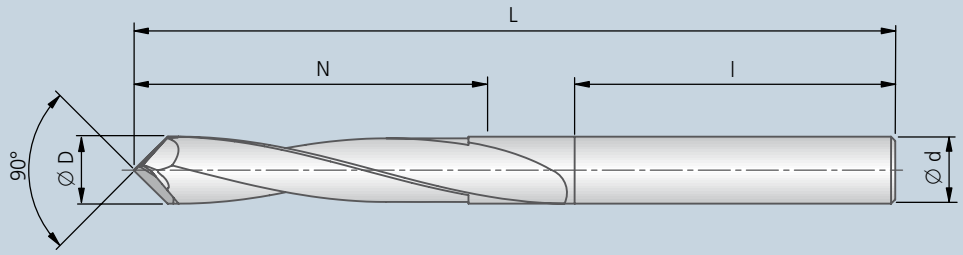
- with coolant channels ■
- 2 cutting edges and 4 guides ■
- spiral fluted ■
- shank to DIN 6535 HA ■
- cutting material: PCD ■



V03.. 5×D					DIN 6535 HA
Ø D_{m7}	Ø d_{h6} × l	L	N	kg ~	Order No.
6	6 × 36	82	30	0,038	V03 06000.145510
8	8 × 36	91	42	0,047	V03 08000.145510
10	10 × 40	103	50	0,083	V03 10000.145510

PCD High-performance drill Drillmax 90

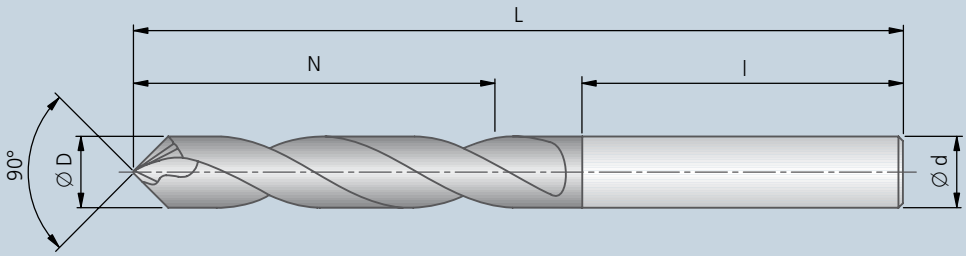
- without internal coolant supply ■
- shank to DIN 6535 HA and DIN 6535 HE ■
- cutting material: PCD ■



V11.. 5×D				DIN 6535 HE	DIN 6535 HA
Ø D_{m7}	Ø d_{h6} × l	L	N	Order No.	Order No.
6	6 × 36	82	30	V11 06000.135510	V11 06000.235510
8	8 × 36	91	42	V11 08000.135510	V11 08000.235510
10	10 × 40	103	50	V11 10000.135510	V11 10000.235510

NCD High-performance drill Drillmax 90

- without internal coolant supply
- 2-flute
- shank to DIN 6535 HA
- cutting material: diamond



		5×D			7×D		
		DIN 6535 HA			DIN 6535 HA		
Ø D_{m7}	Ø d_{h6} × l	Order No.	L	N	Order No.	L	N
0,80	3 × 28	V11 00800.135210	38	6	–		
1,00	3 × 28	V11 01000.135210	38	6	–		
1,50	3 × 28	V11 01500.135210	48	12	–		
1,60	3 × 28	V11 01600.135210	48	12	–		
1,70	3 × 28	V11 01700.135210	48	12	–		
1,80	3 × 28	V11 01800.135210	48	12	–		
1,90	3 × 28	V11 01900.135210	48	12	–		
2,00	3 × 28	V11 02000.135210	48	12	–		
2,10	3 × 28	V11 02100.135210	48	15	–		
2,20	3 × 28	V11 02200.135210	48	15	–		
2,30	3 × 28	V11 02300.135210	48	15	–		
2,40	3 × 28	V11 02400.135210	48	15	–		
2,50	6 × 36	V11 02500.135210	66	19	–		
2,60	6 × 36	V11 02600.135210	66	19	–		
2,70	6 × 36	V11 02700.135210	66	19	–		
2,80	6 × 36	V11 02800.135210	66	19	–		
2,90	6 × 36	V11 02900.135210	66	19	–		
3,00	6 × 36	V11 03000.135210	66	23	–		
3,10	6 × 36	V11 03100.135210	66	23	–		
3,20	6 × 36	V11 03200.135210	66	23	–		
3,30	6 × 36	V11 03300.135210	66	23	–		
3,40	6 × 36	V11 03400.135210	66	23	–		
3,50	6 × 36	V11 03500.135210	66	23	–		
3,60	6 × 36	V11 03600.135210	66	23	–		
3,70	6 × 36	V11 03700.135210	66	23	–		
3,80	6 × 36	V11 03800.135210	74	29	–		
3,90	6 × 36	V11 03900.135210	74	29	–		
4,00	6 × 36	V11 04000.135210	74	29	–		
4,10	6 × 36	V11 04100.135210	74	29	–		
4,20	6 × 36	V11 04200.135210	74	29	–		
4,30	6 × 36	V11 04300.135210	74	29	–		
4,40	6 × 36	V11 04400.135210	74	29	–		
4,50	6 × 36	V11 04500.135210	74	29	–		
4,60	6 × 36	V11 04600.135210	74	29	–		
4,70	6 × 36	V11 04700.135210	74	29	–		
4,80	6 × 36	V11 04800.135210	82	35	–		
4,83	6 × 36	V11 04830.135210	82	35	–		
4,90	6 × 36	V11 04900.135210	82	35	–		
4,93	6 × 36	V11 04930.135210	82	35	–		
5,00	6 × 36	V11 05000.135210	82	35	V21 05000.135210	88	43
5,10	6 × 36	V11 05100.135210	82	35	V21 05100.135210	88	43
5,20	6 × 36	V11 05200.135210	82	35	V21 05200.135210	88	43
5,30	6 × 36	V11 05300.135210	82	35	V21 05300.135210	88	43
5,40	6 × 36	V11 05400.135210	82	35	V21 05400.135210	88	43
5,50	6 × 36	V11 05500.135210	82	35	V21 05500.135210	88	43
5,60	6 × 36	V11 05600.135210	82	35	V21 05600.135210	88	43
5,70	6 × 36	V11 05700.135210	82	35	V21 05700.135210	88	43
5,80	6 × 36	V11 05800.135210	82	35	V21 05800.135210	88	43
5,90	6 × 36	V11 05900.135210	82	35	V21 05900.135210	88	43
6,00	6 × 36	V11 06000.135210	82	35	V21 06000.135210	88	43
6,10	8 × 36	V11 06100.135210	91	42	V21 06100.135210	105	56
6,20	8 × 36	V11 06200.135210	91	42	V21 06200.135210	105	56
6,30	8 × 36	V11 06300.135210	91	42	V21 06300.135210	105	56
6,35	8 × 36	V11 06350.135210	91	42	–		

Recommended application areas see page 12.

		5×D			7×D		
		DIN 6535 HA			DIN 6535 HA		
Ø D_{m7}	Ø d_{h6} × l	Order No.	L	N	Order No.	L	N
6,40	8 × 36	V11 06400.135210	91	42	V21 06400.135210	105	56
6,50	8 × 36	V11 06500.135210	91	42	V21 06500.135210	105	56
6,60	8 × 36	V11 06600.135210	91	42	V21 06600.135210	105	56
6,70	8 × 36	V11 06700.135210	91	42	V21 06700.135210	105	56
6,80	8 × 36	V11 06800.135210	91	42	V21 06800.135210	105	56
6,90	8 × 36	V11 06900.135210	91	42	V21 06900.135210	105	56
7,00	8 × 36	V11 07000.135210	91	42	V21 07000.135210	105	56
7,10	8 × 36	V11 07100.135210	91	42	V21 07100.135210	105	56
7,20	8 × 36	V11 07200.135210	91	42	V21 07200.135210	105	56
7,30	8 × 36	V11 07300.135210	91	42	V21 07300.135210	105	56
7,40	8 × 36	V11 07400.135210	91	42	V21 07400.135210	105	56
7,50	8 × 36	V11 07500.135210	91	42	V21 07500.135210	105	56
7,60	8 × 36	V11 07600.135210	91	42	V21 07600.135210	105	56
7,70	8 × 36	V11 07700.135210	91	42	V21 07700.135210	105	56
7,80	8 × 36	V11 07800.135210	91	42	V21 07800.135210	105	56
7,90	8 × 36	V11 07900.135210	91	42	V21 07900.135210	105	56
7,93	8 × 36	V11 07930.135210	91	42	–		
8,00	8 × 36	V11 08000.135210	91	42	V21 08000.135210	105	56
8,10	10 × 40	V11 08100.135210	103	48	V21 08100.135210	125	68
8,20	10 × 40	V11 08200.135210	103	48	V21 08200.135210	125	68
8,30	10 × 40	V11 08300.135210	103	48	V21 08300.135210	125	68
8,40	10 × 40	V11 08400.135210	103	48	V21 08400.135210	125	68
8,50	10 × 40	V11 08500.135210	103	48	V21 08500.135210	125	68
8,60	10 × 40	V11 08600.135210	103	48	V21 08600.135210	125	68
8,70	10 × 40	V11 08700.135210	103	48	V21 08700.135210	125	68
8,80	10 × 40	V11 08800.135210	103	48	V21 08800.135210	125	68
8,90	10 × 40	V11 08900.135210	103	48	V21 08900.135210	125	68
9,00	10 × 40	V11 09000.135210	103	48	V21 09000.135210	125	68
9,10	10 × 40	V11 09100.135210	103	48	V21 09100.135210	125	68
9,20	10 × 40	V11 09200.135210	103	48	V21 09200.135210	125	68
9,30	10 × 40	V11 09300.135210	103	48	V21 09300.135210	125	68
9,40	10 × 40	V11 09400.135210	103	48	V21 09400.135210	125	68
9,50	10 × 40	V11 09500.135210	103	48	V21 09500.135210	125	68
9,52	10 × 40	V11 09520.135210	103	48	–		
9,60	10 × 40	V11 09600.135210	103	48	V21 09600.135210	125	68
9,70	10 × 40	V11 09700.135210	103	48	V21 09700.135210	125	68
9,80	10 × 40	V11 09800.135210	103	48	V21 09800.135210	125	68
9,90	10 × 40	V11 09900.135210	103	48	V21 09900.135210	125	68
10,00	10 × 40	V11 10000.135210	103	48	V21 10000.135210	125	68
10,10	12 × 45	V11 10100.135210	118	56	V21 10100.135210	145	82
10,20	12 × 45	V11 10200.135210	118	56	V21 10200.135210	145	82
10,30	12 × 45	V11 10300.135210	118	56	V21 10300.135210	145	82
10,40	12 × 45	V11 10400.135210	118	56	V21 10400.135210	145	82
10,50	12 × 45	V11 10500.135210	118	56	V21 10500.135210	145	82
10,60	12 × 45	V11 10600.135210	118	56	V21 10600.135210	145	82
10,70	12 × 45	V11 10700.135210	118	56	V21 10700.135210	145	82
10,80	12 × 45	V11 10800.135210	118	56	V21 10800.135210	145	82
10,90	12 × 45	V11 10900.135210	118	56	V21 10900.135210	145	82
11,00	12 × 45	V11 11000.135210	118	56	V21 11000.135210	145	82
11,10	12 × 45	V11 11100.135210	118	56	V21 11100.135210	145	82
11,20	12 × 45	V11 11200.135210	118	56	V21 11200.135210	145	82
11,30	12 × 45	V11 11300.135210	118	56	V21 11300.135210	145	82
11,40	12 × 45	V11 11400.135210	118	56	V21 11400.135210	145	82
11,50	12 × 45	V11 11500.135210	118	56	V21 11500.135210	145	82
11,60	12 × 45	V11 11600.135210	118	56	V21 11600.135210	145	82
11,70	12 × 45	V11 11700.135210	118	56	V21 11700.135210	145	82
11,80	12 × 45	V11 11800.135210	118	56	V21 11800.135210	145	82
11,90	12 × 45	V11 11900.135210	118	56	V21 11900.135210	145	82
12,00	12 × 45	V11 12000.135210	118	56	V21 12000.135210	145	82
12,10	14 × 45	V11 12100.135210	126	60	V21 12100.135210	160	92
12,20	14 × 45	V11 12200.135210	126	60	V21 12200.135210	160	92
12,30	14 × 45	V11 12300.135210	126	60	V21 12300.135210	160	92
12,40	14 × 45	V11 12400.135210	126	60	V21 12400.135210	160	92
12,50	14 × 45	V11 12500.135210	126	60	V21 12500.135210	160	92
12,60	14 × 45	V11 12600.135210	126	60	V21 12600.135210	160	92
12,70	14 × 45	V11 12700.135210	126	60	V21 12700.135210	160	92
12,80	14 × 45	V11 12800.135210	126	60	V21 12800.135210	160	92
12,90	14 × 45	V11 12900.135210	126	60	V21 12900.135210	160	92
13,00	14 × 45	V11 13000.135210	126	60	V21 13000.135210	160	92

Recommended application areas

NCD Composite milling cutter, HSC (78980.. · 78981.. · 78982.. · 78983.. · 78984.. · 78985.. · 78986.. · 78987..)

Machining: trimming, circular cutting, grooving, ramping, plunging, pocket and slot milling

Cutting speed v_c (m/min) Feed f (mm/rev)	Ø 1,6 mm		Ø 2 mm		Ø 3 mm		Ø 4 mm		Ø 6 mm		Ø 8 mm		Ø 10 mm		Ø 12 mm	
	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f
CFRP	50-100	0,02-0,04	80-150	0,03-0,06	100-200	0,04-0,08	100-200	0,06-0,10	100-300	0,08-0,12	100-300	0,10-0,15	100-300	0,10-0,20	100-300	0,10-0,25
GFRP	70-100	0,02-0,05	100-150	0,03-0,07	120-200	0,04-0,10	120-200	0,06-0,12	100-300	0,08-0,15	100-300	0,10-0,20	100-300	0,10-0,25	100-300	0,10-0,30

NCD Composite multi-tooth milling cutter (78988.. · 78989..)

Machining: trimming, circular cutting, axial grooving, pocket and slot milling

Cutting speed v_c (m/min) Feed f_z (mm/tooth)	Ø 3 mm		Ø 4 mm		Ø 6 mm		Ø 8 mm		Ø 10 mm		Ø 12 mm	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
CFRP	100-200	0,01-0,03	100-200	0,02-0,04	100-300	0,02-0,06	100-300	0,02-0,08	100-300	0,02-0,10	100-300	0,03-0,12
GFRP	100-200	0,01-0,04	100-200	0,02-0,06	100-300	0,02-0,08	100-300	0,02-0,10	100-300	0,02-0,12	100-300	0,03-0,15
CFRP/Al stacks	100-200	0,01-0,03	100-200	0,02-0,04	100-300	0,02-0,06	100-300	0,02-0,08	100-300	0,02-0,10	100-300	0,03-0,12
Honeycombs	100-200	0,01-0,03	100-200	0,02-0,04	100-300	0,02-0,06	100-300	0,02-0,08	100-300	0,02-0,10	100-300	0,03-0,12

PCD Compression milling cutter (38300..)

Machining: trimming, pocket and slot milling

Cutting speed v_c (m/min) Feed f_z (mm/tooth)	Ø 6 mm		Ø 8 mm		Ø 10 mm		Ø 16 mm	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
CFRP	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10	200-400	0,03-0,12
GFRP	200-400	0,02-0,08	200-400	0,03-0,10	200-400	0,03-0,12	200-400	0,03-0,15
CFRP/Al stacks	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10	200-400	0,03-0,12
Honeycombs	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10	200-400	0,03-0,12

PCD Slot milling cutter (38304..)

Machining: trimming, face milling, plunge milling

Cutting speed v_c (m/min) Feed f_z (mm/tooth)	Ø 6 mm		Ø 8 mm		Ø 10 mm	
	v_c	f_z	v_c	f_z	v_c	f_z
CFRP	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10
GFRP	200-400	0,02-0,08	200-400	0,03-0,10	200-400	0,03-0,12
CFRP/Al stacks	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10
Honeycombs	200-400	0,02-0,06	200-400	0,03-0,08	200-400	0,03-0,10

PCD High-performance drill Drillmax 90 (30435..) and Drillmax (38405..)

Machining: through hole, blind hole

Cutting speed v_c (m/min) Feed f (mm/rev)	Ø 6 mm		Ø 8 mm		Ø 10 mm	
	v_c	f	v_c	f	v_c	f
CFRP	100-300	0,05-0,12	100-300	0,06-0,12	100-300	0,06-0,12
GFRP	100-300	0,05-0,15	100-300	0,06-0,18	100-300	0,06-0,20
CFRP/Al stacks	100-300	0,05-0,12	100-300	0,06-0,12	100-300	0,06-0,12
Honeycombs	100-300	0,05-0,12	100-300	0,06-0,12	100-300	0,06-0,12

NCD High-performance drill Drillmax 90 (78205..)

Machining: through hole, blind hole

Cutting speed v_c (m/min) Feed f (mm/rev)	Ø 0,8 - 1,5 mm		Ø 1,6 - 3,9 mm		Ø 4 - 5,9 mm		Ø 6 - 7,9 mm		Ø 8 - 9,9 mm		Ø 10 - 13 mm	
	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f	v_c	f
CFRP	30-100	0,01-0,03	60-200	0,02-0,06	100-200	0,04-0,08	100-300	0,06-0,12	100-300	0,06-0,12	100-300	0,06-0,12
GFRP	30-100	0,01-0,04	60-200	0,02-0,08	100-200	0,04-0,10	100-300	0,06-0,15	100-300	0,06-0,18	100-300	0,06-0,20
CFRP/Al stacks	30-100	0,01-0,03	60-200	0,02-0,06	100-200	0,04-0,08	100-300	0,06-0,12	100-300	0,06-0,12	100-300	0,06-0,12
Honeycombs	30-100	0,01-0,03	60-200	0,02-0,06	100-200	0,04-0,08	100-300	0,06-0,12	100-300	0,06-0,12	100-300	0,06-0,12

Other materials and combinations on request.

We would be delighted to collaborate with you to develop new machining strategies. We offer a modern machining environment to conduct tests in-house or we can visit you to coordinate further.

Interested? Simply contact our experts in lightweight construction at www.kometgroup.com

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