



 **BOGERBENZ**

SOLID CARBIDE TOOLS. PRODUCTION. SERVICE



PRODUCT CATALOG
SOLID CARBIDE TOOLS

WE ARE THE COMPANY YOU'RE LOOKING FOR

IF YOU WANT QUALITY, PRECISION AND DELIVERY RELIABILITY

BOGER & BENZ specializes in precision tool manufacturing and resharpener.

Since 1971 we have provided highly precise premium quality solid carbide tools to tool, mold and die makers for high-speed and hard machining and to metal cutting manufacturers for individual lot sizes as well as series production.

Not matter how challenging the requirements, whether manufacturing a standard tool or a customized solution – we have two fixed targets: highest quality and utmost precision. We know what we can accomplish.

This makes us efficient and results in delivery reliability. If you are looking for new and just as newly made solid carbide tools, you have come to the right place ... because quality, precision and delivery reliability play an important role.



PROGRAM DIVERSITY

FOR EVERY TYPE OF MATERIAL

Shank end mills | Roughing end mills | Finishing end mills | Ball end mills | Radius end mills

Number of teeth	2-8
Shank-Ø	3-32 mm
Cutting edge-Ø	0,1-32 mm
Radii	0,05-2,0 mm





T 1160 S 1100 K 1010 T 1123 S 1020 T 1020 S 1170 I 2020
T 1122 S 1230

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SOLID CARBIDE TOOLS



HPC
Universal
PowerLine
AluLine

Shank end mills

PowerLine
PowerLine
PowerLine
Universal
HPC
Universal roughing end mills
HPC roughing end mills
PowerLine finishing end mills
HPC finishing end mills
AluLine

Ball end mills

PowerLine
HPC
HPC
HPC
AluLine

Radius end mills

HPC
HPC

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SOLID CARBIDE TOOLS

HPC Mini
BlueLine Mikro

Shank end mills

HPC Mini
BlueLine Mikro

Ball end mills

HPC Mini
HPC Mini
HPC Mini
BlueLine Mikro

Radius end mills







BlueLine Mikro
BlueLine Mikro



Type	Characteristics	Page
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S 1106	T2 HRC 65 HSC Sharp edged	34–35
K 1101	T2 HRC 65	37
K 1102	T2 HRC 65	38
K 1103	T2 HRC 65	39
K 1104 K 1105	T2 HRC 65 HSC	40–41
T 1122	T2 HRC 65 HSC $r = 0,05-0,1$	43
T 1123 T 1124	T2 HRC 65 HSC $r = 0,05-1$	44–45



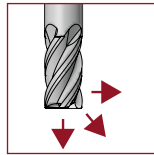
Material Groups

<p>Gen. structural/ case hard. steels Tool/ tempering steels Alloyed/ cold work steels Cast steel</p>		<p>1.0037 1.0570 1.0503 1.7131 1.2367 1.2379 1.7225 1.2312 1.2767 1.3505 1.7707 1.0619 1.0446</p>
<p>Stainless steels Stainless steels</p>		<p>1.4301 1.4305 1.4034 1.4435 1.4571</p>
<p>Cast iron Spherical cast iron</p>		<p>GG25 GG40 GGG40 GGG50 GGG60 GGG70</p>
<p>Aluminum Si content 0,5–9% Aluminum Si content 10–15% Copper/ brass/ bronze Medium hard/ soft plastics</p>		<p>3.1645 3.2163 3.2523 2.0321 2.1030 –</p>
<p>Titanium alloys Nickel alloys</p>		<p>3.7164 3.7165 Inconel 713</p>
<p>Hardened steel Hardened steel Hardened steel</p>		<p>HRC 45–50 HRC 51–58 HRC 59–65</p>

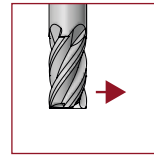
Pictographs



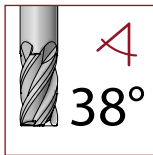
Number of teeth



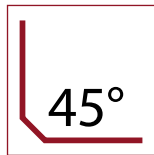
Spatial



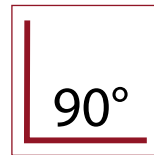
Lateral



Angle of twist



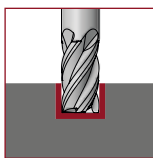
Corner chamfer



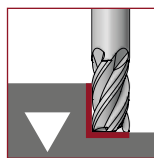
Sharp edged



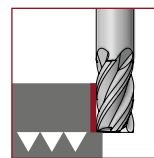
Hardness



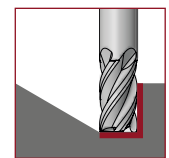
Slotting



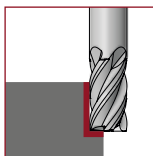
Rough milling



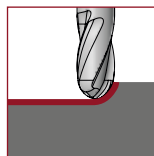
Finishing milling



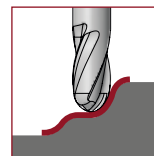
Ramping



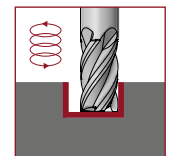
Trimming



Ball track milling



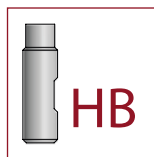
Copy milling



Helix



Smooth shank



Weldon (please inquire)

Cutting data v_c | f_z | a_p | a_e

Shoulder/slot/ball track/copy milling cutting. The cutting data listed for the individual tool types are recommended values. It is impossible to take into account all conditions. As a consequence, we do not assume any liability for this data. Please contact our headquarters or your regular service consultant directly if you require process and workpiece specific information.



SHANK END MILLS

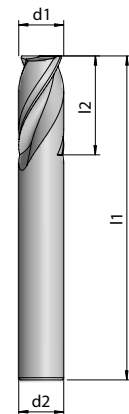
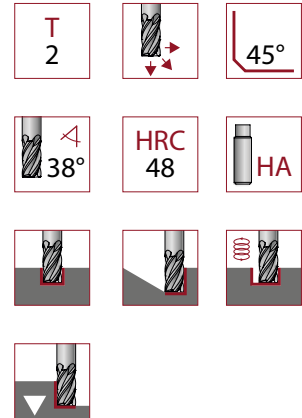
HPC | UNIVERSAL | POWERLINE | ALULINE

SHANK END MILLS

POWERLINE | S 1000

Short version				
Article no.	d1	d2	l1	l2
10000300	3	6	57	7
10000400	4	6	57	8
10000500	5	6	57	10
10000600	6	6	57	10
10000800	8	8	63	16
10001000	10	10	72	19
10001200	12	12	83	22
10001600	16	16	92	30
10001800	18	18	104	34
10002000	20	20	104	38

Medium version				
Article no.	d1	d2	l1	l2
10000301	3	6	80	7
10000401	4	6	80	8
10000501	5	6	80	10
10000601	6	6	100	10
10000801	8	8	100	16
10001001	10	10	100	19
10001201	12	12	100	22



Shoulder milling	$a_p \times a_e = 1d \times 0,3d$
Slot milling	$a_p \times a_e = 1d \times 1d$



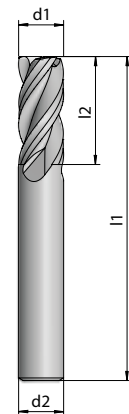
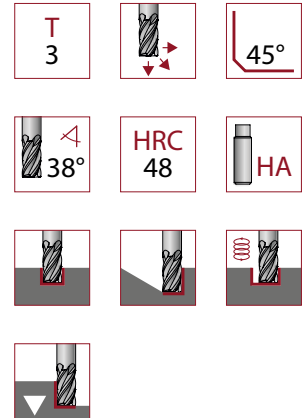
Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	100
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	100	70
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	75	50
M	Stainless steels 1.4301 1.4305 1.4034	< 750	60	–
N	Aluminum Si content 0,5–9% 3.1645 3.2163	–	350	300
	Aluminum Si content 10–15% 3.2523	–	300	260
	Copper/ brass/ bronze 2.0321 2.1030	–	230	150
	Medium hard/ soft plastics	–	200–300	180–250

d1	Shoulder	Slot
	fz mm	
3	0,025	0,010
4	0,035	0,020
5	0,040	0,025
6	0,050	0,030
8	0,060	0,035
10	0,070	0,040
12	0,100	0,045
16	0,120	0,055
18	0,130	0,070
20	0,150	0,090

SHANK END MILLS

POWERLINE | S 1005

Short version				
Article no.	d1	d2	l1	l2
10050300	3	6	57	7
10050400	4	6	57	8
10050500	5	6	57	10
10050600	6	6	57	10
10050800	8	8	63	16
10051000	10	10	72	19
10051200	12	12	83	22
10051600	16	16	92	30
10051800	18	18	104	34
10052000	20	20	104	38



Shoulder milling	$a_p \times a_e = 1d \times 0,3d$
Slot milling	$a_p \times a_e = 1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	100
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	100	70
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	75	50
M	Stainless steels 1.4301 1.4305 1.4034	< 750	60	–
N	Aluminum Si content 0,5–9% 3.1645 3.2163	–	350	300
	Aluminum Si content 10–15% 3.2523	–	300	260
	Copper/ brass/ bronze 2.0321 2.1030	–	230	150
	Medium hard/ soft plastics	–	200–300	180–250

d1	Shoulder fz mm	Slot fz mm
3	0,025	0,010
4	0,035	0,020
5	0,040	0,025
6	0,050	0,030
8	0,060	0,035
10	0,070	0,040
12	0,100	0,045
16	0,120	0,055
18	0,130	0,070
20	0,150	0,090

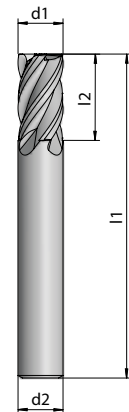
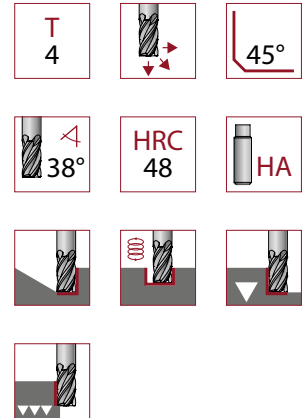
SHANK END MILLS

POWERLINE | S 1020

Short version				
Article no.	d1	d2	l1	l2
10200300	3	6	57	8
10200400	4	6	57	11
10200500	5	6	57	13
10200600	6	6	57	13
10200800	8	8	63	19
10201000	10	10	72	22
10201200	12	12	83	26
10201400	14	14	83	26
10201600	16	16	92	32
10201800	18	18	104	34
10202000	20	20	104	38
10202500	25	25	125	48

Medium version				
Article no.	d1	d2	l1	l2
10201001	10	10	98	40
10201201	12	12	104	48
10201601	16	16	104	48
10201801	18	18	140	72
10202001	20	20	145	80
10202501	25	25	152	75

Long version				
Article no.	d1	d2	l1	l2
10201802	18	18	175	108
10202002	20	20	188	120
10202502	25	25	178	100
10202503	25	25	202	125
10202504	25	25	228	150



Shoulder milling	$a_p \times a_e = 1d \times 0,3d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



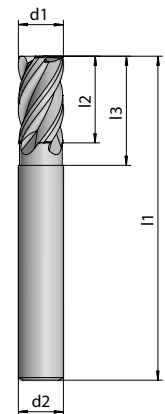
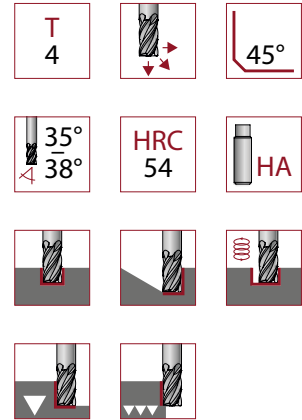
Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	170	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	130	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	90	–
M	Stainless steels 1.4301 1.4305 1.4034	< 750	100	–
N	Aluminum Si content 0,5–9% 3.1645 3.2163	–	350	300
	Aluminum Si content 10–15% 3.2523	–	300	260
	Copper/ brass/ bronze 2.0321 2.1030	–	230	150
	Medium hard/ soft plastics	–	200–300	180–250

d1	Shoulder	Slot
	fz mm	
3	0,025	0,007
4	0,035	0,010
5	0,040	0,015
6	0,050	0,025
8	0,060	0,030
10	0,070	0,040
12	0,100	0,060
14	0,110	0,070
16	0,120	0,090
18	0,130	0,100
20	0,150	0,110
25	0,160	0,110

SHANK END MILLS

UNIVERSAL | S 1025

Short version					
Article no.	d1	d2	l1	l2	l3
10250400	4	6	57	11	19
10250500	5	6	57	13	21
10250600	6	6	57	13	21
10250800	8	8	63	19	27
10251000	10	10	72	24	32
10251200	12	12	83	28	36
10251400	14	14	83	29	37
10251600	16	16	92	35	43
10252000	20	20	104	44	54
10252500	25	25	125	52	65



Shoulder milling	$a_p \times a_e = 1d \times 0,3d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



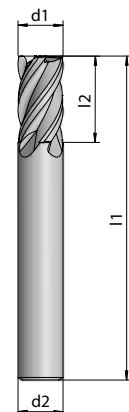
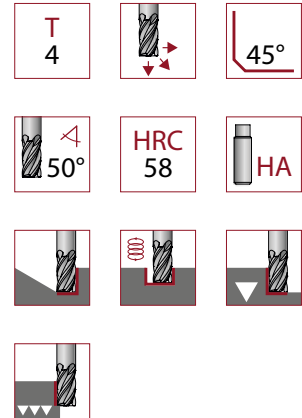
Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	210	150
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	160	100
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	100	–
M	Stainless steels 1.4301 1.4305 1.4034	< 750	120	–
	Stainless steels 1.4435 1.4571	< 850	90	–
K	Cast iron GG25 GG40 GGG40	< 450	200	130
	Spherical cast iron GGG50 GGG60 GGG70	< 650	150	100
N	Copper/ brass/ bronze 2.0321 2.1030	–	230	150
	Medium hard/ soft plastics	–	200–300	180–250

d1	Shoulder	Slot
	fz mm	
4	0,035	0,010
5	0,040	0,015
6	0,050	0,025
8	0,060	0,030
10	0,070	0,040
12	0,100	0,060
14	0,110	0,070
16	0,120	0,090
20	0,150	0,100
25	0,160	0,110

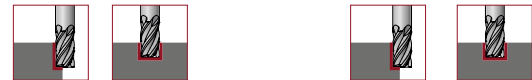
SHANK END MILLS

HPC | S 1130

Short version				
Article no.	d1	d2	l1	l2
11300400	4	4	48	8
11300500	5	6	48	10
11300600	6	6	50	12
11300800	8	8	57	16
11301000	10	10	66	20
11301200	12	12	76	24
11301600	16	16	90	32
11301800	18	18	94	36
11302000	20	20	98	40
11302500	25	25	120	50



Shoulder milling	$a_p \times a_e = 2d \times 0,5d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	210	150
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	160	100
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	100	–
M	Stainless steels 1.4301 1.4305 1.4034	< 750	120	–
	Stainless steels 1.4435 1.4571	< 850	90	–
K	Cast iron GG25 GG40 GGG40	< 450	200	130
	Spherical cast iron GGG50 GGG60 GGG70	< 650	150	100
H	Hardened steel HRC 45–50	–	60–80	50–70
	Hardened steel HRC 51–58	–	50–70	40–60

d1	Shoulder	Slot
	fz mm	
4	0,035	0,010
5	0,040	0,015
6	0,050	0,025
8	0,060	0,030
10	0,070	0,040
12	0,100	0,060
16	0,110	0,070
18	0,120	0,090
20	0,150	0,100
25	0,160	0,110

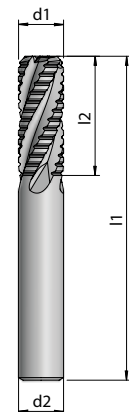
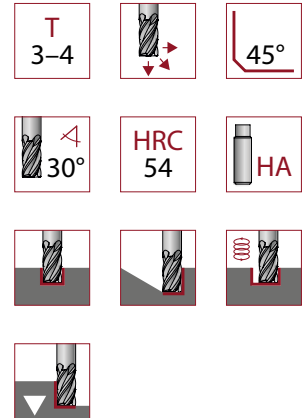
SHANK END MILLS

UNIVERSAL ROUGHING END MILLS | S 1030



Short version Number of teeth 3				
Article no.	d1	d2	l1	l2
10300600	6	6	57	10
10300800	8	8	63	16

Short version Number of teeth 4				
Article no.	d1	d2	l1	l2
10301000	10	10	72	22
10301200	12	12	83	26
10301400	14	14	83	26
10301600	16	16	92	32
10301800	18	18	92	34
10302000	20	20	104	38
10302500	25	25	125	48



Shoulder milling	$a_p \times a_e = 1d \times 0,4d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	170	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	130	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	80	-
	Cast steel 1.0619 1.0446	-	130-170	110-140
M	Stainless steels 1.4301 1.4305 1.4034	< 750	120-140	80-130
	Stainless steels 1.4435 1.4571	< 850	80-120	60-90
K	Cast iron GG25 GG40 GGG40	< 450	230	150
	Spherical cast iron GGG50 GGG60 GGG70	< 650	140-180	100-150
S	Titanium alloys 3.7164 3.7165	-	50	40
	Nickel alloys Inconel 713	-	50	40

d1	Shoulder	Slot
	fz mm	
6	0,050	0,035
8	0,060	0,040
10	0,080	0,055
12	0,090	0,065
14	0,100	0,080
16	0,120	0,090
18	0,140	0,100
20	0,150	0,110
25	0,160	0,120

SHANK END MILLS

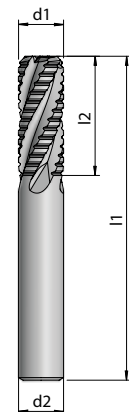
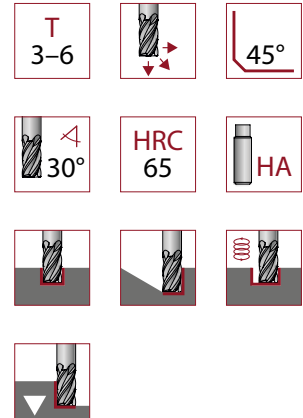
HPC ROUGHING END MILLS | S 1230

Short version Number of teeth 3				
Article no.	d1	d2	l1	l2
12300600	6	6	57	14
12300800	8	8	63	16

Short version Number of teeth 4				
Article no.	d1	d2	l1	l2
12301000	10	10	72	24

Short version Number of teeth 5				
Article no.	d1	d2	l1	l2
12301200	12	12	80	30
12301400	14	14	83	32
12301600	16	16	105	32
12301800	18	18	108	36

Short version Number of teeth 6				
Article no.	d1	d2	l1	l2
12302000	20	20	109	40



Shoulder milling	$a_p \times a_e = 1d \times 0,4d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1100	130	90
	< 1400	80	-
	-	130-170	110-140
M Stainless steels 1.4301 1.4305 1.4034 Stainless steels 1.4435 1.4571	< 750	120-140	80-130
	< 850	80-120	60-90
S Titanium alloys 3.7164 3.7165 Nickel alloys Inconel 713	-	50	40
	-	50	40
H Hardened steel HRC 45-50 Hardened steel HRC 51-58 Hardened steel HRC 59-65	-	250	-
	-	210	-
	-	170	-

d1	Shoulder	Slot
	fz mm	
6	0,050	0,035
8	0,060	0,040
10	0,080	0,055
12	0,090	0,065
14	0,100	0,080
16	0,120	0,090
18	0,140	0,100
20	0,150	0,110

SHANK END MILLS

POWERLINE FINISHING END MILLS | S 1040

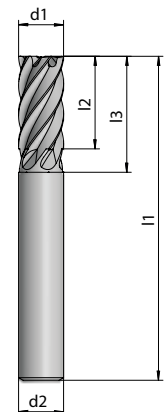
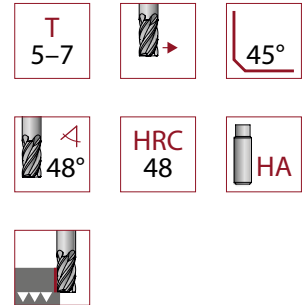


Short version Number of teeth 5					
Article no.	d1	d2	l1	l2	l3
10400601	6	6	56	12	20
10400801	8	8	62	16	26
10401001	10	10	85	20	40
10401201	12	12	86	24	40

Long version Number of teeth 5					
Article no.	d1	d2	l1	l2	l3
10400600	6	6	62	18	26
10400800	8	8	70	24	34
10401000	10	10	98	30	50
10401200	12	12	98	36	52

Short version Number of teeth 7					
Article no.	d1	d2	l1	l2	l3
10401601	16	16	86	32	38
10401801	18	18	90	36	42
10402001	20	20	98	40	48
10402501	25	25	117	50	61

Long version Number of teeth 7					
Article no.	d1	d2	l1	l2	l3
10401600	16	16	102	48	54
10401800	18	18	108	54	60
10402000	20	20	118	60	68
10402500	25	25	142	75	86



Shoulder milling $a_p \times a_e = 2,5d \times 0,04d$



Cutting data for short version		Shoulder	
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	150	
	< 1100	110	
	< 1400	70	
M Stainless steels 1.4301 1.4305 1.4034	< 750	70	
N Copper/ brass/ bronze 2.0321 2.1030 Medium hard/ soft plastics	-	230	
	-	200-300	

Shoulder	
d1	fz mm
6	0,020
8	0,025
10	0,030
12	0,040
16	0,055
18	0,065
20	0,075
25	0,080

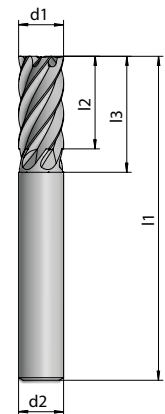
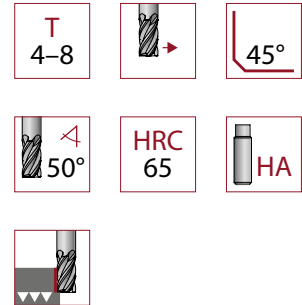
SHANK END MILLS

HPC FINISHING END MILLS | S 1170

Short version Number of teeth 4					
Article no.	d1	d2	l1	l2	l3
11700300	3	6	50	9	-
11700350	3,5	6	50	10	-
11700400	4	6	52	12	-
11700450	4,5	6	54	14	-
11700500	5	6	56	15	-

Short version Number of teeth 6					
Article no.	d1	d2	l1	l2	l3
11700600	6	6	58	18	22
11700800	8	8	65	24	29
11701000	10	10	76	30	36
11701200	12	12	88	36	43

Short version Number of teeth 8					
Article no.	d1	d2	l1	l2	l3
11701600	16	16	105	48	56
11701800	18	18	114	54	62
11702000	20	20	118	60	68
11702500	25	25	145	75	87



Shoulder milling $a_p \times a_e = 2d \times 0,04d$



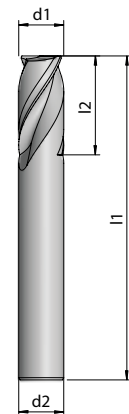
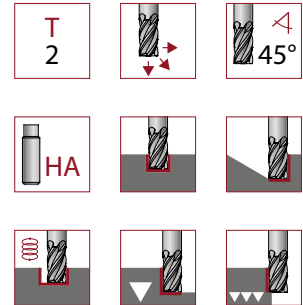
Cutting data for short version		Shoulder	
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	170	
	< 1100	120	
	< 1400	90	
M Stainless steels 1.4301 1.4305 1.4034 Stainless steels 1.4435 1.4571	< 750	100	
	< 850	80	
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	230	
	< 650	160	

Shoulder	
d1	fz mm
3	0,020
3,5	0,020
4	0,025
4,5	0,025
5	0,030
6	0,040
8	0,050
10	0,060
12	0,070
16	0,075
18	0,080
20	0,085
25	0,090

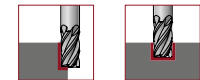
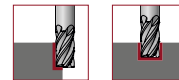
SHANK END MILLS

ALULINE | S 1070

Short version				
Article no.	d1	d2	l1	l2
10700300	3	3	60	6
10700400	4	4	70	8
10700500	5	5	70	10
10700600	6	6	98	12
10700800	8	8	98	16
10701000	10	10	98	20
10701200	12	12	98	24
10701600	16	16	128	32
10702000	20	20	140	40
10702500	25	25	150	50



Shoulder milling	$a_p \times a_e = 1d \times 0,5d$
Slot milling	$a_p \times a_e = 1d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
N	Aluminum Si content 0,5–9% 3.1645 3.2163	–	350 285
	Aluminum Si content 10–15% 3.2523	–	300 240
	Copper/ brass/ bronze 2.0321 2.1030	–	230 150
	Medium hard/ soft plastics	–	200–300 180–250

d1	Shoulder	Slot
	fz mm	
3	0,012	0,008
4	0,016	0,010
5	0,025	0,018
6	0,030	0,020
8	0,040	0,030
10	0,055	0,040
12	0,065	0,050
16	0,085	0,065
18	0,100	0,075
20	0,120	0,090
25	0,140	0,100



BALL END MILLS

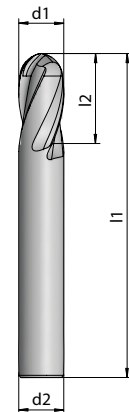
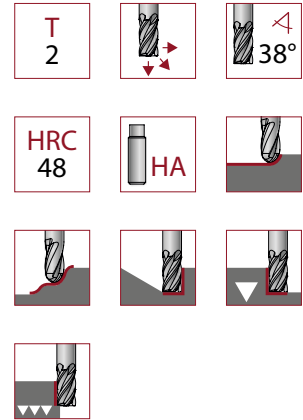
HPC | POWERLINE | ALULINE

BALL END MILLS

POWERLINE | K 1010

Short version				
Article no.	d1	d2	l1	l2
10100300	3	6	57	7
10100400	4	6	57	8
10100500	5	6	57	10
10100600	6	6	57	10
10100800	8	8	63	16
10101000	10	10	72	19
10101200	12	12	83	22
10101600	16	16	92	30
10101800	18	18	104	34
10102000	20	20	104	38

Long version				
Article no.	d1	d2	l1	l2
10100301	3	3	80	7
10100401	4	4	80	8
10100501	5	5	80	10
10100601	6	6	100	10
10100801	8	8	100	16
10101001	10	10	100	19
10101201	12	12	120	22



Ball track milling	$a_p \times a_e = 0,1d \times 0,3d$
Copy milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	170	120
	< 1100	130	90
	< 1400	90	80
N Copper/ brass/ bronze 2.0321 2.1030 Medium hard/ soft plastics	-	230	150
	-	200-300	180-250

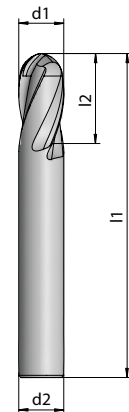
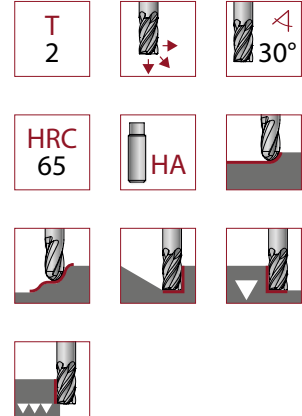
	Ball track	Copy
d1	fz mm	
3	0,030	0,020
4	0,040	0,025
5	0,050	0,035
6	0,060	0,040
8	0,080	0,045
10	0,080	0,050
12	0,100	0,070
14	0,100	0,070
16	0,100	0,070
18	0,100	0,070
20	0,100	0,070

BALL END MILLS

HPC | K 1150

Short version				
Article no.	d1	d2	l1	l2
11500301	3	4	50	5
11500401	4	4	50	6
11500501	5	5	57	8
11500601	6	6	57	9
11500801	8	8	63	12
11501001	10	10	72	15
11501201	12	12	83	18
11501601	16	16	92	24
11502001	20	20	104	30

Long version				
Article no.	d1	d2	l1	l2
11500300	3	4	78	5
11500400	4	4	78	6
11500500	5	5	78	8
11500600	6	6	98	9
11500800	8	8	98	12
11501000	10	10	98	15
11501200	12	12	118	18
11501600	16	16	152	24
11502000	20	20	152	30



Ball track milling	$a_p \times a_e = 0,3d \times 0,3d$
Copy milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	170	120
	< 1100	130	90
	< 1400	90	80
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	160–230	100–160
	< 650	100–150	80–130
H Hardened steel HRC 45–50 Hardened steel HRC 51–58 Hardened steel HRC 59–65	–	250	200
	–	210	180
	–	190	130

d1	Ball track	Copy
	fz mm	
3	0,050	0,020
4	0,060	0,025
5	0,065	0,035
6	0,070	0,040
8	0,080	0,045
10	0,085	0,050
12	0,100	0,070
14	0,110	0,070
16	0,110	0,070
18	0,110	0,070
20	0,110	0,070

BALL END MILLS

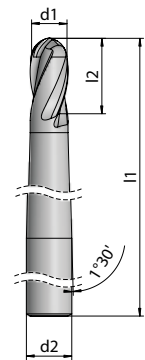
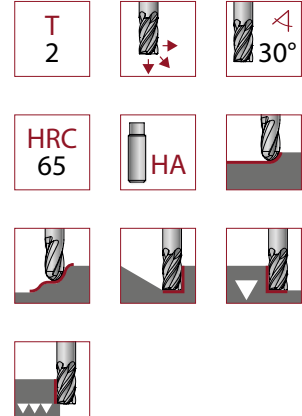
HPC | K 1110

Short version Neck angle 1°30'				
Article no.	d1	d2	l1	l2
11100401	4	6	85	6
11100502	5	6	85	8
11100600	6	8	98	9
11100802	8	10	110	12
11101001	10	12	110	15

Long version Neck angle 1°30'				
Article no.	d1	d2	l1	l2
11100400	4	6	98	6
11100501	5	6	118	8
11100602	6	8	138	9
11100801	8	10	152	12
11101000	10	12	152	15

Medium version Neck angle 1°30'				
Article no.	d1	d2	l1	l2
11100500	5	6	98	8
11100601	6	8	118	9
11100800	8	10	138	12

Extra long version Neck angle 1°30'				
Article no.	d1	d2	l1	l2
11100603	6	8	152	9



Ball track milling	$a_p \times a_e = 0,3d \times 0,3d$
Copy milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	170	120
	< 1100	130	90
	< 1400	90	80
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	160–230	100–160
	< 650	100–150	80–130
H Hardened steel HRC 45–50 Hardened steel HRC 51–58 Hardened steel HRC 59–65	–	250	200
	–	210	180
	–	190	130

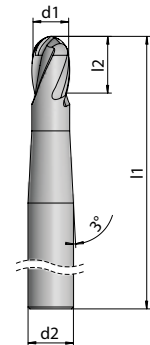
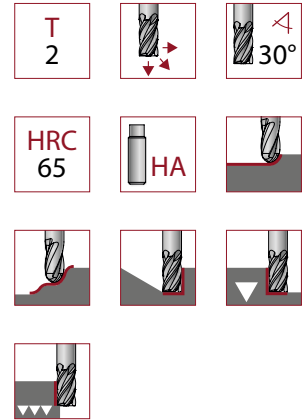
	Ball track	Copy
d1	fz mm	
4	0,060	0,025
5	0,065	0,035
6	0,070	0,040
8	0,080	0,045
10	0,085	0,050

BALL END MILLS

HPC | K 1111

Short version Neck angle 3°				
Article no.	d1	d2	l1	l2
11110301	3	6	72	5
11110401	4	6	75	6
11110501	5	6	75	8
11110601	6	8	80	9
11110801	8	10	100	12
11111001	10	12	100	15
11111201	12	16	120	18
11111601	16	20	140	24

Long version Neck angle 3°				
Article no.	d1	d2	l1	l2
11110300	3	6	98	5
11110400	4	6	98	6
11110500	5	6	98	8
11110600	6	8	118	9
11110800	8	10	128	12
11111000	10	12	128	15
11111200	12	16	152	18
11111600	16	20	178	24



Ball track milling	$a_p \times a_e = 0,3d \times 0,3d$
Copy milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Ball track	Copy	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	170	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	130	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	90	80
K	Cast iron GG25 GG40 GGG40	< 450	160–230	100–160
	Spherical cast iron GGG50 GGG60 GGG70	< 650	100–150	80–130
H	Hardened steel HRC 45–50	–	250	200
	Hardened steel HRC 51–58	–	210	180
	Hardened steel HRC 59–65	–	190	130

d1	Ball track	Copy
	fz mm	
4	0,060	0,025
5	0,065	0,035
6	0,070	0,040
8	0,080	0,045
10	0,085	0,050

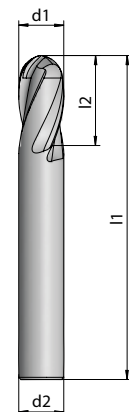
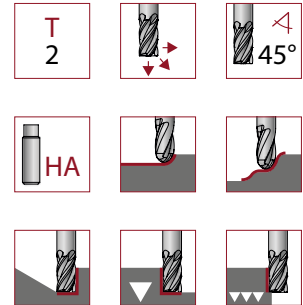
BALL END MILLS

ALULINE | K 1080 | K 1081



Short version				
Article no.	d1	d2	l1	l2
10800300	3	6	60	8
10800400	4	6	70	10
10800500	5	6	70	14
10800600	6	6	98	16
10800800	8	8	98	24
10801000	10	10	98	30
10801200	12	12	98	36
10801600	16	16	128	48
10802000	20	20	140	60
10802500	25	25	150	75

Long version				
Article no.	d1	d2	l1	l2
10810600	6	6	120	24
10810800	8	8	120	32
10811000	10	10	150	40
10811200	12	12	150	48
10811600	16	16	180	64
10812000	20	20	200	80
10812500	25	25	200	100
10813200	32	32	250	128



Ball track milling	$a_p \times a_e = 0,5d \times 1d$
Copy milling	$a_p \times a_e = 0,5d \times 0,5d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v _c m/min	
N	Aluminum Si content 0,5–9% 3.1645 3.2163	–	500–2000
	Aluminum Si content 10–15% 3.2523	–	500–1300
	Copper/ brass/ bronze 2.0321 2.1030	–	230
	Medium hard/ soft plastics	–	200–300

d1	Ball track	Copy
	fz mm	
3	0,030	0,020
4	0,040	0,030
5	0,045	0,030
6	0,055	0,040
8	0,075	0,050
10	0,090	0,065
12	0,105	0,075
16	0,150	0,100
20	0,160	0,110
25	0,170	0,120
32	0,180	0,120



RADIUS END MILLS
HPC

RADIUS END MILLS

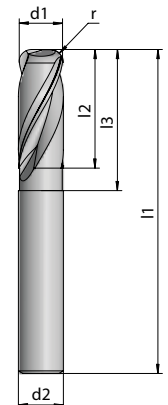
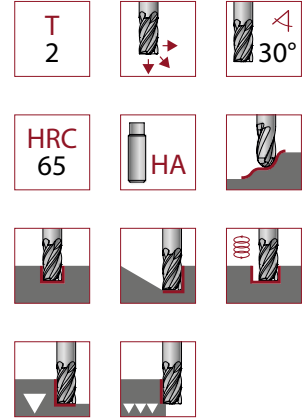
HPC | T 1120 | T 1121

Short version Corner radius 0,5 mm					
Article no.	d1	d2	l1	l2	l3
11200301	3	4	50	6	12
11200401	4	4	50	8	14
11200501	5	5	60	10	16
11200601	6	6	60	12	20
11200801	8	8	70	16	30
11201001	10	10	70	20	30
11201201	12	12	90	24	40

Long version Corner radius 0,5 mm					
Article no.	d1	d2	l1	l2	l3
11210301	3	4	80	6	12
11210401	4	4	80	8	14
11210501	5	5	80	10	16
11210601	6	6	100	12	20
11210801	8	8	100	16	30
11211001	10	10	100	20	30
11211201	12	12	120	24	40

Short version Corner radius 1 mm					
Article no.	d1	d2	l1	l2	l3
11200300	3	4	50	6	12
11200400	4	4	50	8	14
11200500	5	5	60	10	16
11200600	6	6	60	12	20
11200800	8	8	70	16	30
11201000	10	10	70	20	30
11201200	12	12	90	24	40

Long version Corner radius 1 mm					
Article no.	d1	d2	l1	l2	l3
11210300	3	4	80	6	12
11210400	4	4	80	8	14
11210500	5	5	80	10	16
11210600	6	6	100	12	20
11210800	8	8	100	16	30
11211000	10	10	100	20	30
11211200	12	12	120	24	40



Shoulder milling $a_p \times a_e = 1d \times 0,4d$
 Slot milling $a_p \times a_e = 1d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	300	150
	< 1100	230	100
	< 1400	180	-
M Stainless steels 1.4301 1.4305 1.4034 Stainless steels 1.4435 1.4571	< 750	120	-
	< 850	90	-
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	220	130
	< 650	160	100
H Hardened steel HRC 45-50 Hardened steel HRC 51-58 Hardened steel HRC 59-65	-	250	-
	-	210	-
	-	170	-

d1	Shoulder	Slot
	fz mm	
3	0,022	0,010
4	0,030	0,012
5	0,040	0,020
6	0,060	0,025
8	0,070	0,040
10	0,090	0,055
12	0,110	0,070

RADIUS END MILLS

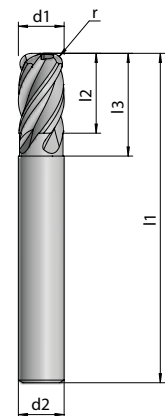
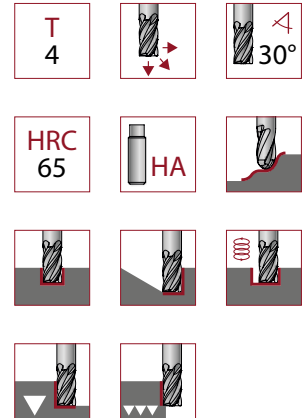
HPC | T 1160 | T 1161

Short version Corner radius 0,5 mm					
Article no.	d1	d2	l1	l2	l3
11600300	3	6	58	3	9
11600400	4	6	58	4	12
11600500	5	6	58	5	15
11600600	6	6	58	6	18
11600800	8	8	64	8	24
11601000	10	10	73	10	30
11601200	12	12	84	12	36

Short version Corner radius 1 mm					
Article no.	d1	d2	l1	l2	l3
11600401	4	6	58	4	12
11600501	5	6	58	5	15
11600601	6	6	58	6	18
11600801	8	8	64	8	24
11601001	10	10	73	10	30
11601201	12	12	84	12	36

Long version Corner radius 0,5 mm					
Article no.	d1	d2	l1	l2	l3
11610600	6	6	74	6	18
11610800	8	8	78	8	24
11611000	10	10	98	10	30
11611200	12	12	108	12	36

Long version Corner radius 1 mm					
Article no.	d1	d2	l1	l2	l3
11610601	6	6	74	6	18
11610801	8	8	78	8	24
11611001	10	10	98	10	30
11611201	12	12	108	12	36



Shoulder milling	$a_p \times a_e = 1d \times 0,4d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	300	150
	< 1100	230	100
	< 1400	180	-
M Stainless steels 1.4301 1.4305 1.4034	< 750	120	-
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	220	130
	< 650	160	100
H Hardened steel HRC 45-50 Hardened steel HRC 51-58 Hardened steel HRC 59-65	-	250	-
	-	210	-
	-	170	-

d1	Shoulder	Slot
	fz mm	
3	0,022	0,007
4	0,030	0,010
5	0,040	0,015
6	0,060	0,025
8	0,070	0,030
10	0,090	0,040
12	0,110	0,060

RADIUS END MILLS

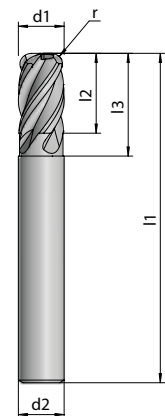
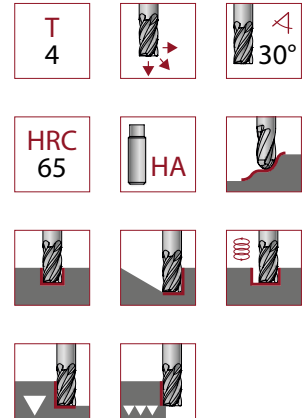
HPC | T 1160 | T 1161

Short version Corner radius 1,5 mm					
Article no.	d1	d2	l1	l2	l3
11600402	4	6	58	4	12
11600502	5	6	58	5	15
11600602	6	6	58	6	18
11600802	8	8	64	8	24
11601002	10	10	73	10	30
11601202	12	12	84	12	36

Short version Corner radius 2 mm					
Article no.	d1	d2	l1	l2	l3
11600503	5	6	58	5	15
11600603	6	6	58	6	18
11600803	8	8	64	8	24
11601003	10	10	73	10	30
11601203	12	12	84	12	36

Long version Corner radius 1,5 mm					
Article no.	d1	d2	l1	l2	l3
11610602	6	6	74	6	18
11610802	8	8	78	8	24
11611002	10	10	98	10	30
11611202	12	12	108	12	36

Long version Corner radius 2 mm					
Article no.	d1	d2	l1	l2	l3
11610603	6	6	74	6	18
11610803	8	8	78	8	24
11611003	10	10	98	10	30
11611203	12	12	108	12	36



Shoulder milling	$a_p \times a_e = 1d \times 0,4d$
Slot milling	$a_p \times a_e = 0,65d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	300	150
	< 1100	230	100
	< 1400	180	-
M Stainless steels 1.4301 1.4305 1.4034	< 750	120	-
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	220	130
	< 650	160	100
	-	-	-
H Hardened steel HRC 45-50 Hardened steel HRC 51-58 Hardened steel HRC 59-65	-	250	-
	-	210	-
	-	170	-

d1	Shoulder	Slot
	fz mm	
3	0,022	0,007
4	0,030	0,010
5	0,040	0,015
6	0,060	0,025
8	0,070	0,030
10	0,090	0,040
12	0,110	0,060

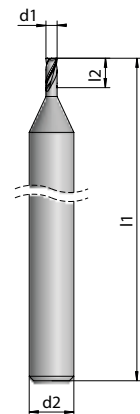
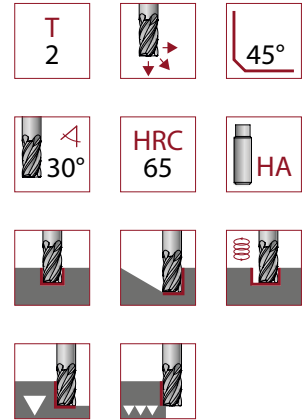


SHANK END MILLS
HPC MINI | BLUELINE MIKRO

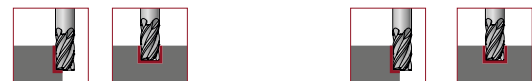
SHANK END MILLS

HPC MINI | S 1100

Short version				
Article no.	d1	d2	l1	l2
11000040	0,4	3	40	0,8
11000050	0,5	3	40	1
11000060	0,6	3	40	1,2
11000070	0,7	3	40	1,4
11000080	0,8	3	40	1,6
11000090	0,9	3	40	2
11000100	1	4	40	2,5
11000110	1,1	4	40	2,5
11000120	1,2	4	40	4
11000130	1,3	4	40	4
11000140	1,4	4	40	4
11000150	1,5	4	40	4
11000200	2	4	40	6
11000250	2,5	4	40	8



Shoulder milling	$a_p \times a_e = 0,2d \times 0,05d$
Slot milling	$a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	120	100
	Hardened steel HRC 51–58	–	100	80
	Hardened steel HRC 59–65	–	60	40

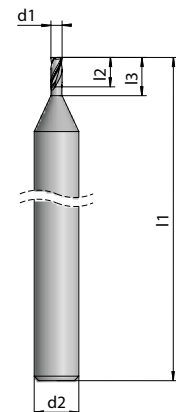
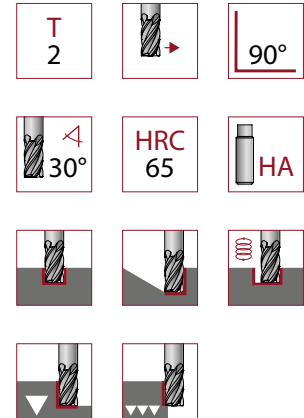
d1	Shoulder	Slot
	fz mm	
0,4	0,009	0,006
0,5	0,014	0,008
0,6	0,016	0,010
0,7	0,018	0,012
0,8	0,020	0,015
0,9	0,022	0,016
1	0,025	0,016
1,1	0,027	0,018
1,2	0,030	0,020
1,3	0,032	0,022
1,4	0,036	0,022
1,5	0,040	0,025
2	0,050	0,030
2,5	0,065	0,035

SHANK END MILLS

BLUELINE MIKRO | S 1106

Short version Cutting edge-Ø 0,1–0,5					
Article no.	d1	d2	l1	l2	l3
11060010	0,1	4	45	0,15	0,3
11060011	0,1	4	45	0,15	0,5
11060020	0,2	4	45	0,3	0,5
11060021	0,2	4	45	0,3	1
11060022	0,2	4	45	0,3	1,5
11060030	0,3	4	45	0,45	1
11060031	0,3	4	45	0,45	1,5
11060032	0,3	4	45	0,45	2
11060033	0,3	4	45	0,45	3
11060034	0,3	4	45	0,45	4
11060040	0,4	4	45	0,6	1
11060041	0,4	4	45	0,6	2
11060042	0,4	4	45	0,6	3
11060043	0,4	4	45	0,6	4
11060044	0,4	4	45	0,6	5
11060050	0,5	4	45	0,7	2
11060051	0,5	4	45	0,7	2,5
11060052	0,5	4	45	0,7	4
11060053	0,5	4	45	0,7	6
11060054	0,5	4	45	0,7	8

Short version Cutting edge-Ø 0,6–0,8					
Article no.	d1	d2	l1	l2	l3
11060060	0,6	4	45	0,9	2
11060061	0,6	4	45	0,9	3
11060062	0,6	4	45	0,9	4
11060063	0,6	4	45	0,9	6
11060064	0,6	4	45	0,9	8
11060065	0,6	4	45	0,9	10
11060080	0,8	4	45	1,2	2
11060081	0,8	4	45	1,2	4
11060082	0,8	4	45	1,2	6
11060083	0,8	4	45	1,2	8
11060084	0,8	4	45	1,2	10
11060085	0,8	4	45	1,2	12



Shoulder milling	$a_p \times a_e = 0,2d \times 0,05d$
Slot milling	$a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
M	Stainless steels 1.4301 1.4305 1.4034	< 750	140	120
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	100	75
	Hardened steel HRC 51–58	–	80	65
	Hardened steel HRC 59–65	–	50	40

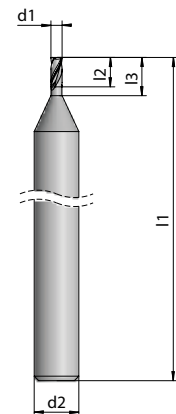
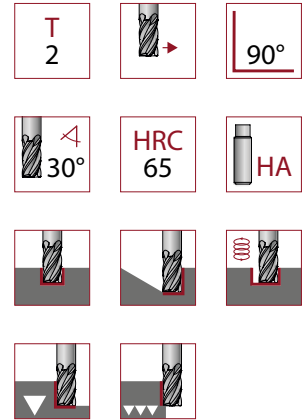
d1	Shoulder	Slot
	fz mm	
0,1	0,001	0,001
0,2	0,002	0,002
0,3	0,002	0,002
0,4	0,002	0,004
0,5	0,004	0,004
0,6	0,006	0,005
0,8	0,008	0,006

SHANK END MILLS

BLUELINE MIKRO | S 1106

Short version Cutting edge-Ø 1-1,5					
Article no.	d1	d2	l1	l2	l3
11060100	1	4	45	1,5	4
11060101	1	4	45	1,5	6
11060102	1	4	45	1,5	8
11060103	1	4	45	1,5	10
11060104	1	4	45	1,5	12
11060105	1	4	50	1,5	16
11060106	1	4	55	1,5	20
11060120	1,2	4	45	1,8	6
11060121	1,2	4	45	1,8	8
11060122	1,2	4	45	1,8	10
11060123	1,2	4	45	1,8	12
11060124	1,2	4	50	1,8	16
11060150	1,5	4	45	2,3	6
11060151	1,5	4	45	2,3	8
11060152	1,5	4	45	2,3	10
11060153	1,5	4	45	2,3	12
11060154	1,5	4	50	2,3	14
11060155	1,5	4	50	2,3	16
11060156	1,5	4	55	2,3	18
11060157	1,5	4	55	2,3	20

Short version Cutting edge-Ø 2					
Article no.	d1	d2	l1	l2	l3
11060200	2	4	45	3	6
11060201	2	4	45	3	8
11060202	2	4	45	3	10
11060203	2	4	45	3	12
11060204	2	4	50	3	14
11060205	2	4	50	3	16
11060206	2	4	55	3	18
11060207	2	4	55	3	20
11060208	2	4	60	3	25
11060209	2	4	70	3	30



Shoulder milling	$a_p \times a_e = 0,2d \times 0,05d$
Slot milling	$a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	150	120
	< 1100	110	90
	< 1400	85	65
M Stainless steels 1.4301 1.4305 1.4034	< 750	140	120
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	140	120
	< 650	120	100
H Hardened steel HRC 45-50 Hardened steel HRC 51-58 Hardened steel HRC 59-65	-	100	75
	-	80	65
	-	50	40

d1	Shoulder	Slot
	fz mm	
1	0,010	0,010
1,2	0,012	0,012
1,5	0,014	0,012
2	0,020	0,018



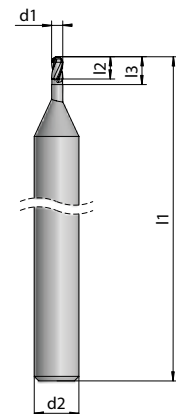
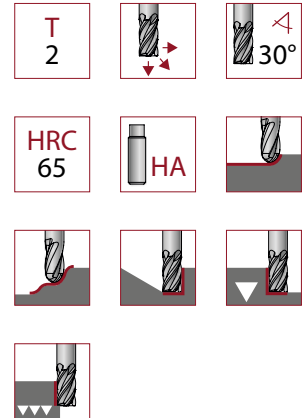
BALL END MILLS

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BALL END MILLS

HPC MINI | K 1101

Short version					
Article no.	d1	d2	l1	l2	l3
11010060	0,6	3	35	0,9	6
11010080	0,8	4	45	1,2	6
11010081	0,8	4	45	1,2	8
11010100	1	4	45	1,5	6
11010101	1	4	45	1,5	8
11010102	1	4	45	1,5	12
11010120	1,2	4	45	1,8	8
11010121	1,2	4	45	1,8	12
11010140	1,4	4	45	2,1	12
11010150	1,5	4	45	2,3	8
11010151	1,5	4	45	2,3	12
11010152	1,5	4	50	2,3	16
11010160	1,6	4	50	2,6	16
11010180	1,8	4	50	2,7	16
11010200	2	4	45	3	8
11010201	2	4	50	3	16
11010202	2	4	55	3	20
11010300	3	6	55	4,5	16
11010301	3	6	60	4,5	20



Ball track milling	$a_p \times a_e = 0,1d \times 0,2d$
Copy milling	$a_p \times a_e = 0,04d \times 0,04d$



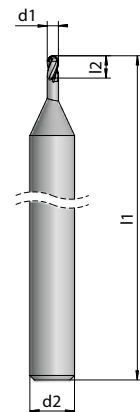
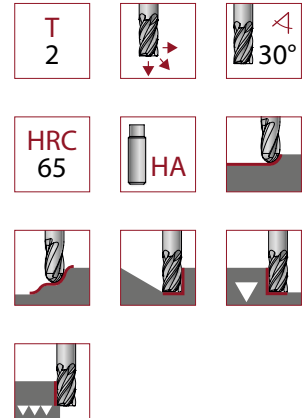
Cutting data for short version		Ball track	Copy	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GGG25 GGG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	120	100
	Hardened steel HRC 51–58	–	100	80
	Hardened steel HRC 59–65	–	60	40

d1	Ball track fz mm	Copy fz mm
0,6	0,012	0,014
0,8	0,020	0,016
1	0,026	0,020
1,2	0,030	0,022
1,4	0,034	0,023
1,5	0,038	0,024
1,6	0,041	0,025
1,8	0,045	0,025
2	0,050	0,026
3	0,076	0,032

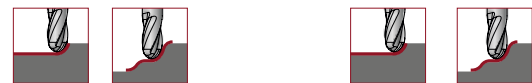
BALL END MILLS

HPC MINI | K 1102

Short version				
Article no.	d1	d2	l1	l2
11020050	0,5	6	64	1
11020060	0,6	6	64	1,2
11020080	0,8	6	64	1,6
11020100	1	6	64	2
11020120	1,2	6	64	2,4
11020140	1,4	6	64	2,8
11020150	1,5	6	64	3
11020160	1,6	6	64	3,2
11020180	1,8	6	64	3,6
11020200	2	6	64	4



Ball track milling	$a_p \times a_e = 0,1d \times 0,2d$
Copy milling	$a_p \times a_e = 0,04d \times 0,04d$



Cutting data for short version		Ball track	Copy	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	120	100
	Hardened steel HRC 51–58	–	100	80
	Hardened steel HRC 59–65	–	60	40

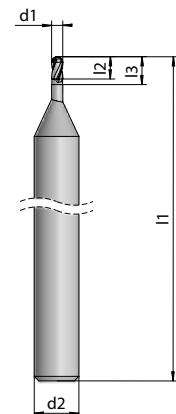
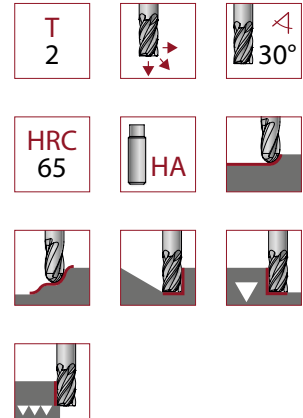
d1	Ball track	Copy
	fz mm	
0,5	0,012	0,016
0,6	0,015	0,017
0,8	0,020	0,018
1	0,028	0,022
1,2	0,032	0,024
1,4	0,036	0,026
1,5	0,040	0,028
1,6	0,044	0,028
1,8	0,048	0,029
2	0,052	0,030

BALL END MILLS

HPC MINI | K 1103

Short version					
Article no.	d1	d2	l1	l2	l3
11030050	0,5	6	64	1	2,5
11030051	0,5	6	64	1	5
11030060	0,6	6	64	1,2	3
11030061	0,6	6	64	1,2	6
11030080	0,8	6	64	1,6	4
11030081	0,8	6	64	1,6	8
11030100	1	6	64	2	5
11030101	1	6	64	2	10
11030102	1	6	64	2	15
11030103	1	6	64	2	20
11030120	1,2	6	64	2,4	6
11030121	1,2	6	64	2,4	12
11030140	1,4	6	64	2,8	7
11030141	1,4	6	64	2,8	14

Short version					
Article no.	d1	d2	l1	l2	l3
11030150	1,5	6	64	3	7,5
11030151	1,5	6	64	3	10
11030152	1,5	6	64	3	15
11030153	1,5	6	64	3	20
11030160	1,6	6	64	3,2	8
11030161	1,6	6	64	3,2	16
11030180	1,8	6	64	3,6	9
11030181	1,8	6	64	3,6	18
11030200	2	6	64	4	10
11030201	2	6	64	4	15
11030202	2	6	64	4	20
11030203	2	6	64	4	25



Ball track milling $a_p \times a_e = 0,1d \times 0,2d$
 Copy milling $a_p \times a_e = 0,04d \times 0,04d$



Cutting data for short version		Ball track	Copy	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	120	100
	Hardened steel HRC 51–58	–	100	80
	Hardened steel HRC 59–65	–	60	40

d1	Ball track	Copy
	fz mm	
0,5	0,012	0,016
0,6	0,015	0,017
0,8	0,020	0,018
1	0,028	0,022
1,2	0,032	0,024
1,4	0,036	0,026
1,5	0,040	0,028
1,6	0,044	0,028
1,8	0,048	0,029
2	0,052	0,030

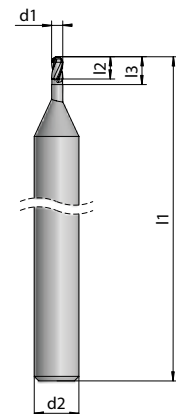
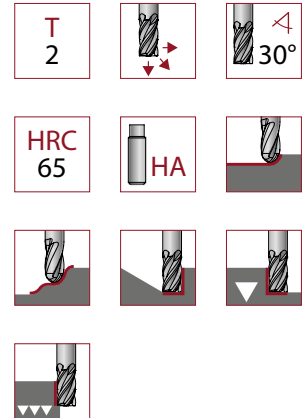
BALL END MILLS

BLUELINE MIKRO | K 1104 | K 1105



Short version Cutting edge-Ø 0,1–0,5					
Article no.	d1	d2	l1	l2	l3
11050010	0,1	4	45	0,1	0,3
11050011	0,1	4	45	0,1	0,5
11050020	0,2	4	45	0,2	0,5
11050021	0,2	4	45	0,2	1
11050022	0,2	4	45	0,2	1,5
11050030	0,3	4	45	0,3	1
11050031	0,3	4	45	0,3	2
11050032	0,3	4	45	0,3	3
11050040	0,4	4	45	0,4	1
11050041	0,4	4	45	0,4	2
11050042	0,4	4	45	0,4	3
11050043	0,4	4	45	0,4	4
11050044	0,4	4	45	0,4	5
11050050	0,5	4	45	0,4	2
11050051	0,5	4	45	0,4	2,5
11050052	0,5	4	45	0,4	4
11050053	0,5	4	45	0,4	6
11050054	0,5	4	45	0,4	8
11040050	0,5	6	50	0,5	1,5
11040051	0,5	6	50	0,5	3,3

Short version Cutting edge-Ø 0,6–0,8					
Article no.	d1	d2	l1	l2	l3
11050060	0,6	4	45	0,5	2
11050061	0,6	4	45	0,5	3
11050062	0,6	4	45	0,5	4
11050063	0,6	4	45	0,5	5
11050064	0,6	4	45	0,5	6
11050065	0,6	4	45	0,5	8
11050066	0,6	4	45	0,5	10
11040060	0,6	6	50	0,3	2
11040061	0,6	6	50	0,3	4
11050080	0,8	4	45	0,6	2
11050081	0,8	4	45	0,6	4
11050082	0,8	4	45	0,6	6
11050083	0,8	4	45	0,6	8
11050084	0,8	4	45	0,6	10
11040080	0,8	6	50	0,8	2,5
11040081	0,8	6	50	0,8	5,5



Ball track milling	$a_p \times a_e = 0,1d \times 0,2d$
Copy milling	$a_p \times a_e = 0,04d \times 0,04d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v _c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	150	120
	< 1100	110	90
	< 1400	85	65
K Cast iron GG25 GG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	140	120
	< 650	120	100
H Hardened steel HRC 45–50 Hardened steel HRC 51–58 Hardened steel HRC 59–65	–	100	75
	–	80	65
	–	50	40

	Ball track	Copy
d1	fz mm	
0,1	0,002	0,004
0,2	0,004	0,006
0,3	0,006	0,008
0,4	0,008	0,010
0,5	0,010	0,012
0,6	0,013	0,013
0,8	0,016	0,014

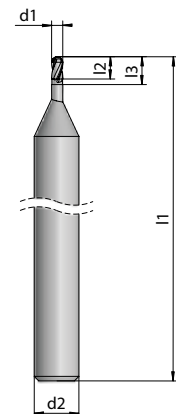
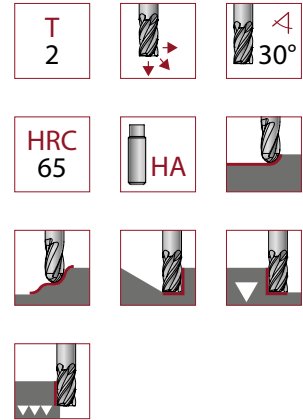
BALL END MILLS

BLUELINE MIKRO | K 1104 | K 1105



Short version Cutting edge-Ø 1-1,2					
Article no.	d1	d2	l1	l2	l3
11050100	1	4	45	0,8	3
11050101	1	4	45	0,8	4
11050102	1	4	45	0,8	5
11050103	1	4	45	0,8	6
11050104	1	4	45	0,8	7
11050105	1	4	45	0,8	8
11050106	1	4	45	0,8	9
11050107	1	4	45	0,8	10
11050108	1	4	45	0,8	12
11050109	1	4	50	0,8	14
11050110	1	4	50	0,8	16
11050111	1	4	55	0,8	20
11040100	1	6	50	1	3,3
11040101	1	6	50	1	6,7
11040102	1	6	50	1	12
11050120	1,2	4	45	1	6
11050121	1,2	4	45	1	8
11050122	1,2	4	45	1	10
11050123	1,2	4	45	1	12
11040120	1,2	6	50	1,2	4,4
11040121	1,2	6	50	1,2	8

Short version Cutting edge-Ø 1,5-2					
Article no.	d1	d2	l1	l2	l3
11050150	1,5	4	45	1,2	6
11050151	1,5	4	45	1,2	8
11050152	1,5	4	45	1,2	10
11050153	1,5	4	45	1,2	12
11050154	1,5	4	50	1,2	14
11050155	1,5	4	50	1,2	16
11050156	1,5	4	55	1,2	20
11040150	1,5	6	50	1,5	5
11040151	1,5	6	50	1,5	9,7
11040152	1,5	6	50	1,5	15
11050200	2	4	45	1,6	4
11050201	2	4	45	1,6	6
11050202	2	4	45	1,6	8
11050203	2	4	45	1,6	10
11050204	2	4	50	1,6	12
11050205	2	4	50	1,6	14
11050206	2	4	50	1,6	16
11050207	2	4	55	1,6	18
11050208	2	4	55	1,6	20
11050209	2	4	60	1,6	22
11050210	2	4	60	1,6	25
11050211	2	4	70	1,6	30
11040200	2	6	50	2	6
11040201	2	6	50	2	13
11040202	2	6	60	2	20



Ball track milling $a_p \times a_e = 0,1d \times 0,2d$
 Copy milling $a_p \times a_e = 0,04d \times 0,04d$



Cutting data for short version		Ball track	Copy
Material	N/mm ²	v_c m/min	
P Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131 Tool/ tempering steels 1.2367 1.2379 1.7225 Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 800	150	120
	< 1100	110	90
	< 1400	85	65
K Cast iron GGG25 GGG40 GGG40 Spherical cast iron GGG50 GGG60 GGG70	< 450	140	120
	< 650	120	100
H Hardened steel HRC 45–50 Hardened steel HRC 51–58 Hardened steel HRC 59–65	–	100	75
	–	80	65
	–	50	40

	Ball track	Copy
d1	fz mm	
1	0,020	0,017
1,2	0,022	0,020
1,5	0,027	0,022
2	0,038	0,024

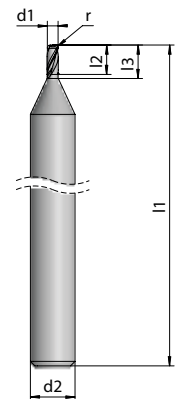
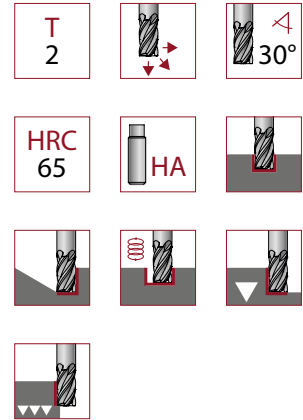


RADIUS END MILLS
BLUELINE MIKRO

RADIUS END MILLS

BLUELINE MIKRO | T 1122

Short version						
Article no.	d1	d2	l1	l2	l3	r
11220051	0,5	4	40	1	-	0,05
11220061	0,6	4	40	1,2	-	0,05
11220070	0,7	4	40	1,4	-	0,05
11220081	0,8	4	40	1,6	-	0,05
11220090	0,9	4	40	2	-	0,05
11220101	1	4	40	1,5	-	0,1
11220102	1	6	40	1,5	-	0,1
11220151	1,5	6	40	2,2	-	0,1
11220201	2	4	40	3	6	0,1
11220202	2	6	40	3	6	0,1
11220251	2,5	6	40	4	6	0,1
11220300	3	6	45	4	7	0,1
11220350	3,5	6	45	5	9	0,1
11220400	4	6	45	5	9	0,1



Shoulder milling	$a_p \times a_e = 0,2d \times 0,05d$
Slot milling	$a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	-	100	75
	Hardened steel HRC 51–58	-	80	65
	Hardened steel HRC 59–65	-	50	40

d1	Shoulder	Slot
	fz mm	
0,5	0,012	0,008
0,6	0,014	0,008
0,7	0,015	0,010
0,8	0,016	0,012
0,9	0,018	0,015
1	0,020	0,016
1,5	0,030	0,025
2	0,040	0,032
2,5	0,050	0,040
3	0,060	0,045
3,5	0,060	0,045
4	0,060	0,045

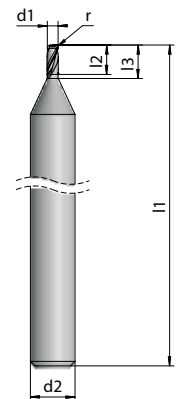
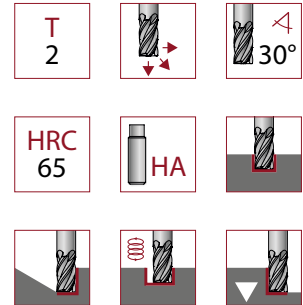
RADIUS END MILLS

BLUELINE MIKRO | T 1123 | T 1124



Short version Cutting edge-Ø 0,5–0,8						
Article no.	d1	d2	l1	l2	l3	r
11230050	0,5	4	45	0,7	1,5	0,05
11230051	0,5	4	45	0,7	2,5	0,05
11230052	0,5	4	45	0,7	4	0,05
11240050	0,5	6	50	0,7	1,5	0,05
11240051	0,5	6	50	0,7	3,3	0,05
11230060	0,6	4	45	0,9	2	0,05
11230061	0,6	4	45	0,9	3	0,05
11230062	0,6	4	45	0,9	4	0,05
11230063	0,6	4	45	0,9	2	0,1
11240060	0,6	6	50	0,9	2	0,05
11240061	0,6	6	50	0,9	4	0,05
11230070	0,7	4	45	1	4	0,1
11230080	0,8	4	45	1,2	2	0,1
11230081	0,8	4	45	1,2	4	0,1
11230082	0,8	4	45	1,2	6	0,1
11240080	0,8	6	50	1,2	2,5	0,05
11240081	0,8	6	50	1,2	5,5	0,05

Short version Cutting edge-Ø 1,0–1,5						
Article no.	d1	d2	l1	l2	l3	r
11230100	1	6	50	1,5	4	0,1
11230101	1	6	50	1,5	6	0,1
11230102	1	6	50	1,5	4	0,2
11230103	1	6	50	1,5	6	0,2
11230104	1	6	50	1,5	8	0,2
11230105	1	6	50	1,5	4	0,3
11230106	1	6	50	1,5	6	0,3
11230107	1	6	50	1,5	8	0,3
11240100	1	6	50	1,5	3,3	0,1
11240101	1	6	50	1,5	6,7	0,1
11240120	1,2	6	50	1,8	4,4	0,1
11240121	1,2	6	50	1,8	8	0,1
11230150	1,5	6	50	2,5	4	0,2
11230151	1,5	6	50	2,5	6	0,2
11230152	1,5	6	50	2,5	8	0,2
11230153	1,5	6	50	2,5	10	0,2
11230154	1,5	6	50	2,5	12	0,2
11230155	1,5	6	50	2,5	4	0,3
11230156	1,5	6	50	2,5	6	0,3
11230157	1,5	6	50	2,5	8	0,3
11240150	1,5	6	50	2,2	5	0,15
11240151	1,5	6	50	2,2	9,7	0,15



Shoulder milling $a_p \times a_e = 0,1d \times 0,05d$
 Slot milling $a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Casts iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	100	75
	Hardened steel HRC 51–58	–	80	65
	Hardened steel HRC 59–65	–	50	40

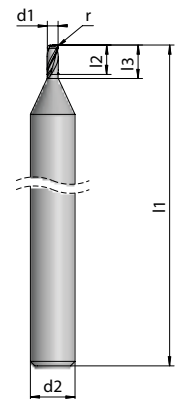
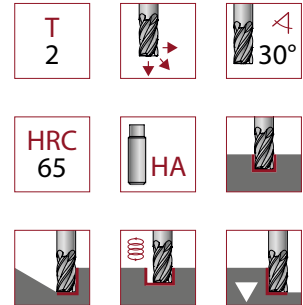
d1	Shoulder	Slot
	fz mm	
0,5	0,010	0,008
0,6	0,011	0,009
0,7	0,012	0,010
0,8	0,014	0,012
1	0,015	0,013
1,2	0,016	0,014
1,5	0,017	0,015

RADIUS END MILLS

BLUELINE MIKRO | T 1123 | T 1124

Short version Cutting edge-Ø 2,0						
Article no.	d1	d2	l1	l2	l3	r
11230200	2	6	50	3	6	0,2
11230201	2	6	50	3	8	0,2
11230202	2	6	55	3	10	0,2
11230203	2	6	55	3	12	0,2
11230204	2	6	50	3	6	0,3
11230205	2	6	50	3	8	0,3
11230206	2	6	55	3	10	0,3
11230207	2	6	55	3	12	0,3
11230208	2	6	55	3	16	0,3
11230209	2	6	50	3	6	0,5
11230210	2	6	55	3	10	0,5
11230211	2	6	55	3	12	0,5
11240200	2	6	50	2,2	6	0,15
11240201	2	6	50	2,2	13	0,15

Short version Cutting edge-Ø 3,0–4,0						
Article no.	d1	d2	l1	l2	l3	r
11230300	3	6	55	4	8	0,2
11230301	3	6	55	4	10	0,2
11230302	3	6	55	4	12	0,2
11230303	3	6	55	4	16	0,2
11230304	3	6	55	4	8	0,3
11230305	3	6	55	4	10	0,3
11230306	3	6	55	4	12	0,3
11230307	3	6	55	4	16	0,3
11230308	3	6	55	4	10	0,5
11230309	3	6	55	4	12	0,5
11230310	3	6	55	4	16	0,5
11230311	3	6	55	4	20	0,5
11230400	4	6	55	5	12	0,2
11230401	4	6	55	5	16	0,2
11230402	4	6	55	5	20	0,2
11230403	4	6	55	5	10	0,3
11230404	4	6	55	5	12	0,3
11230405	4	6	55	5	16	0,3
11230406	4	6	55	5	20	0,3
11230407	4	6	55	5	12	0,5
11230408	4	6	55	5	16	0,5
11230409	4	6	55	5	20	0,5
11230410	4	6	55	5	12	1
11230411	4	6	55	5	16	1



Shoulder milling $a_p \times a_e = 0,1d \times 0,05d$
 Slot milling $a_p \times a_e = 0,1d \times 1d$



Cutting data for short version		Shoulder	Slot	
Material	N/mm ²	v _c m/min		
P	Gen. structural/ case hard. steels 1.0037 1.0570 1.0503 1.7131	< 800	150	120
	Tool/ tempering steels 1.2367 1.2379 1.7225	< 1100	110	90
	Alloyed/ cold work steels 1.2312 1.2767 1.3505 1.7707	< 1400	85	65
K	Cast iron GG25 GG40 GGG40	< 450	140	120
	Spherical cast iron GGG50 GGG60 GGG70	< 650	120	100
H	Hardened steel HRC 45–50	–	100	75
	Hardened steel HRC 51–58	–	80	65
	Hardened steel HRC 59–65	–	50	40

d1	Shoulder	Slot
	fz mm	
2	0,020	0,017
3	0,022	0,019
4	0,025	0,020



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When resharpening and recoating solid carbide tools, we use the same high standards as for BOGER & BENZ's new tools.

That's what a team with long years of experience and – in precisely this sense – invaluable knowhow stands for. When old is turned into as good as new.

Every tool wears out. Eventually, it will be unfit for use. The BOGER & BENZ service stands for successfully turning old into as good as new: Our team in the tool sharpening department returns solid carbide tools to their original quality and geometry and to the sharpness and contour required.

This also applies to new and re-coating in collaboration with renowned coating companies. Thanks to our optimally equipped machine facilities and highly efficient QA, we can implement individual requirements and all usual quality and precision standards when resharpening. And this we guarantee.

*Empirical value for resharpened/ recoated tools: 5 % less life distance than in new tools on average.



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