KOMET PCD Milling cutter

The use of PCD monotools in the production of aluminium components is widespread.

This system is distinguished by the minimum effort required to set an increased number of teeth, as well as its long life time and very low roughness depths.

Different requirements for surface roughness are met using special tools that have the appropriate cutting geometry.

Our portfolio includes PCD face milling and shoulder milling cutters, radius milling cutters, slot milling cutters and compression milling cutters.

3D-printed tools – welcome to the machining revolution

HPC PCD face milling cutters

The cutter holders in the completely redesigned KOMET PCD milling cutters are manufactured using the generative process of laser melting, which means that these new tools can offer feed rates that are up to 100% higher than before.

3D printing enables up to twice as many cutting edges to be created, depending on the diameter.

In these milling cutters, KOMET is utilising the advantages offered by additive manufacturing, a method which allows the coolant channels to be designed optimally and positioned exactly so that each cutting edge is supplied with coolant by a separate channel.

The angle between the axes of the cutting edges is larger than that on conventionally manufactured tools, which makes the cutting action smoother while also maintaining a high level of tool stability.

PCD Milling cutter

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PCD Slot milling cutter	
∅ 6 – 20 mm (DIN 6535 HA) ∅ 10 – 25 mm (screw-in)	694
PCD Radius milling cutter	
∅ 10 – 16 mm (screw-in)	694
PCD Face milling cutter	
∅ 10 – 32 mm (screw-in) ∅ 40 – 160 mm (HSK-A) ∅ 40 – 125 mm (DIN 8030 A/B)	696
PCD Face and corner milling cutter	
∅ 16 – 25 mm (DIN 6535 HA) ∅ 32 – 63 mm (HSK-A)	698
PCD Face milling cutter HPC	
∅ 10 – 32 mm (DIN 6535 HA) ∅ 10 – 32 mm (screw-in)	700
PCD Slot milling cutter	
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for machining composite materials ∅ 6 – 16 mm	705
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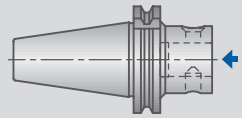
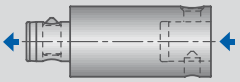
6 Adaptors

Adaptors with ABS connection

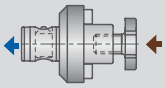


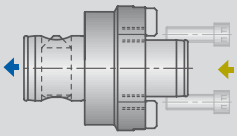


Key

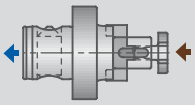
- ABS connection
- Cylindrical connection
- Weldon connection
- Shrink connection
- Screw connection
- DIN 6357 adaptor
- DIN 6358 adaptor

ABS Adaptors FA | FAM

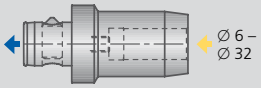




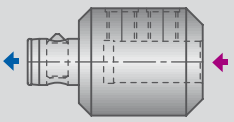
Combination milling cutter arbor FAK



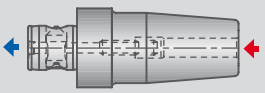
Expanding chuck



Adaptors with Weldon connection



Shrink fit technology ThermoGrip



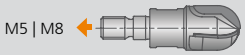
3 PCD Milling cutter

Compression milling cutter
Ø 6 – 16 mm ▸ 705

Slot milling cutter
Ø 6 – 10 mm ▸ 704

Slot milling cutter
Ø 6 – 20 mm ▸ 694

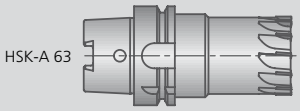
Ø 10 – 25 mm ▸ 694



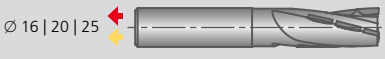
Radius milling cutter
Ø 10 – 16 mm ▸ 694

Face milling cutter
Ø 10 – 32 mm ▸ 696

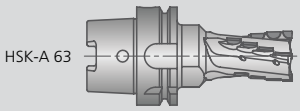
Ø 40 – 125 mm ▸ 696



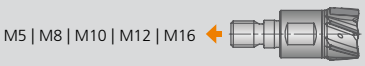
Ø 40 – 160 mm ▸ 696



Facing and corner milling cutter
Ø 16 – 25 mm ▸ 698

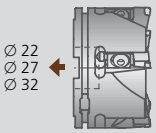


Ø 32 – 63 mm ▸ 698



Face milling cutter HPC
Ø 10 – 32 mm ▸ 700

Ø 10 – 32 mm ▸ 700



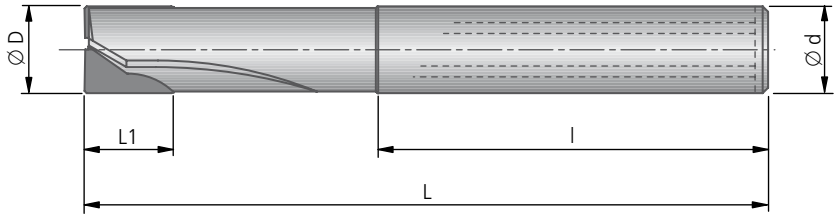
Finishing, facing and corner milling cutter HSC
Ø 80 – 100 mm ▸ 706

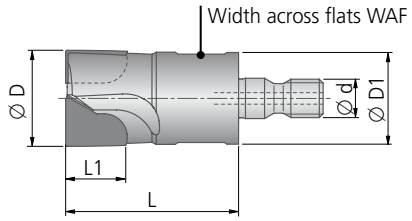
1 Countersinking tool

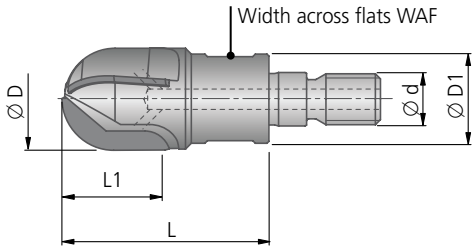
Countersink KWZ
Ø 10 – 48 mm

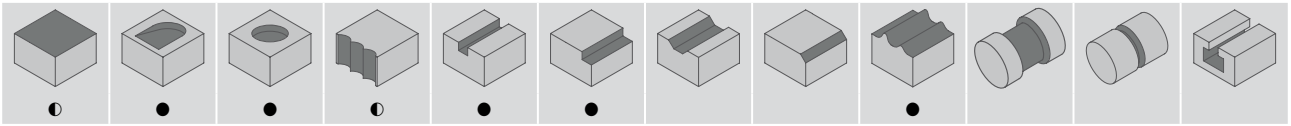
Countersink KWS
Ø 16,5 – 37 mm

PCD Slot milling cutter | PCD Radius milling cutter









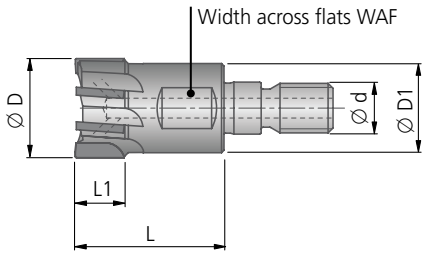
DIN 6535 HA 1×D					
Ø D	Cylindrical shank Ø d × l	L	L1	Z	Order No.
6	6 × 36	57	6	2	38390000000600
8	8 × 36	63	8	2	38390000000800
10	10 × 40	72	10	2	38390000001000
12	12 × 45	83	12	2	38390000001200
16	16 × 48	90	16	3	38391000001600
20	20 × 50	104	20	3	38391000002000
DIN 6535 HA 2×D					
6	6 × 36	57	12	2	38392057000600
8	8 × 36	63	16	2	38392063000800
10	10 × 40	72	20	2	38392072001000
12	12 × 45	83	24	2	38392083001200
16	16 × 48	90	32	3	38393090001600
20	20 × 50	104	40	3	38393004002000

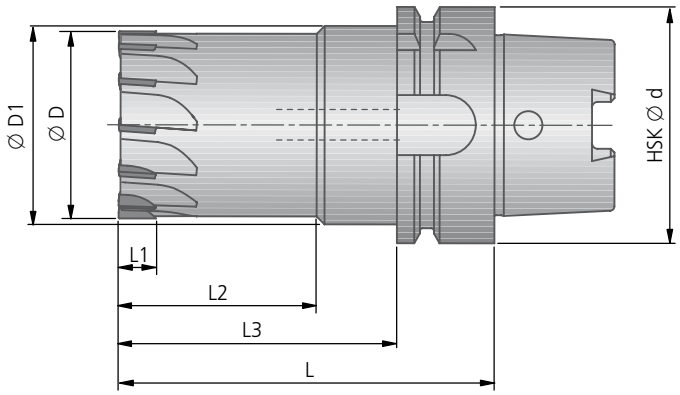
Screw-in cutter									
Ø D	Ø d	Width across flats WAF	Tightening torque Nm	Ø D1	L	L1	Z	kg	Order No.
10	M5	8	7	9,6	28	10	2	0,018	37340099001000
12	M5	8	7	9,6	28	12	2	0,018	37340099001200
16	M8	13	18	13,8	32	16	3	0,036	37340099001600
20	M10	16	30	18,0	45	20	3	0,095	37340099002000
25	M12	18	40	21,0	45	20	3	0,165	37340099002500

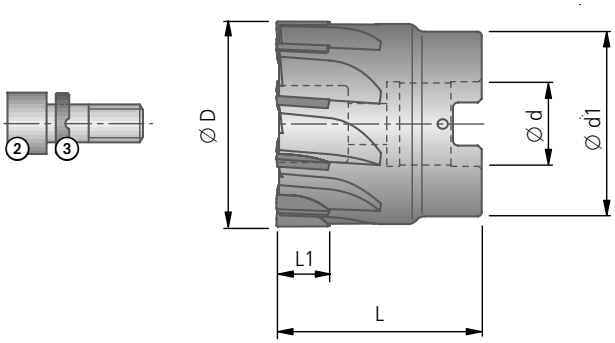
Radius screw-in cutter										
Ø D	R	Ø d	Width across flats WAF	Tightening torque Nm	Ø D1	L	L1	Z	kg	Order No.
10	5	M5	8	7	9,6	28	10	2	0,018	37340098001000
12	6	M5	8	7	9,6	28	12	2	0,018	37340098001200
16	8	M8	13	18	13,8	32	16	3	0,036	37340098001600

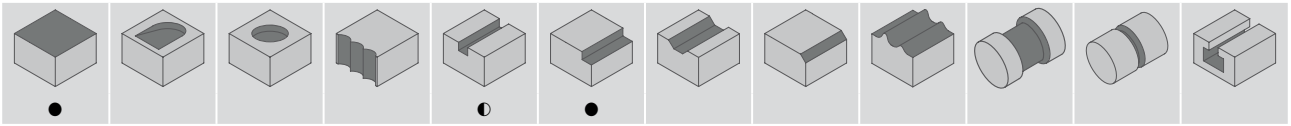
Cutting values for milling: Page 702.

PCD Face milling cutter









Screw-in cutter									
Ø D	Ø d	Width across flats WAF	Tightening torque Nm	Ø D1	L	L1	Z	kg	Order No.
10	M5	8	7	9,6	22	5	2	0,012	37341099001000
12	M5	8	7	9,6	28	5	2	0,018	37341099001200
16	M8	13	18	13,8	28	10	3	0,040	37341099001600
20	M10	16	30	18,0	30	10	4	0,070	37341099002000
25	M12	18	40	21,0	35	10	5	0,140	37341099002500
32	M16	27	80	29,0	35	10	6	0,250	37341099003200

HSK-A									Type 140 · R_z > 10 µm	Type 150 · R_z < 10 µm
Ø D	HSK Ø d	Ø D1	L ±0,02	L1	L2	L3	Z	kg	eroded cutting edge Order No.	specially design cutting edge Order No.
40	63	53	100	10	48	74	10	1,4	37140026004000	37150026004000
50	63	52	100	10	53	74	12	1,7	37140026005000	37150026005000
63	63	–	100	10	–	–	14	2,0	37140026006300	37150026006300
80	63	–	100	10	–	–	16	2,5		37150026008000
100	63	–	100	10	–	–	18	3,2	37140026010000	37150026010000
125	63	–	100	10	–	–	22	4,3	37140026012500	37150026012500
160	63	–	100	10	–	–	24	6,2	37140026016000	37150026016000

Other connections and cutting edge shapes available on request.

Supply includes: PCD milling cutter with coolant screw and coolant supply kit.

Arbor milling cutter								
ØD	DIN 8030 form	Ød^{H6}	Ød1	L	L1	Z	kg	Order No.
40	A	16	36	40	10	10		37155099004000
50	A	22	41	40	10	12		37155099005000
63	A	22	48	40	10	14		37155099006300
80	B	27	60	50	10	16		37155099008000
100	B	32	78	50	10	18		37155099010000
125	B	40	100	63	10	22		37155099012500

Supply includes milling cutter: with coolant sleeve ③ and cylindrical screw ②.

Cutting values for milling: Page 702.

KOMET

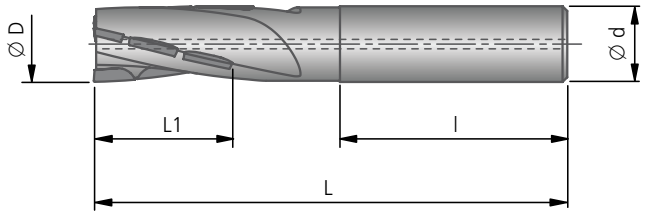
Ø 16 – 63 mm

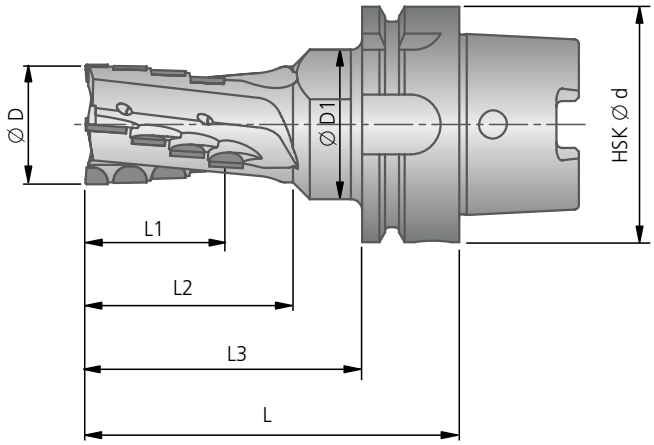
PCD Face and corner milling cutter

for workpiece material
N

DIN 6535
HA

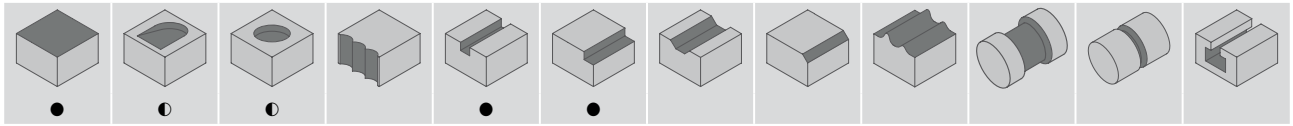
HSK-A
ISO 12164-1





● very good | ◐ good

PCD Face and corner milling cutter



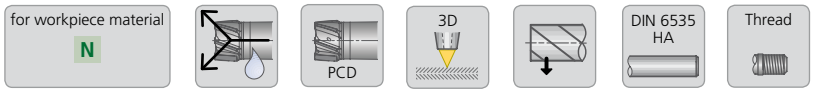
DIN 6535 HA					
Ø D	Cylindrical shank Ø d × l	L	L1	Z	Order No.
16	16 × 48	93	30	3	38170099001600
20	20 × 50	100	30	3	38170099002000
25	25 × 56	110	30	3	38170099002500

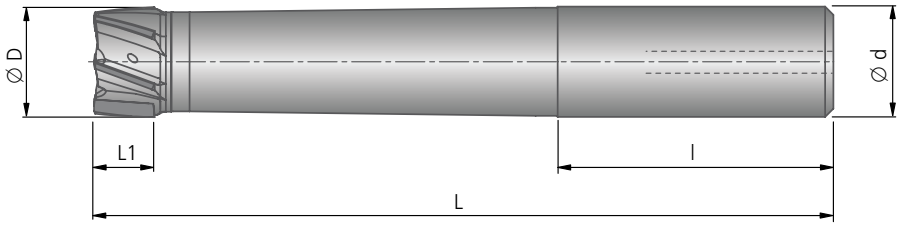
HSK-A									
Ø D	HSK Ø d	Ø D1	L ±0,02	L1	L2	L3	Z	kg	Order No.
32	63	40	100	40	55	74	4		37170026003200
40	63	-	100	40	-	-	4		37170026004000
50	63	-	100	40	-	-	4		37170026005000
63	63	-	100	40	-	-	4		37170026006300

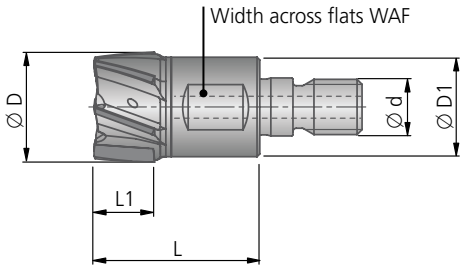
Supply includes: PCD milling cutter with coolant screw and coolant supply kit.

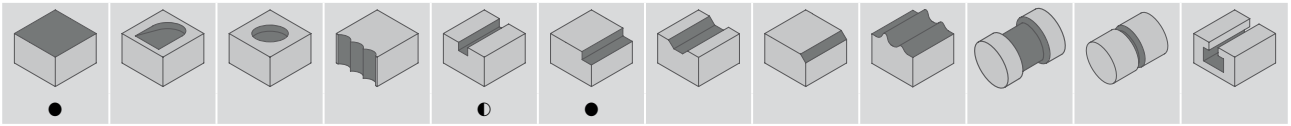
Cutting values for milling: Page 703.

PCD Face milling cutter HPC









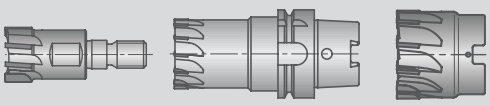
DIN 6535 HA 2,5×D						
Ø D	Cylindrical shank Ø d × l	L	L1	Z	kg	Order No.
10	10 × 40	67	5	4	0,074	38320001001000
12	12 × 45	78	5	4	0,084	38320001001200
16	16 × 48	91	10	5	0,132	38320001001600
20	20 × 50	104	10	6	0,229	38320001002000
25	25 × 56	124	10	8	0,401	38320001002500
32	32 × 60	147	10	10	0,871	38320001003200
DIN 6535 HA 4×D						
10	10 × 40	82	5	4	0,084	38321001001000
12	12 × 45	96	5	4	0,104	38321001001200
16	16 × 48	115	10	5	0,192	38321001001600
20	20 × 50	134	10	6	0,349	38321001002000
25	25 × 56	161	10	8	0,631	38321001002500
32	32 × 60	195	10	10	1,391	38321001003200

Screw-in cutter									
Ø D	Ø d	Width across flats WAF	Tightening torque Nm	Ø D1	L	L1	Z	kg	Order No.
10	M5	8	7	9,6	22	5	4	0,012	37310001001000
12	M5	8	7	9,6	28	5	4	0,018	37310001001200
16	M8	13	15	13,8	28	10	5	0,040	37310001001600
20	M10	16	30	18,0	30	10	6	0,070	37310001002000
25	M12	18	50	21,0	35	10	8	0,140	37310001002500
32	M16	27	100	29,0	35	10	10	0,250	37310001003200

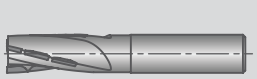
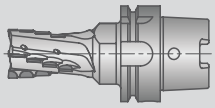
Cutting values for milling: Page 703.

Recommended cutting data

Guideline values for milling					PCD Slot milling cutter | PCD Radius milling cutter									
Material group		Strength Rm (N/mm²)	Hardness HB	v_c (m/min) = Cutting speed f_z (mm/tooth) = Milling feed Material										
					∅ 6		∅ 8		∅ 10		∅ 12		∅ 16 | 20 | 25	
					v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth
N	6.1	≤350	≤100	non-alloy copper										
N	6.2	≤700	≤200	short chip, brass, bronze, red brass	200-600	0,04-0,08	200-800	0,04-0,10	300-800	0,04-0,12	300-1000	0,04-0,15	300-1000	0,06-0,20
N	6.3	≤700	≤200	long chip brass										
N	6.4	≤500	≤470	Cu-Al-Fe alloy (Ampco)										
N	7.1	≤350	≤100	Al, Mg non-alloy	200-800	0,04-0,08	200-800	0,04-0,10	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
N	7.2	≤600	≤180	Al wrought alloy, breaking strain (A 5) <14 %	200-800	0,04-0,08	200-800	0,04-0,10	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
N	7.3	≤600	≤180	Al wrought alloy, breaking strain (A 5) ≥14 %	200-800	0,04-0,08	200-800	0,04-0,10	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
N	7.4	≤600	≤180	Al cast alloy, Si <10 %	200-800	0,04-0,08	200-800	0,04-0,10	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
N	7.5	≤600	≤180	Al cast alloy, Si ≥10 %	200-800	0,04-0,08	200-800	0,04-0,10	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
N	8.1			thermoplastics										
N	8.2			thermosetting plastics										
N	8.3			fibre reinforced plastics	200-500	0,02-0,06	200-500	0,03-0,08	200-600	0,03-0,10	200-600	0,04-0,12	500-1200	0,05-0,15

Guideline values for milling					PCD Face milling cutter							
Material group		Strength Rm (N/mm²)	Hardness HB	v_c (m/min) = Cutting speed f_z (mm/tooth) = Milling feed Material								
					∅ 10		∅ 12		∅ 16 | 20 | 25 | 32		∅ 40 – 160	
					v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth
N	6.1	≤350	≤100	non-alloy copper								
N	6.2	≤700	≤200	short chip, brass, bronze, red brass	300-800	0,04-0,12	300-1000	0,04-0,15	300-1000	0,06-0,20	1000-1500	0,04-0,15
N	6.3	≤700	≤200	long chip brass								
N	6.4	≤500	≤470	Cu-Al-Fe alloy (Ampco)								
N	7.1	≤350	≤100	Al, Mg non-alloy	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20	1000-3500	0,04-0,15
N	7.2	≤600	≤180	Al wrought alloy, breaking strain (A 5) <14 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20	1000-3500	0,04-0,15
N	7.3	≤600	≤180	Al wrought alloy, breaking strain (A 5) ≥14 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20	1000-3500	0,04-0,15
N	7.4	≤600	≤180	Al cast alloy, Si <10 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20	1000-1500	0,04-0,15
N	7.5	≤600	≤180	Al cast alloy, Si ≥10 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20	1000-1500	0,04-0,15
N	8.1			thermoplastics								
N	8.2			thermosetting plastics								
N	8.3			fibre reinforced plastics	200-600	0,03-0,10	200-600	0,04-0,12	500-1200	0,05-0,15	500-1200	0,05-0,15

Cutting values shown are relating to the basic recommendations for cutting materials given.

Guideline values for milling					PCD Face and corner milling cutter			
Material group		Strength Rm (N/mm²)	Hardness HB	v_c (m/min) = Cutting speed f_z (mm/tooth) = Milling feed Material				
					∅ 16 | 20 | 25		∅ 32 | 40 | 50 | 63	
					v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth
N	6.1	≤350	≤100	non-alloy copper				
	6.2	≤700	≤200	short chip, brass, bronze, red brass	300-1000	0,06-0,20	300-1500	0,06-0,20
	6.3	≤700	≤200	long chip brass				
	6.4	≤500	≤470	Cu-Al-Fe alloy (Ampco)				
	7.1	≤350	≤100	Al, Mg non-alloy	400-1500	0,06-0,20	400-2500	0,06-0,20
	7.2	≤600	≤180	Al wrought alloy, breaking strain (A 5) <14 %	400-1500	0,06-0,20	400-2500	0,06-0,20
	7.3	≤600	≤180	Al wrought alloy, breaking strain (A 5) ≥14 %	400-1500	0,06-0,20	400-2500	0,06-0,20
	7.4	≤600	≤180	Al cast alloy, Si <10 %	400-1500	0,06-0,20	400-2500	0,06-0,20
	7.5	≤600	≤180	Al cast alloy, Si ≥10 %	400-1500	0,06-0,20	400-2500	0,06-0,20
	8.1			thermoplastics				
	8.2			thermosetting plastics				
	8.3			fibre reinforced plastics	500-1200	0,05-0,15	500-1200	0,05-0,15

Guideline values for milling					PCD Face milling cutter HPC					
Material group		Strength Rm (N/mm²)	Hardness HB	v_c (m/min) = Cutting speed f_z (mm/tooth) = Milling feed Material						
					∅ 10		∅ 12		∅ 16 | 20 | 25 | 32	
					v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth	v_c m/min	f_z mm/tooth
N	6.1	≤350	≤100	non-alloy copper						
	6.2	≤700	≤200	short chip, brass, bronze, red brass	300-800	0,04-0,12	300-1000	0,04-0,15	300-1000	0,06-0,20
	6.3	≤700	≤200	long chip brass						
	6.4	≤500	≤470	Cu-Al-Fe alloy (Ampco)						
	7.1	≤350	≤100	Al, Mg non-alloy	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
	7.2	≤600	≤180	Al wrought alloy, breaking strain (A 5) <14 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
	7.3	≤600	≤180	Al wrought alloy, breaking strain (A 5) ≥14 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
	7.4	≤600	≤180	Al cast alloy, Si <10 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
	7.5	≤600	≤180	Al cast alloy, Si ≥10 %	400-1000	0,04-0,12	400-1500	0,04-0,15	400-1500	0,06-0,20
	8.1			thermoplastics						
	8.2			thermosetting plastics						
	8.3			fibre reinforced plastics	200-600	0,03-0,10	200-600	0,04-0,12	500-1200	0,05-0,15

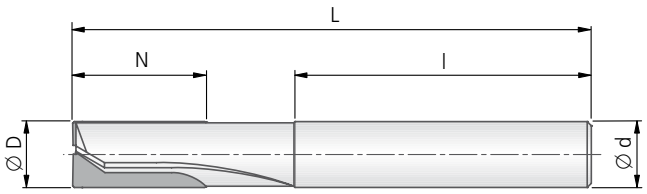
PCD Slot milling cutter

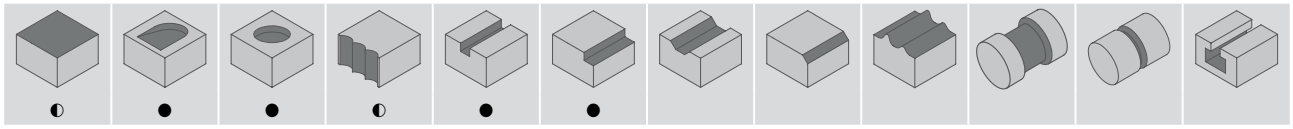
for workpiece material
N CFRP | GFRP
CFRP/Al stacks
Honeycombs

PCD

DIN 6535
HA

straight fluted





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

Recommended cutting data

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

Important: See chapter 8 for more application details and safety notes!

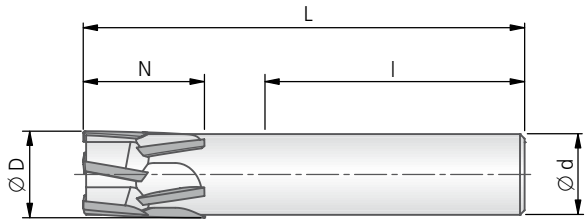
PCD Compression milling cutter

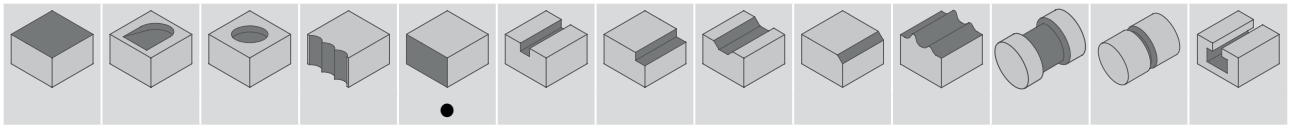
for workpiece material
N CFRP | GFRP
CFRP/Al stacks
Honeycombs

PCD

DIN 6535
HA

staggered cut with dual right and left helix





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

Recommended cutting data

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

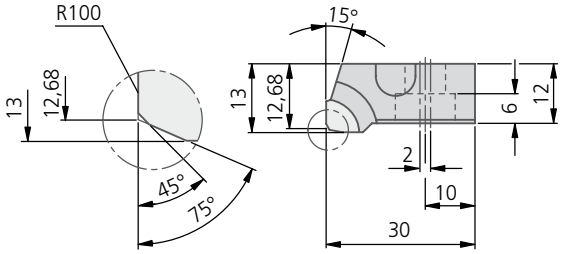
PCD high-performance drill Drillmax

With a point angle of 90° and 130°, the Drillmax PCD high-performance drill is excellently suited for drilling composite materials.

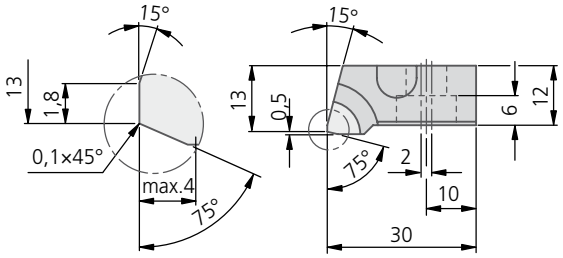
PCD Finishing, facing and corner milling cutter for HSC operations

Cartridges

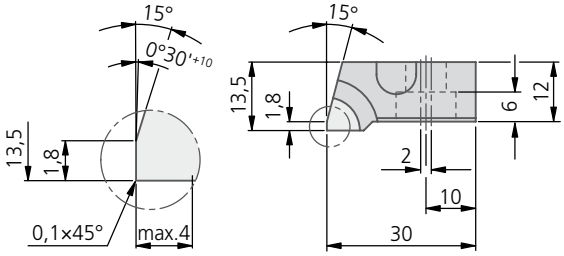
Finishing cartridge F51 34130



Facing cartridge F51 34120

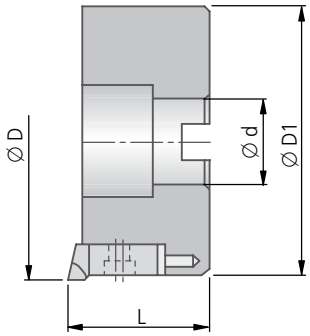


Corner cartridge F51 34110



Basic body

Dimensions to DIN 8030

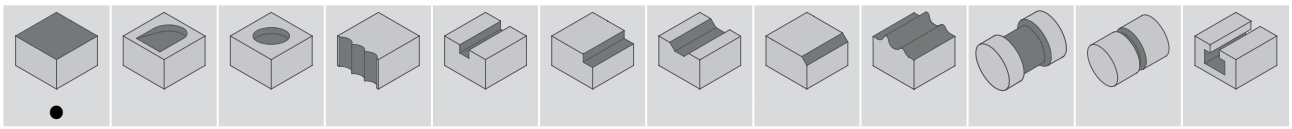


Supply of basic body includes:
Basic body incl. balancing screws and clamping screws already fitted. Cartridges not included.

Supply of cartridges includes:
Cartridges without clamping screws.

Clamping screw for cartridges: Order No.
55024 06012

Examples for ordering:
Face milling cutter complete tool ∅ 80 mm, Z = 5
1 × basic body F51 02350
4 × facing cartridge F51 34120
1 × finishing cartridge F51 34130



Basic body							Clamping screw		Cartridge with PCD insert		
Ø D	Order No.	Ø d^{H7}	L	Ø D1	Z	kg	Size	Torque setting Milling cutter arbor	Corner cartridge Order No.	Facing cartridge Order No.	Finishing cartridge Order No.
80	**F51 02350**	27	50	78	5	0,57	M12	70 Nm	**F51 34110**	**F51 34120**	**F51 34130**
100	**F51 02360**	32	50	98	6	0,95	M16				

Special milling cutter features:

Internal coolant supply
applied with clamping screw provided

Balance
Balanced to DIN 69888 and additional screws for precision balancing

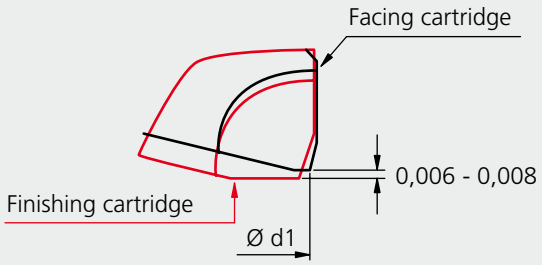
Setting
Secure adjusting screws for setting axial run-out on the milling head

Cartridges
PCD cartridges manufactured to high precision for maximum stability and perfect circular cutting movement

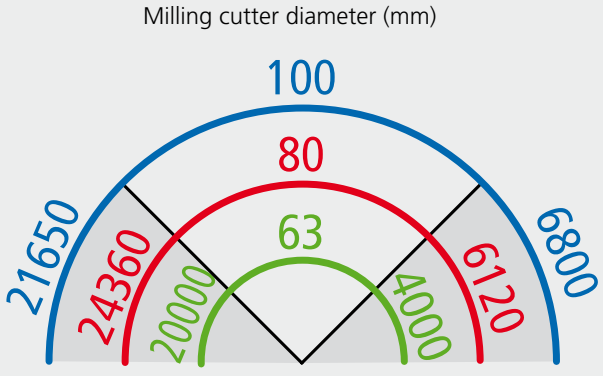
Milling cutter body
Manufactured from special aluminium alloy with high tensile strength, considerably reduced weight and excellent surface finish (Note 63 mm diameter body in steel)

Secure srews
Strong, high quality screws in hardened threaded inserts and with additional lateral screws

Setting notes for combination finishing and facing cartridge



Spindle speeds and cutting speeds



n (min⁻¹)
permissible maximum spindle speed

v_c (m/min)
Permissible maximum cutting speed

Problems → possible causes → solutions

Machine capacity

Pay attention to the machine's performance curve. Machine performance may be reduced at excessively low speeds.

Possible causes	Solutions
The power requirement when milling varies according to: · Workpiece material quantity · Average chip thickness · Milling cutter geometry · Cutting speed	· Switch from a narrow to wide pitch, e.g. fewer teeth · Milling cutters with positive cutting edge geometry are more power-efficient · Reduce the cutting speed before the table feed · Use a smaller milling cutter and work in several operations · Reduce the cutting depth ap

Chip jam

Frequent problem with full slot milling – particularly with long-chipping workpiece materials

Possible causes	Solutions
· Damage to corners · Edge chipping and breakage · Chips being cut again	· Improve chip removal through abundant, precisely guided cooling lubricant or compressed air · Reduce the feed rate fz · Divide deep cuts into several operations · Try conventional milling when milling deep grooves · Choose a milling cutter with a wide pitch

Unsatisfactory surface finish

Possible causes	Solutions
Feed per revolution too high	· Axially adjust milling cutter or classify indexable inserts. Check height on tool presetting device. · Check spindle concentricity and surfaces on the milling cutter adapter · Reduce the feed per revolution to max. 70% of the face chamfer width · Use wiper indexable inserts if possible (finishing operations)
Vibration	· See "Vibrations"
Build-up on the cutting edge	· Increase the cutting speed v_c in order to raise the machining temperature · Without cooling lubricant – dry · Use indexable inserts with a sharp cutting edge and soft-cutting geometry · Use positive cutting edge geometry
Recutting of the milling cutter	· Check the spindle pitch · Check the axial runout of the spindle · Minimise radial cutting forces (reduce the cutting depth a_p) · Choose a smaller milling cutter diameter · Check the lateral runout · Ensure that the milling cutter does not wobble – check and adapt surfaces on the milling cutter adapter
Chipping on workpiece edges	· Reduce the feed rate f_z · Choose a milling cutter with a narrow or extra-narrow pitch · Convert milling cutter to achieve a thinner chip when the milling cutter exits the hole · Choose a more suitable lead angle (45°) and easy-cutting geometry · Choose a sharp cutting edge geometry · Monitor flank face wear to prevent excessive wear

Vibration

Possible causes	Solutions
Weak clamping	· Determine the direction of the cutting forces and ensure sufficient clamping or increase clamping · Reduce the cutting forces by decreasing the cutting depth a_p · Choose a milling cutter with a wide pitch and positive cutting edge geometry · Choose a fine-grain, uncoated indexable insert or a thinner coating · Avoid machining operations in which the workpiece is insufficiently protected from the cutting forces which occur
Axially weak workpiece	· Choose a shoulder milling cutter (90° lead angle) with positive cutting edge geometry · Minimise axial cutting forces – reduce the cutting depth, and select a smaller corner radius and smaller face chamfer · Choose a milling cutter with a wide pitch · Check tool wear · Check concentricity faults in the tool holder · Improve tool clamping
Long tool projection	· Minimise the projection length · Choose a milling cutter with a wide pitch · Choose a high-feed milling cutter or a milling cutter with a large corner radius, round indexable inserts or a 45° lead angle · Increase the feed rate per tooth · Choose an easy-cutting insert geometry · Reduce the axial cutting depth a_e · Use conventional milling when finishing
Shoulder milling with weak spindle	· Choose the smallest possible milling cutter diameter · Choose a positive indexable insert and easy-cutting milling cutter · Use conventional milling · Check spiral deflection, suitability of the machine
Cutting data	· Vary the cutting speed (vc) · Increase the feed rate fz · Reduce the cutting depth ap
Poor stability	· Reduce the projection length · Improve stability
Vibrations in corners	· Program corner radius with reduced feed rate

3D-printed HPC PCD milling cutters

3D-printed tools – welcome to the machining revolution
Maximum number of cutting edges – up to 100% increase in productivity

Face milling into flange using 20 mm dia. tool

The challenge:

Material:	3.2315 (AlSiMgMn)
Workpiece:	Connector
Tool:	Conventional 20 mm diameter tool with four teeth
Machining task:	Producing a 60 mm diameter collar with a flange facing, a_p = 3 mm, a_e = 20 mm
Objective:	Reduce machining time per unit

The solution:
20 mm dia. KOMET HPC PCD screw-in cutter with six teeth (37310001002000)

Cutting values:
v_c = 1068 m/min
= 17,000 rpm
f_t = 0.1 mm/tooth

Customer benefits:
The milling cutter runs very smoothly and quietly.
Machining time per unit is reduced from 1 min 45 s to 55 s.

Machining time per unit is reduced by 48%

Face milling into filter housing using 32 mm dia. tool

The challenge:

Material:	3.2371 (AlSi7Mg0.3)
Workpiece:	Filter housing
Tool:	Conventional 50 mm diameter tool with seven teeth v_c = 1600 m/min, f_t = 0.03 mm/tooth
Machining task:	Milling various webs, lands, surfaces, reliefs and shoulders a_p = 1-3 mm, a_e = 19-32 mm
Objective:	Reduce machining time per unit

The solution:
32 mm dia. KOMET HPC PCD screw-in cutter with 10 teeth (37310001003200), A = 129 mm

Cutting values:
v_c = 1206 m/min = 12,000 rpm (max. speed)
f_t = 0.04 mm/tooth

Customer benefits:
Machining time per unit is reduced from 1 min 23 s to 23 s.
100 min machining time saved per day.

Machining time per unit is reduced by 72%

Face milling into cylinder head using 40 mm dia. tool

The challenge:

Material:	3.2371 (G-AlSi7Mg)
Workpiece:	Cylinder head
Tool:	Conventional tool with six teeth for roughing, a_p = 2 mm
Machining task:	Milling the contact surface
Objective:	Increase productivity

The solution:
KOMET
40 mm dia. PCD arbour milling cutter with 12 teeth

Cutting values:
v_c = 1382 m/min
= 11,000 rpm
f_t = 0.1 mm/tooth = F 13,200 mm/min

Customer benefits:
This tool runs much more smoothly and quietly than conventional tools. No noticeable burr on the edge of the workpiece, unlike when conventional tools are used for machining.

Machining time per unit is reduced by 45%

Face milling into gearbox cover using 40 mm dia. tool

The challenge:

Material:	EN AC-48000 (Al Si12CuNiMg)
Workpiece:	Gearbox cover
Tool:	Conventional 40 mm diameter tool with seven teeth
Machining task:	Milling webs or lands, a_p = 1 mm, requisite max. surface roughness R_a = 1.6 µm
Objective:	Increase productivity

The solution:
KOMET
40 mm dia. PCD milling cutter with 12 teeth
HSK-A63, A = 200 mm

Cutting values:
v_c = 2000 m/min
= 15,924 rpm
f_t = 0.15 mm/tooth

Customer benefits:
This tool runs much more smoothly and quietly than conventional tools, surface roughness Ra = 1.15 µm
Tool life to date 107,000 parts, still in use.

Machining time per unit is reduced by 30%