



Solid drilling and bore machining

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WNT \ Performance

Premium quality tools for high performance.

The premium quality tools from the **WNT Performance** product line have been designed for specific applications and are distinguished by their outstanding performance. If you make high demands on the performance of your production and want to achieve the very best results, we recommend the Premium tools in this product line.

Symbol explanation

Shank



Shank type



Length: extra short / short / medium / long / extra long

Cutting edge preparation



Sharp



Corner chamfer (CHW = chamfer width in mm)



Full Radius

Application



Machining example



The red arrows describe the possible feed directions



Cutting geometry
 $\lambda_s = 30^\circ$ λ_s = helix angle
 $\gamma_s = 12^\circ$ γ_s = rake angle

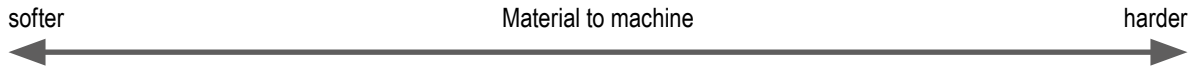
ZFP = Number of flutes

● = Main Application

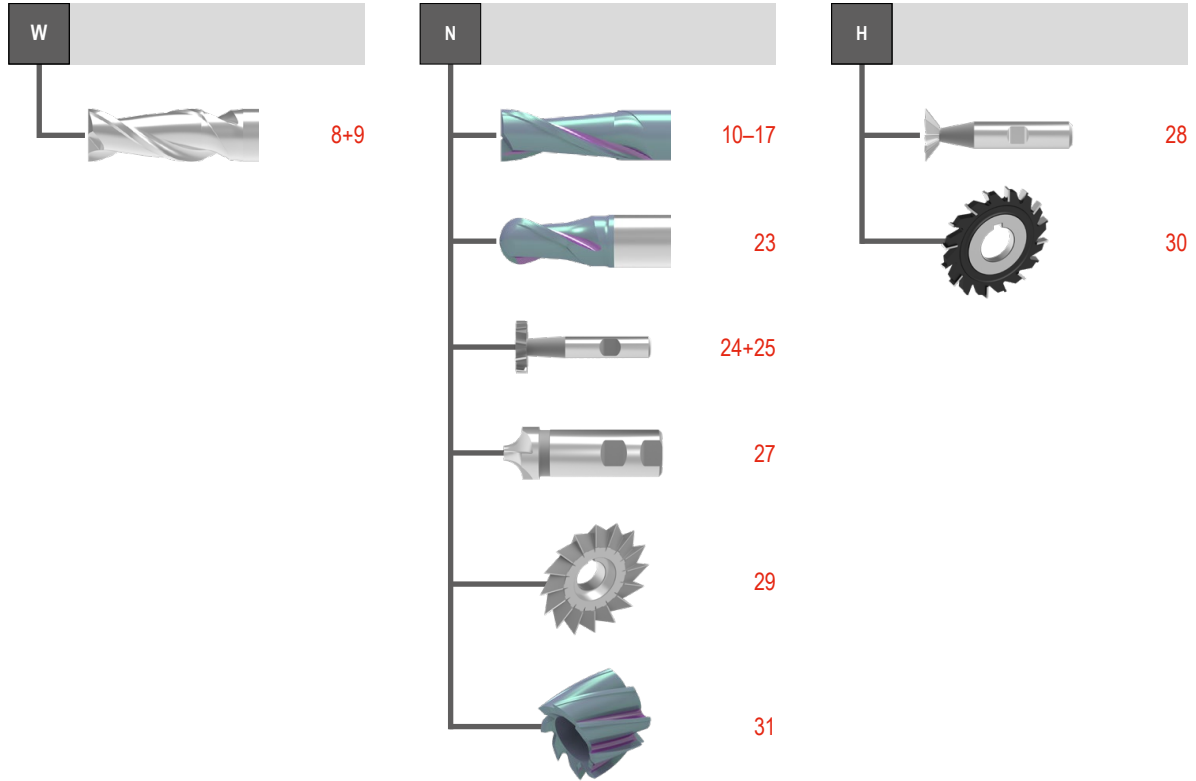
○ = Extended application



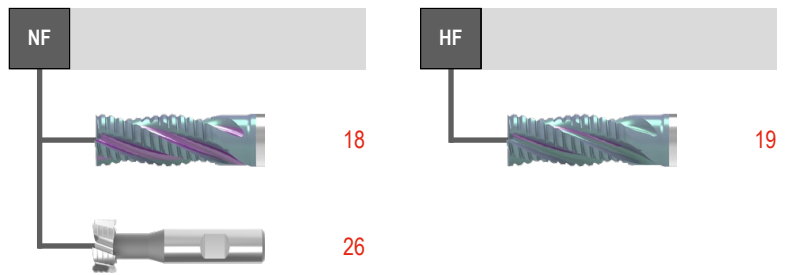
Toolfinder



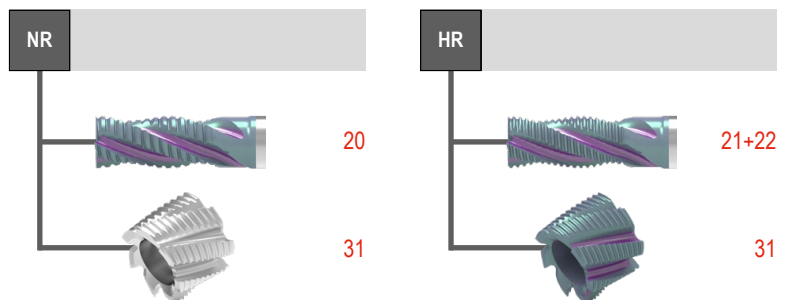
Finish milling



Rough and finish machining



Rough machining



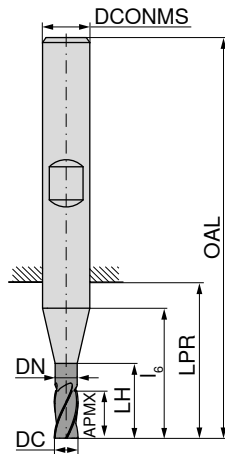
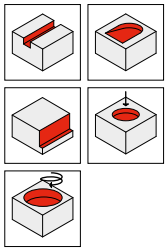
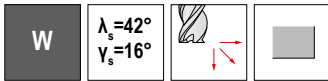
Overview HSS milling cutters

Tool type	ZEFP	Number of flutes	Diameter in mm Ø DC	Material							Sharp	Corner chamfer	Corner radius	Full Radius	Length	Material, e.g. PM = Powdersteel	coated	uncoated	WNT \ Performance
				Steel	Stainless steel	Cast iron	Non-ferrous metals	Heat-resistant	Tempered steel	Non-metal materials									
Finishing cutter																			
	W	2	2-20	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	8
	W	3-4	2-32	●	●	●	○	○	○	○	○	○	○	○	○	○	○	9	
	N	2	1-26	●	●	●	○	○	○	○	○	○	○	○	○	○	○	10+11	
	N	3	1-10	●	●	●	○	○	○	○	○	○	○	○	○	○	○	12	
	N	3	1,8-22,0	●	●	●	○	○	○	○	○	○	○	○	○	○	○	13+14	
	N	4	4-20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	15	
	N	4-8	2-50	●	●	●	○	○	○	○	○	○	○	○	○	○	○	16+17	
Rough and finish milling cutters																			
	NF	4	6-25	●	○	○	○	○	○	○	○	○	○	○	○	○	○	18	
	HF	4	6-20	●	○	○	○	○	○	○	○	○	○	○	○	○	○	19	
Rough milling cutters																			
	NR	3	6-25	●	○	○	○	○	○	○	○	○	○	○	○	○	○	20	
	HR	4-6	6-32	●	○	○	○	○	○	○	○	○	○	○	○	○	○	21	
	HR	3-6	4-32	●	○	○	○	○	○	○	○	○	○	○	○	○	○	22	
Ball nose end milling cutters																			
	N	2	2-30	●	○	○	○	○	○	○	○	○	○	○	○	○	○	23	

Overview HSS milling cutters

Tool type	ZEFP	Number of flutes	Diameter in mm	Material							Form				Length	Material, e.g. PM = Powdersteel	Coating		Price
				P	M	K	N	S	H	O	Sharp	Corner chamfer	Corner radius	Full Radius			coated	uncoated	
	N	6-10	11-60	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	24
	N	6-12	10,5-45,5	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	25
	NF	6-8	21-45	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	26
	N	4-6	6-16	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	27
	H	10	16-25	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	28
	N	14-28	40-125	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	29
	H	16-48	50-160	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	30
		7-10	40-80	●	○	●	○	○	○	○	○					HSS-E	<input type="checkbox"/>	<input type="checkbox"/>	31

Slot milling cutter HSS-E Co 8



DIN 844



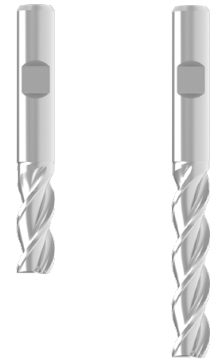
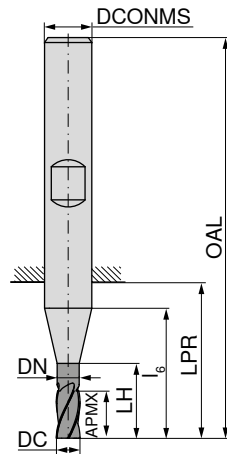
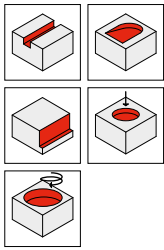
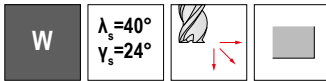
50 144 ...

DC _{e8} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP	
2,0	7		7	13	15	51	6	2	020
2,5	8		8	14	16	52	6	2	025
3,0	8		8	14	16	52	6	2	030
4,0	11		11	17	19	55	6	2	040
5,0	13		13	19	21	57	6	2	050
6,0	13		13	19	21	57	6	2	060
6,5	16	6,0	22	24	26	66	10	2	065
8,0	19	7,5	25	27	29	69	10	2	080
10,0	22	9,5	30	30	32	72	10	2	100
12,0	26	11,5	36	36	38	83	12	2	120
14,0	26	11,5	36	36	38	83	12	2	140
16,0	32	15,0	42	42	44	92	16	2	160
18,0	32	15,0	42	42	44	92	16	2	180
20,0	38	19,0	52	52	54	104	20	2	200

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End milling cutter HSS-E Co 8



DIN 69844



DIN 844



50 120 ...

50 121 ...

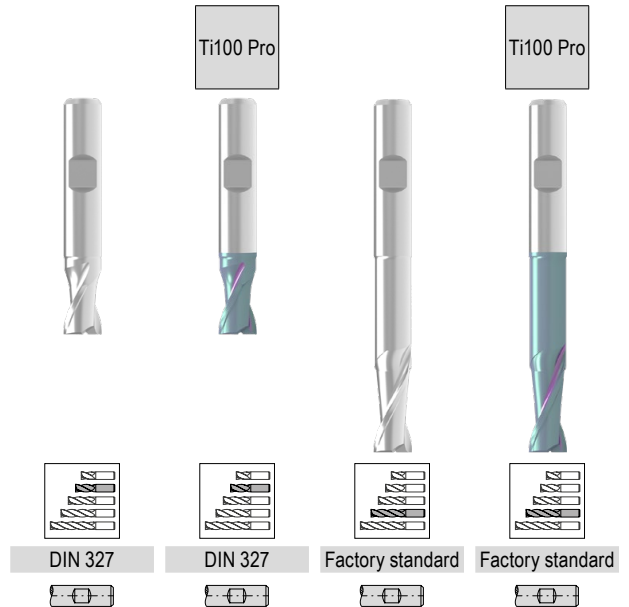
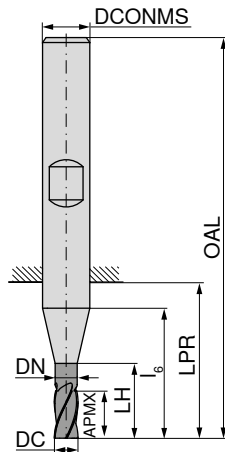
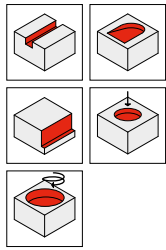
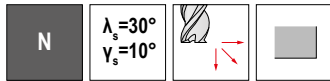
DC _{k10} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
2	7		7	13	15	51	6	3
3	8		8	14	16	52	6	3
3	12		12	18	20	56	6	3
4	11		11	17	19	55	6	3
4	19		19	25	27	63	6	3
5	13		13	19	21	57	6	3
5	24		24	30	32	68	6	3
6	13	5,5	19	19	21	57	6	3
6	24	5,5	30	30	32	68	6	3
7	16	6,5	22	24	26	66	10	3
7	30	6,5	36	38	40	80	10	3
8	19	7,5	25	27	29	69	10	3
8	38	7,5	44	46	48	88	10	3
9	19	8,5	26	27	29	69	10	3
9	38	8,5	45	46	48	88	10	3
10	22	9,5	30	30	32	72	10	3
10	45	9,5	53	53	55	95	10	3
12	26	11,5	36	36	38	83	12	3
12	53	11,5	63	63	65	110	12	3
14	26	11,5	36	36	38	83	12	3
14	53	11,5	63	63	65	110	12	3
16	32	15,0	42	42	44	92	16	3
16	63	15,0	73	73	75	123	16	3
18	32	15,0	42	42	44	92	16	3
18	63	15,0	73	73	75	123	16	3
20	38	19,0	52	52	54	104	20	3
20	75	19,0	89	89	91	141	20	3
22	38	19,0	52	52	54	104	20	3
22	75	19,0	89	89	91	141	20	3
24	90	23,0	106	108	110	166	25	3
25	45	24,0	63	45	65	121	25	4
25	90	24,0	108	108	110	166	25	4
28	90	24,0	108	108	110	166	25	4
30	90	24,0	108	108	110	166	25	4
32	106	31,0	123	123	126	186	32	4

020	
030	
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	120
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180	
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	240
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	250
	280
	300
	320

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Slot milling cutter HSS-E Co 8



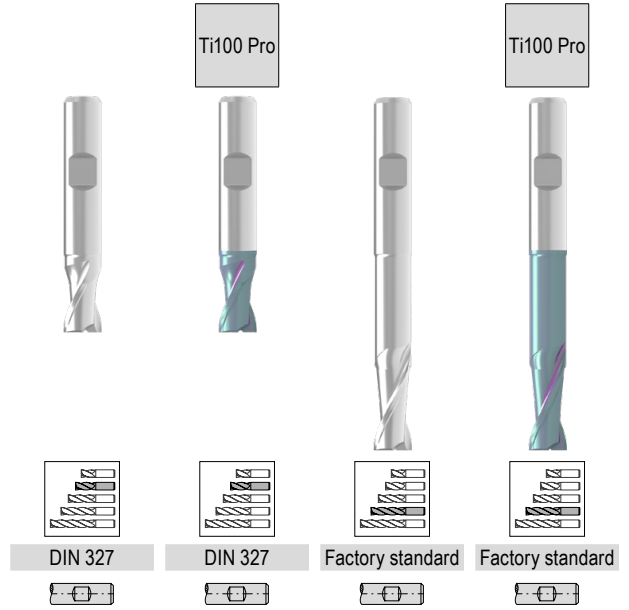
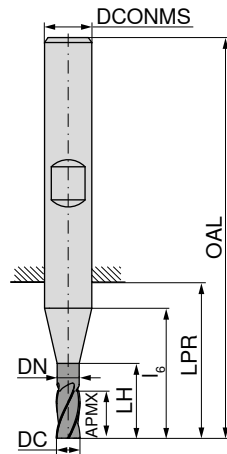
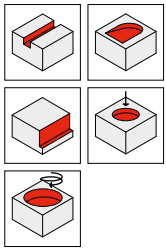
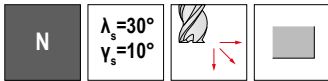
DC	DC Tol.	APMX	DN	LH	l ₆	LPR	OAL	DCONMS _{h6}	ZEFP
mm		mm	mm	mm	mm	mm	mm	mm	
1,0	h10	2,5		2,5	9	11	47	6	2
1,5	h10	3,0		3,0	9	11	47	6	2
1,8	h10	4,0		4,0	10	12	48	6	2
2,0	e8	4,0		4,0	10	12	48	6	2
2,5	e8	5,0		5,0	11	13	49	6	2
3,0	e8	5,0		5,0	11	13	49	6	2
3,0	e8	8,0		8,0	18	20	56	6	2
3,5	h10	6,0		6,0	12	14	50	6	2
4,0	e8	7,0		7,0	13	15	51	6	2
4,0	e8	11,0		11,0	25	27	63	6	2
4,5	h10	7,0		7,0	13	15	51	6	2
5,0	e8	8,0		8,0	14	16	52	6	2
5,0	e8	13,0		13,0	30	32	68	6	2
5,5	h10	8,0		8,0	14	16	52	6	2
6,0	e8	8,0	5,50	14,0	14	16	52	6	2
6,0	e8	13,0	5,50	30,0	30	32	68	6	2
6,5	h10	10,0	6,00	16,0	18	20	60	10	2
7,0	e8	10,0	6,50	16,0	18	20	60	10	2
7,0	e8	16,0	6,35	36,0	38	40	80	10	2
7,5	h10	10,0	7,00	16,0	18	20	60	10	2
8,0	e8	11,0	7,50	17,0	19	21	61	10	2
8,0	e8	19,0	7,35	44,0	46	48	88	10	2
8,5	h10	11,0	8,00	18,0	19	21	61	10	2
9,0	h10	11,0	8,50	18,0	19	21	61	10	2
9,0	h10	19,0	8,35	45,0	46	48	88	10	2
9,5	h10	11,0	9,00	18,0	19	21	61	10	2
10,0	e8	13,0	9,50	21,0	21	23	63	10	2
10,0	e8	22,0	9,35	53,0	53	55	95	10	2
10,5	h10	13,0	10,00	21,0	23	25	70	12	2
11,0	h10	13,0	10,50	21,0	23	25	70	12	2
11,0	h10	22,0	10,50	53,0	55	57	102	12	2
11,5	h10	13,0	11,00	21,0	23	25	70	12	2
12,0	e8	16,0	11,50	26,0	26	28	73	12	2
12,0	e8	26,0	11,50	63,0	63	65	110	12	2
13,0	h10	16,0	11,50	26,0	26	28	73	12	2
14,0	e8	16,0	11,50	26,0	26	28	73	12	2
14,0	e8	26,0	11,50	63,0	63	65	110	12	2
15,0	h10	16,0	11,50	26,0	26	28	73	12	2
15,0	h10	26,0	11,50	63,0	63	65	110	12	2
16,0	e8	19,0	15,00	29,0	29	31	79	16	2
16,0	e8	32,0	15,00	73,0	73	75	123	16	2

50 100 ...	54 025 ...	50 122 ...	54 020 ...
010 ¹⁾	010 ¹⁾		
015 ¹⁾	015 ¹⁾		
018	018		
020	020		
025	025		
030	030		
		030	030
035	035		
040	040		
		040	040
045	045		
050	050		
		050	050
055	055		
060	060		
		060	060
065	065		
070	070		
		070	070
075	075		
080	080		
		080	080
085	085		
090	090		
		090	090
095	095		
100	100		
		100	100
105	105		
110	110		
		110	110
115	115		
120	120		
		120	120
130	130		
140	140		
		140	140
150	150		
		150	150
160	160		
		160	160

P	●	●	●	●
M	○	●	○	●
K	●	●	●	●
N	○	○	○	○
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1) Factory standard

Slot milling cutter HSS-E Co 8



DC	DC Tol.	APMX	DN	LH	l ₆	LPR	OAL	DCONMS	h ₆	ZEFP
mm		mm	mm	mm	mm	mm	mm	mm		
17,0	h10	19,0	15,00	29,0	29	31	79	16	2	
18,0	e8	19,0	15,00	29,0	29	31	79	16	2	
18,0	e8	32,0	15,00	73,0	73	75	123	16	2	
19,0	h10	19,0	15,00	29,0	29	31	79	16	2	
20,0	e8	22,0	19,00	36,0	36	38	88	20	2	
20,0	e8	38,0	19,00	89,0	89	91	141	20	2	
22,0	e8	22,0	19,00	36,0	36	38	88	20	2	
24,0	e8	26,0	23,00	42,0	44	46	102	25	2	
25,0	e8	26,0	24,00	44,0	44	46	102	25	2	
26,0	h10	26,0	24,00	44,0	44	46	102	25	2	

50 100 ...	54 025 ...	50 122 ...	54 020 ...
170	170		
180	180		
190	190	180	180
200	200		
220	220	200	200
240	240		
250	250		
260	260		

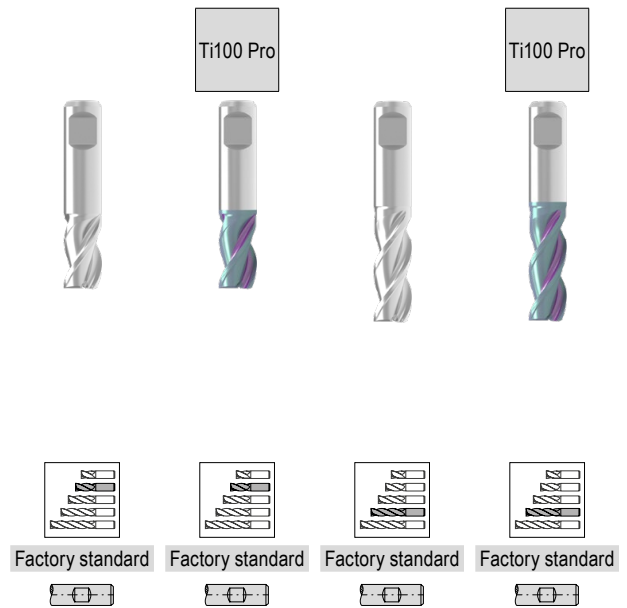
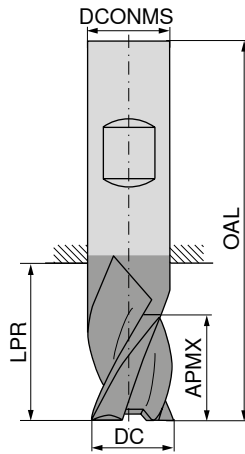
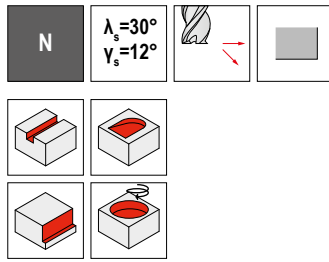
P	●	●	●	●
M	○	●	○	●
K	●	●	●	●
N	○	○	○	○
S	○	○	○	○
H				
O	○	○	○	○

1) Factory standard

→ v_c/f_z Page 33-35

Throw-away milling cutter, HSS-E Co 8

▲ Shank similar to DIN 1835 B



DC _{e8} mm	APMX mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
1,00	2	8	34	6	3
1,50	3	8	34	6	3
1,50	4	10	35	6	3
1,80	3	8	34	6	3
2,00	4	9	35	6	3
2,00	7	12	38	6	3
2,30	4	9	35	6	3
2,50	5	10	36	6	3
2,50	8	13	39	6	3
2,80	5	10	36	6	3
3,00	5	10	36	6	3
3,00	8	13	39	6	3
3,30	6	11	37	6	3
3,50	6	11	37	6	3
3,50	10	15	41	6	3
3,80	7	12	38	6	3
4,00	7	12	38	6	3
4,00	11	16	42	6	3
4,30	7	12	38	6	3
4,50	7	12	38	6	3
4,50	11	16	42	6	3
4,80	8	13	39	6	3
5,00	8	13	39	6	3
5,00	13	18	44	6	3
5,30	8	13	39	6	3
5,50	8	13	39	6	3
5,50	13	18	44	6	3
5,75	8	13	39	6	3
6,00	8	13	39	6	3
6,00	13	18	44	6	3
6,50	10	14	42	8	3
6,50	16	20	48	8	3
7,00	10	14	42	8	3
7,00	16	20	48	8	3
7,50	10	14	42	8	3
7,50	16	20	48	8	3
8,00	11	15	43	8	3
8,00	19	23	51	8	3
8,50	11	16	48	10	3
8,50	19	24	56	10	3
9,00	11	16	48	10	3
9,00	19	24	56	10	3
9,50	11	16	48	10	3
9,50	19	24	56	10	3
10,00	13	18	50	10	3
10,00	22	27	59	10	3

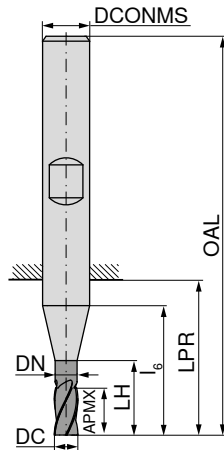
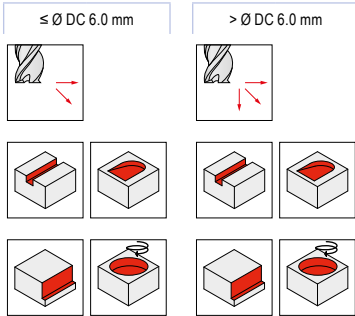
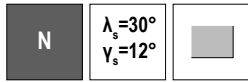
50 092 ...	54 014 ...	50 093 ...	54 042 ...
010	010		
015	015		
018	018	015 ¹⁾	015 ¹⁾
020	020		
023	023	020 ¹⁾	020
025	025		
028	028	025 ¹⁾	025
030	030		
033	033	030 ¹⁾	030
035	035		
038	038	035 ¹⁾	035
040	040		
043	043	040 ¹⁾	040
045	045		
048	048	045 ¹⁾	045
050	050		
053	053	050 ¹⁾	050
055	055		
057	057	055 ¹⁾	055
060	060		
065	065	060 ¹⁾	060
070	070		
075	075	065 ¹⁾	065
080	080		
085	085	070 ¹⁾	070
090	090		
095	095	075 ¹⁾	075
100	100		
		080 ¹⁾	080
		085 ¹⁾	085
		090 ¹⁾	090
		095 ¹⁾	095
		100 ¹⁾	100

P	●	●	●	●
M	○	●	○	●
K	●	●	●	●
N	○	○	○	○
S	○	○	○	○
H				
O	○	○	○	○

1) Shank tolerance -0,025 / -0,0323

End milling cutter HSS-E Co 8

▲ ≤ Ø DC 6 mm, 3 cutting edges to centre

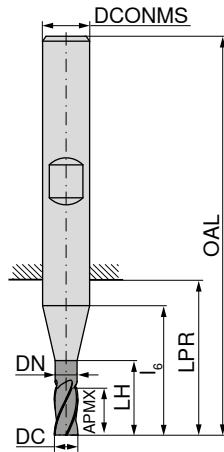
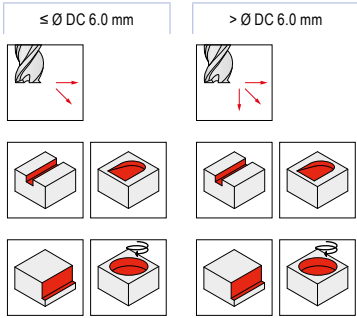
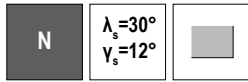


DC mm	DC Tol.	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP	54 021 ...	54 016 ...
1,8	h10	4		4	10	12	48	6	3	018	
2,0	e8	4		4	10	12	48	6	3	020	
2,5	e8	5		5	11	13	49	6	3	025	
3,0	e8	5		5	11	13	49	6	3	030	
3,0	e8	8		8	14	16	52	6	3		030
3,5	h10	6		6	12	14	50	6	3	035	
3,5	h10	10		10	16	18	54	6	3		035
4,0	e8	7		7	13	15	51	6	3	040	
4,0	e8	11		11	17	19	55	6	3		040
4,5	h10	7		7	13	15	51	6	3	045	
4,5	h10	11		11	17	19	55	6	3		045
5,0	e8	8		8	14	16	52	6	3	050	
5,0	e8	13		13	19	21	57	6	3		050
5,5	h10	8		8	14	16	52	6	3	055	
5,5	h10	13		13	19	21	57	6	3		055
6,0	e8	8	5,5	14	14	16	52	6	3	060	
6,0	e8	13	5,5	19	19	21	57	6	3		060
6,5	h10	10	6,0	16	18	20	60	10	3	065	
6,5	h10	16	6,0	22	24	26	66	10	3		065
7,0	e8	10	6,5	16	18	20	60	10	3	070	
7,0	e8	16	6,5	22	24	26	66	10	3		070
7,5	h10	10	7,0	16	18	20	60	10	3	075	
7,5	h10	16	7,0	22	24	26	66	10	3		075
8,0	e8	11	7,5	17	19	21	61	10	3	080	
8,0	e8	19	7,5	25	27	29	69	10	3		080
8,5	h10	11	8,0	18	19	21	61	10	3	085	
8,5	h10	19	8,0	26	27	29	69	10	3		085
9,0	h10	11	8,5	18	19	21	61	10	3	090	
9,0	h10	19	8,5	26	27	29	69	10	3		090
9,5	h10	11	9,0	18	19	21	61	10	3	095	
9,5	h10	19	9,0	26	27	29	69	10	3		095
10,0	e8	13	9,5	21	21	23	63	10	3	100	
10,0	e8	22	9,5	30	30	32	72	10	3		100
10,5	h10	13	10,0	21	23	25	70	12	3	105	
11,0	h10	13	10,5	21	23	25	70	12	3	110	
11,0	h10	22	10,5	30	32	34	79	12	3		110
11,5	h10	13	11,0	21	23	25	70	12	3	115	
11,5	h10	22	11,0	30	32	34	79	12	3		115
12,0	e8	16	11,5	26	26	28	73	12	3	120	
12,0	e8	26	11,5	36	36	38	83	12	3		120

P	●	●
M	●	●
K	●	●
N	○	○
S	○	○
H		
O	○	○

End milling cutter HSS-E Co 8

▲ ≤ Ø DC 6 mm, 3 cutting edges to centre

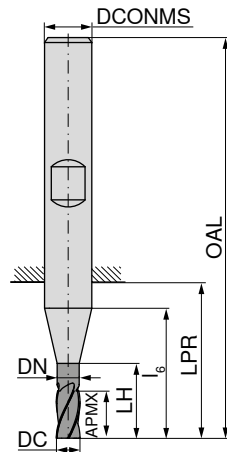
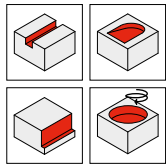


DC mm	DC Tol.	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
13,0	h10	16	11,5	26	26	28	73	12	3
13,0	h10	26	11,5	36	36	38	83	12	3
14,0	e8	16	11,5	26	26	28	73	12	3
14,0	e8	26	11,5	36	36	38	83	12	3
15,0	h10	16	11,5	26	26	28	73	12	3
15,0	h10	26	11,5	36	36	38	83	12	3
15,5	h10	32	15,0	42	42	44	92	16	3
16,0	e8	19	15,0	29	29	31	79	16	3
16,0	e8	32	15,0	42	42	44	92	16	3
17,0	h10	19	15,0	29	29	31	79	16	3
17,0	h10	32	15,0	42	42	44	92	16	3
18,0	e8	19	15,0	29	29	31	79	16	3
18,0	e8	32	15,0	42	42	44	92	16	3
19,0	h10	19	15,0	29	29	31	79	16	3
19,0	h10	32	15,0	42	42	44	92	16	3
19,5	h10	38	19,0	52	52	54	104	20	3
20,0	e8	22	19,0	36	36	38	88	20	3
20,0	e8	38	19,0	52	52	54	104	20	3
22,0	e8	38	19,0	52	52	54	104	20	3

	54 021 ...	54 016 ...
P	●	●
M	●	●
K	●	●
N	○	○
S	○	○
H		
O	○	○

→ v_c/f_z Page 33-35

End milling cutter HSS-E Co 8



Ti100 Pro



Ti100 Pro



Factory standard



DIN 844



DIN 844



DC mm	DC Tol.	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
4	k10	11		11	17	19	55	6	4
5	k10	13		13	19	21	57	6	4
6	e8	8	5,5	14	14	16	52	6	4
6	k10	13	5,5	19	19	21	57	6	4
8	e8	11	7,5	17	19	21	61	10	4
8	k10	19	7,5	25	27	29	69	10	4
10	e8	13	9,5	21	21	23	63	10	4
10	k10	22	9,5	30	30	32	72	10	4
12	e8	16	11,5	26	26	28	73	12	4
12	k10	26	11,5	36	36	38	83	12	4
14	e8	16	11,5	26	26	28	73	12	4
14	k10	26	11,5	36	36	38	83	12	4
15	k10	26	11,5	36	36	38	83	12	4
16	e8	19	15,0	29	29	31	79	16	4
16	k10	32	15,0	42	42	44	92	16	4
20	e8	22	19,0	36	36	38	88	20	4
20	k10	38	19,0	52	52	54	104	20	4

54 017 ...

50 124 ...

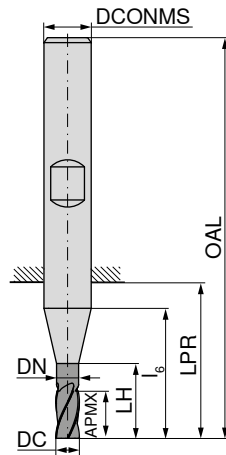
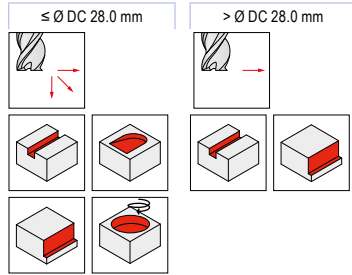
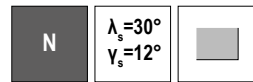
54 011 ...

P	○	○	○
M	●	●	●
K	○	○	○
N	●	●	●
S	●	●	●
H			
O	●	●	●

→ v_c/f_z Page 33-35

End milling cutter HSS-E Co 8

▲ > Ø 28,0 mm recessed centre



Ti100 Pro

Ti100 Pro



DIN 69844

DIN 69844

DIN 844

DIN 844

Factory standard



50 110 ...

54 018 ...

50 111 ...

54 019 ...

50 104 ...

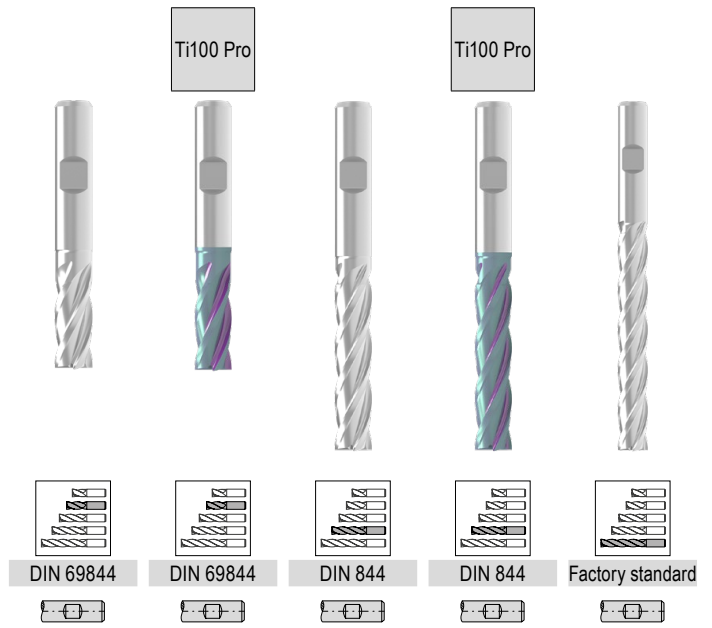
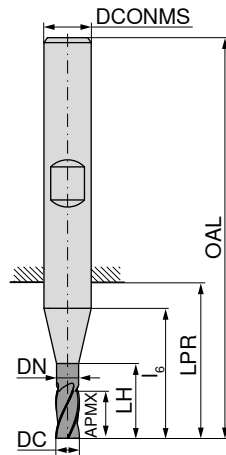
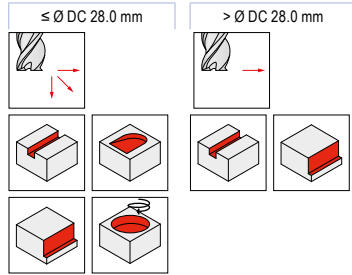
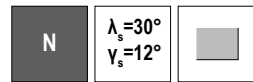
DC _{k10} mm	APMX mm	DN mm	LH mm	i ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
2,0	7		7	13	15	51	6	4
2,5	8		8	14	16	52	6	4
3,0	8		8	14	16	52	6	4
3,0	12		12	18	20	56	6	4
4,0	11		11	17	19	55	6	4
4,0	19		19	25	27	63	6	4
5,0	13		13	19	21	57	6	4
5,0	24		24	30	32	68	6	4
6,0	13	5,5	19	19	21	57	6	4
6,0	24	5,5	30	30	32	68	6	4
6,0	56	5,5	62	62	64	100	6	4
7,0	16	6,5	22	24	26	66	10	4
8,0	19	7,5	25	27	29	69	10	4
8,0	38	7,5	44	46	48	88	10	4
8,0	70	7,5	73	73	75	115	10	4
9,0	19	8,5	26	27	29	69	10	4
10,0	22	9,5	30	30	32	72	10	4
10,0	45	9,5	53	53	55	95	10	4
10,0	75	9,5	79	79	81	121	10	4
11,0	22	10,5	30	32	34	79	12	4
12,0	26	11,5	36	36	38	83	12	4
12,0	53	11,5	63	63	65	110	12	4
12,0	85		85	85	85	130	12	4
13,0	26	11,5	36	36	38	83	12	4
14,0	26	11,5	36	36	38	83	12	4
14,0	53	11,5	63	63	65	110	12	4
14,0	85		85	85	85	130	12	4
15,0	26	11,5	36	36	38	83	12	4
15,0	53	11,5	63	63	65	110	12	4
16,0	32	15,0	42	42	44	92	16	4
16,0	63	15,0	73	73	75	123	16	4
16,0	90	15,0	95	95	97	145	16	4
18,0	32	15,0	42	42	44	92	16	4
18,0	63	15,0	73	73	75	123	16	4
18,0	100	15,0	110	110	112	160	16	5
20,0	38	19,0	52	52	54	104	20	4
20,0	75	19,0	89	89	91	141	20	4
20,0	110	19,0	128	128	130	180	20	5

P	●	●	●	●	●
M	○	●	○	●	○
K	●	●	●	●	●
N	○	○	○	○	○
S	○	○	○	○	○
H					
O	○	○	○	○	○

→ v_c/f_z Page 33-35

End milling cutter HSS-E Co 8

▲ > Ø 28,0 mm recessed centre



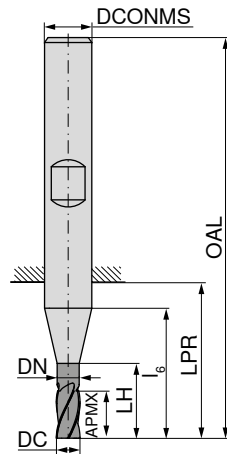
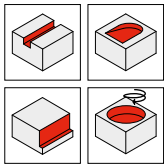
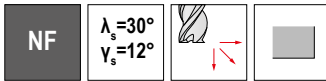
DC _{k10} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
22,0	38	19,0	52	52	54	104	20	5
22,0	75	19,0	89	89	91	141	20	5
22,0	110	19,0	128	128	130	180	20	5
25,0	45	24,0	63	63	65	121	25	5
25,0	90	24,0	108	108	110	166	25	5
25,0	125	24,0	142	142	144	200	25	6
28,0	45	24,0	63	63	65	121	25	5
28,0	90	24,0	108	108	110	166	25	5
28,0	140	24,0	147	147	149	205	25	6
30,0	45	24,0	63	63	65	121	25	5
30,0	90	24,0	108	108	110	166	25	5
32,0	53	31,0	70	70	73	133	32	5
32,0	53	31,0	70	70	73	133	32	6
32,0	106	31,0	123	123	126	186	32	6
32,0	160	31,0	167	167	170	230	32	6
40,0	63	38,0	80	80	85	155	40	6
40,0	125	38,0	142	142	147	217	40	6
40,0	180	31,0	197	197	200	260	32	8
50,0	150	48,0	172	172	172	252	50	8

50 110 ...	54 018 ...	50 111 ...	54 019 ...	50 104 ...
220	220			
		220	220	220
250	250			
		250	250	250
280	280			
		280	280	280
300	300			
		300	300	300
320	320			
		320	320	320
400	400			
		400	400	400
		500	500	

P	●	●	●	●	●
M	○	●	○	●	○
K	●	●	●	●	●
N	○	○	○	○	○
S	○	○	○	○	○
H					
O	○	○	○	○	○

→ v_c/f_z Page 33-35

Roughing-finishing milling cutter HSS-E Co 5

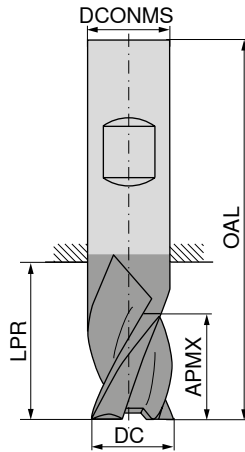
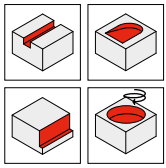
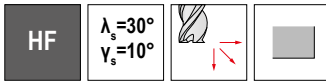


DC _{k12} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
6	13	5,5	19	19	21	57	6	4
6	24	5,5	30	30	32	68	6	4
7	16	6,5	22	24	26	66	10	4
8	19	7,5	25	27	29	69	10	4
8	38	7,5	44	46	48	88	10	4
9	19	8,5	26	27	29	69	10	4
10	22	9,5	30	30	32	72	10	4
10	45	9,5	53	53	55	95	10	4
11	22	10,5	30	32	32	79	12	4
11	45	10,5	53	55	57	102	12	4
12	26	11,5	36	36	38	83	12	4
12	53	11,5	63	63	65	110	12	4
13	26	11,5	36	36	38	83	12	4
14	26	11,5	36	36	38	83	12	4
16	32	15,0	42	42	44	92	16	4
16	63	15,0	73	73	75	123	16	4
18	32	15,0	42	42	44	92	16	4
20	38	19,0	52	52	54	104	20	4
20	75	19,0	89	89	91	141	20	4
22	38	19,0	52	52	54	104	20	4
22	75	19,0	89	89	91	141	20	4
25	45	24,0	63	63	65	121	25	4
25	90	24,0	108	108	110	166	25	4

	54 028 ...	54 029 ...
P	●	●
M	○	○
K	●	●
N	○	○
S	○	○
H		
O	○	○

→ v_c/f_z Page 33-35

Powdersteel roughing finishing cutter



Ti100 Pro



DIN 844



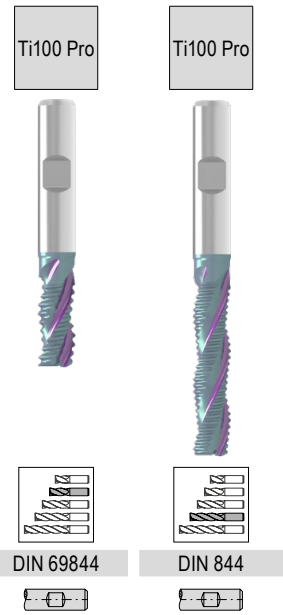
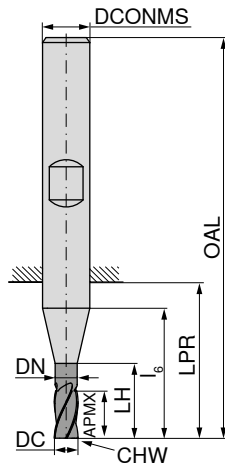
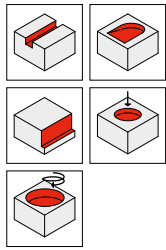
54 034 ...

DC _{k12} mm	APMX mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZFP	
6	13	21	57	6	4	060
8	19	29	69	10	4	080
10	22	32	72	10	4	100
12	26	38	83	12	4	120
16	32	44	92	16	4	160
20	38	54	104	20	4	200

P	●
M	○
K	●
N	○
S	○
H	○
O	○

→ v_c/f_z Page 33–35

Rough milling cutter HSS-E Co 8



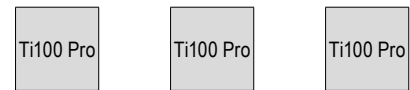
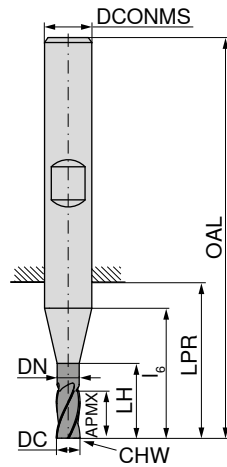
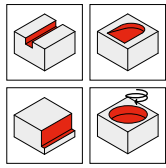
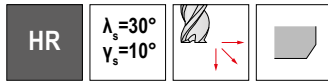
DC _{k12} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	CHW mm	ZEFP
6	13	5,5	19	19	21	57	6	0,5	3
6	24	5,5	30	30	32	68	6	0,5	3
8	19	7,5	25	27	29	69	10	0,7	3
8	38	7,5	44	46	48	88	10	0,7	3
10	22	9,5	30	30	32	72	10	0,7	3
10	45	9,5	53	53	55	95	10	0,7	3
12	26	11,5	36	36	38	83	12	0,7	3
12	53	11,5	63	63	65	110	12	0,7	3
14	26	11,5	36	36	38	83	12	0,9	3
14	53	11,5	63	63	65	110	12	0,9	3
16	32	15,0	42	42	44	92	16	0,9	3
16	63	15,0	73	73	75	123	16	0,9	3
18	32	15,0	42	42	44	92	16	0,9	3
18	63	15,0	73	73	75	123	16	0,9	3
20	38	19,0	52	52	54	104	20	0,9	3
20	75	19,0	89	89	91	141	20	0,9	3
25	45	24,0	63	63	65	121	25	0,9	3
25	90	24,0	108	108	110	166	25	0,9	3

54 026 ...	54 027 ...
060	060
080	080
100	100
120	120
140	140
160	160
180	180
200	200
250	250

P	●	●
M	○	○
K	●	●
N	○	○
S	○	○
H		
O	○	○

→ v_c/f_z Page 33-35

Powdersteel Fine rough milling cutter



Factory standard

DIN 844

Factory standard



DC _{k12} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	CHW mm	ZEFP
6	8	5,5	14	14	16	52	6	0,35	4
6	13	5,5	19	19	21	57	6	0,35	4
8	11	7,5	17	19	21	61	10	0,45	4
8	19	7,5	25	27	29	69	10	0,45	4
8	28	7,5	34	36	38	78	10	0,45	4
10	13	9,5	21	21	23	63	10	0,45	4
10	22	9,5	30	30	32	72	10	0,45	4
10	34	9,5	42	42	44	84	10	0,45	4
12	16	11,5	26	26	28	73	12	0,60	4
12	26	11,5	36	36	38	83	12	0,60	4
12	40	11,5	50	50	52	97	12	0,60	4
14	16	11,5	26	26	28	73	12	0,60	4
14	26	11,5	36	36	38	83	12	0,60	4
14	40	11,5	50	50	52	97	12	0,60	4
16	19	15,0	29	29	31	79	16	0,70	4
16	32	15,0	42	42	44	92	16	0,70	4
16	48	15,0	58	58	60	108	16	0,70	4
18	19	15,0	29	29	31	79	16	0,70	4
18	32	15,0	42	42	44	92	16	0,70	4
18	48	15,0	58	58	60	108	16	0,70	4
20	22	19,0	36	36	38	88	20	0,70	4
20	38	19,0	52	52	54	104	20	0,70	4
20	56	19,0	70	70	72	122	20	0,70	4
22	22	19,0	36	36	38	88	20	0,70	4
22	38	19,0	52	52	54	104	20	0,70	4
22	56	19,0	70	70	72	122	20	0,70	4
25	26	24,0	44	44	46	102	25	0,70	4
25	45	24,0	63	63	65	121	25	0,70	4
25	68	24,0	86	86	88	144	25	0,70	4
32	32	31,0	49	49	52	112	32	0,90	6
32	53	31,0	70	70	73	133	32	0,90	6

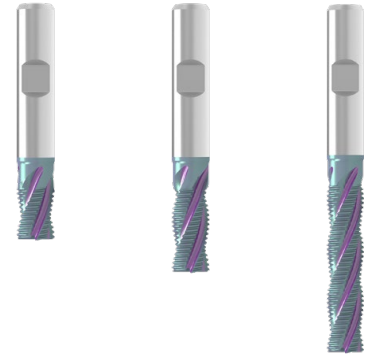
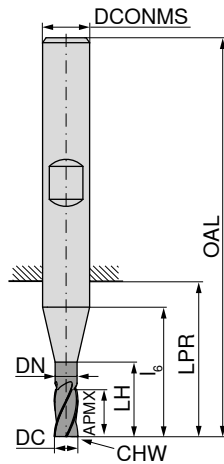
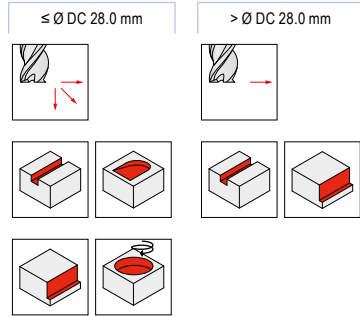
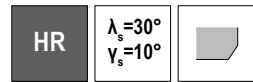
54 031 ...	54 032 ...	54 033 ...
060	060	
080	080	080
100	100	100
120	120	120
140	140	140
160	160	160
180	180	180
200	200	200
220	220	220
250	250	250
320	320	320

P	●	●	●
M	●	●	●
K	●	●	●
N	○	○	○
S	○	○	○
H			
O	○	○	○

→ v_c/f_z Page 33-35

Fine profile milling cutter HSS-E Co 8

▲ > Ø 28,0 mm recessed centre



Factory standard



DIN 69844



DIN 844

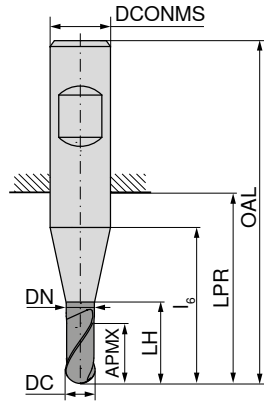
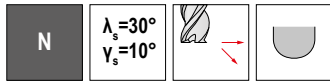


DC	APMX	DN	LH	l ₆	LPR	OAL	DCONMS	CHW	ZEPF	54 022 ...	54 023 ...	54 024 ...
4	11		11	17	19	55	6	0,35	3			
5	13		13	19	21	57	6	0,35	3			
6	8	5,5	14	14	16	52	6	0,35	4			
6	13	5,5	19	19	21	57	6	0,35	4	060		
6	24	5,5	30	30	32	68	6	0,35	4		060	
8	11	7,5	17	19	21	61	10	0,45	4	080		060
8	19	7,5	25	27	29	69	10	0,45	4		080	
8	38	7,5	44	46	48	88	10	0,45	4		080	080
10	13	9,5	21	21	23	63	10	0,45	4	100		
10	22	9,5	30	30	32	72	10	0,45	4		100	
10	45	9,5	53	53	55	95	10	0,45	4		100	100
12	16	11,5	26	26	28	73	12	0,60	4	120		
12	26	11,5	36	36	38	83	12	0,60	4		120	
12	53	11,5	63	63	65	110	12	0,60	4		120	120
14	16	11,5	26	26	28	73	12	0,60	4	140		
14	26	11,5	36	36	38	83	12	0,60	4		140	
14	53	11,5	63	63	65	110	12	0,60	4		140	140
16	19	15,0	29	29	31	79	16	0,70	4	160		
16	32	15,0	42	42	44	92	16	0,70	4		160	
16	63	15,0	73	73	75	123	16	0,70	4		160	160
18	19	15,0	29	29	31	79	16	0,70	4	180		
18	32	15,0	42	42	44	92	16	0,70	4		180	
18	63	15,0	73	73	75	123	16	0,70	4		180	180
20	22	19,0	36	36	38	88	20	0,70	4	200		
20	38	19,0	52	52	54	104	20	0,70	4		200	
20	75	19,0	89	89	91	141	20	0,70	4		200	200
22	38	19,0	52	52	54	114	20	0,70	4		220	
22	75	19,0	89	89	91	141	20	0,70	4		220	220
25	45	24,0	63	63	65	121	25	0,70	4		250	
25	90	24,0	108	108	110	166	25	0,70	4		250	250
28	45	24,0	63	63	65	121	25	0,90	5		280	
28	90	24,0	108	108	110	166	25	0,90	5		280	280
30	45	24,0	63	63	65	121	25	0,90	5		300	
30	90	24,0	108	108	110	166	25	0,90	5		300	300
32	53	31,0	70	70	73	133	32	0,90	6		320	
32	106	31,0	123	123	126	186	32	0,90	6		320	320

P	●	●	●
M	●	●	●
K	●	●	●
N	○	○	○
S	○	○	○
H			
O	○	○	○

→ v_c/f_z Page 33-35

Ball nosed end milling cutter HSS-E Co 8



Ti100 Pro



Factory standard

Factory standard

Factory standard



DC _{h10} mm	APMX mm	DN mm	LH mm	l ₆ mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP
2	4		4	10	12	48	6	2
3	5		5	11	13	49	6	2
3	8		8	18	20	56	6	2
4	7		7	13	15	51	6	2
4	11		11	25	27	63	6	2
5	8		8	14	16	52	6	2
5	13		13	30	32	68	6	2
6	8	5,50	14	14	16	52	6	2
6	13	5,50	30	30	32	68	6	2
7	10	6,50	16	18	20	60	10	2
7	16	6,35	36	38	40	80	10	2
8	11	7,50	17	19	21	61	10	2
8	19	7,35	44	46	48	88	10	2
9	11	8,50	18	19	21	61	10	2
9	19	8,35	45	46	48	88	10	2
10	13	9,50	21	21	23	63	10	2
10	22	9,35	53	53	55	95	10	2
11	13	10,50	21	23	25	70	12	2
11	22	10,50	53	55	57	102	12	2
12	16	11,50	26	26	28	73	12	2
12	26	11,50	63	63	65	110	12	2
13	16	11,50	26	26	28	73	12	2
14	16	11,50	26	26	28	73	12	2
14	26	11,50	63	63	65	110	12	2
15	16	11,50	26	26	28	73	12	2
15	26	11,50	63	63	65	110	12	2
16	19	15,50	29	29	31	79	16	2
16	32	15,00	73	73	75	123	16	2
18	19	15,50	29	29	31	79	16	2
18	32	15,00	73	73	75	123	16	2
20	22	19,00	36	36	38	88	20	2
22	22	19,00	36	36	38	88	20	2
24	26	23,00	42	44	46	102	25	2
24	45	23,00	106	108	110	166	25	2
25	26	24,00	44	44	46	102	25	2
25	45	24,00	108	108	110	166	25	2
26	26	24,00	44	44	46	102	25	2
28	26	24,00	44	44	46	102	25	2
30	26	24,00	44	44	46	102	25	2
30	45	24,00	108	108	110	166	25	2

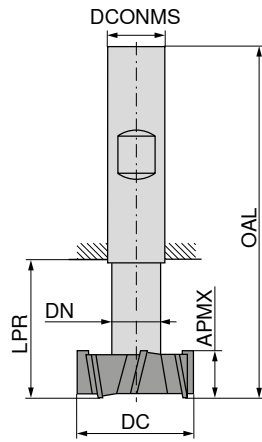
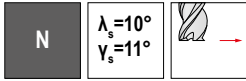
50 320 ...	54 041 ...	50 321 ...
020	020	
030	030	
		030
040	040	
		040
050	050	
		050
060	060	
		060
070	070	
		070
080	080	
		080
090	090	
		090
100	100	
		100
110		
		110
120	120	
		120
130	130	
		130
140	140	
		140
150	150	
		150
160	160	
		160
180	180	
		180
201	201	
220		
240	240	
		240
250		
		250
260		
280		
300		
		300

P	●	●	●
M	○	○	○
K	●	●	●
N	○	○	○
S	○	○	○
H			
O	○	○	○

13

T-slot milling cutter HSS-E Co 5, cross pitched

▲ For slots according to DIN 650



DIN 851 A



50 240 ...

DC _{d11} mm	APMX _{d11} mm	DN _{h12} mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP	
11,0	4	4	13,5	53,5	10	6	110
12,5	6	5	17,0	57,0	10	6	125
16,0	8	7	22,0	62,0	10	6	160
18,0	8	8	25,0	70,0	12	6	180
19,0	9	8	26,0	71,0	12	6	190 ¹⁾
21,0	9	10	29,0	74,0	12	6	210
22,0	10	10	30,0	75,0	12	6	220 ¹⁾
25,0	11	12	34,0	82,0	16	8	250
28,0	12	13	37,0	85,0	16	8	280 ¹⁾
32,0	14	15	42,0	90,0	16	8	320
36,0	16	17	47,0	103,0	25	8	360 ¹⁾
40,0	18	19	52,0	108,0	25	10	400
45,0	20	21	57,0	113,0	25	10	450 ¹⁾
50,0	22	25	64,0	124,0	32	10	500
60,0	28	30	79,0	139,0	32	10	600

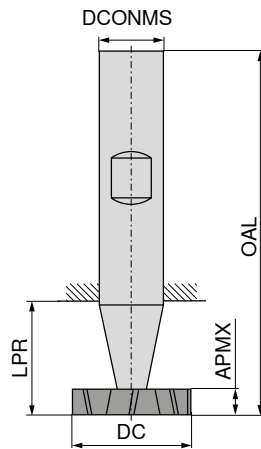
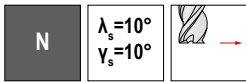
P	●
M	○
K	●
N	○
S	○
H	
O	○

1) Factory standard

Slot milling cutter HSS-E Co 5, cross-pitched

▲ For slots according to DIN 6888

▲ $CDX = a_{p\max}$



DIN 850



50 234 ...

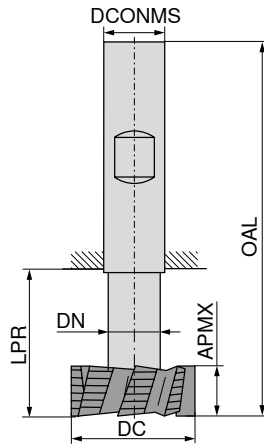
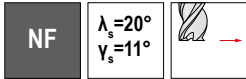
DC _{h12} mm	APMX _{e8} mm	LPR mm	OAL mm	DCONMS _{h6} mm	CDX mm	ZEFP	
10,5	2,0	14	50	6	3,25	6	100
10,5	2,5	14	50	6	3,15	6	101
10,5	3,0	14	50	6	3,15	6	102
13,5	2,0	16	56	10	4,45	6	130 ¹⁾
13,5	3,0	16	56	10	4,45	6	132
13,5	4,0	16	56	10	4,45	6	133
16,5	3,0	16	56	10	5,95	6	161
16,5	4,0	16	56	10	5,95	6	162
16,5	5,0	16	56	10	5,75	6	163
19,5	3,0	23	63	10	6,95	8	190 ¹⁾
19,5	4,0	23	63	10	6,95	8	191
19,5	5,0	23	63	10	6,75	8	192
22,5	4,0	23	63	10	8,25	8	220 ¹⁾
22,5	5,0	23	63	10	8,25	8	221
22,5	6,0	23	63	10	8,00	8	222
25,5	5,0	23	63	10	9,00	10	250 ¹⁾
25,5	6,0	23	63	10	9,00	10	251
28,5	6,0	23	63	10	10,00	10	281
28,5	8,0	23	63	10	10,00	10	283
32,5	6,0	26	71	12	12,00	10	321 ¹⁾
32,5	8,0	26	71	12	12,00	10	322
38,5	8,0	26	71	12	13,35	10	381 ¹⁾
45,5	10,0	26	71	12	16,85	12	450

P	●
M	○
K	●
N	○
S	○
H	
O	○

1) Factory standard

T-slot milling cutter HSS-E Co 5

▲ For slots according to DIN 650



DIN 851 A

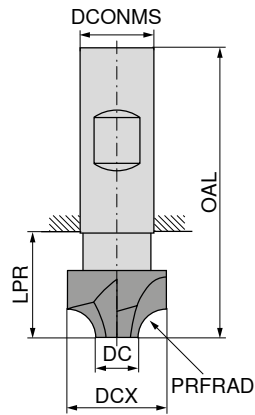
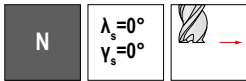


50 241 ...

DC _{d11} mm	APMX mm	DN _{h12} mm	LPR mm	OAL mm	DCONMS _{h6} mm	ZEFP	
21	9	10	29	74	12	6	210
22	10	10	30	75	12	6	220 ¹⁾
25	11	12	34	82	16	6	250
28	12	13	37	85	16	6	280 ¹⁾
32	14	15	42	90	16	6	320
36	16	17	47	103	25	6	360 ¹⁾
40	18	19	52	108	25	8	400
45	20	21	57	113	25	8	450 ¹⁾
P							●
M							○
K							●
N							○
S							○
H							
O							○

1) Factory standard

Quarter-round profile milling cutter HSS-E Co 5, concave



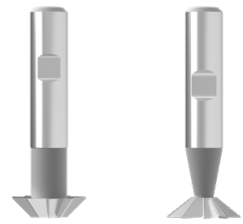
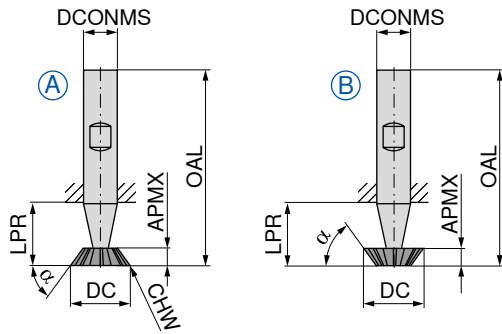
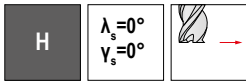
50 248 ...

PRFRAD _{H11} mm	DCX mm	DC mm	LPR mm	OAL mm	DCONMS _{H6} mm	ZEFP	
1,0	8	6	20	60	10	4	010
1,5	9	6	20	60	10	4	015
2,0	10	6	20	60	10	4	020
2,5	11	6	20	60	10	4	025
3,0	12	6	15	60	12	4	030
4,0	14	6	15	60	12	4	040
5,0	16	6	15	60	12	4	050
6,0	20	8	19	67	16	4	060
8,0	24	8	23	71	16	4	080
9,0	26	8	29	85	25	4	090
10,0	28	8	29	85	25	4	100
12,0	34	10	34	90	25	4	120
15,0	46	16	44	100	25	6	150
16,0	48	16	44	100	25	6	160

P	●
M	○
K	●
N	○
S	○
H	
O	○

→ v_c/f_z Page 36

Single angle milling cutters HSS-E Co 5



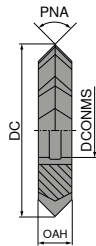
α°	DC mm	APMX mm	LPR mm	OAL mm	DCONMS _{h6} mm	CHW mm	ZEFP	Fig.	DIN 1833	
									50 246 ...	50 245 ...
45	16	4,0	15	60	12	0,3	10	A		
	16	4,0	15	60	12		10	B	016	016
	20	5,0	18	63	12	0,3	10	A		020
	20	5,0	18	63	12		10	B	020	
	25	6,3	22	67	12	0,3	10	A		025
	25	6,3	22	67	12		10	B	025	
60	16	6,3	15	60	12	0,3	10	A		
	16	6,3	15	60	12		10	B	116	
	20	8,0	18	63	12	0,3	10	A		120
	20	8,0	18	63	12		10	B	120	
	25	10,0	22	67	12	0,3	10	A		125
	25	10,0	22	67	12		10	B	125	
70	16	7,0	15	60	12	0,3	10	A		216 ¹⁾
	20	9,0	18	63	12	0,3	10	A		220 ¹⁾
	25	11,0	19	67	16	0,3	10	A		225 ¹⁾
P									●	●
M									○	○
K									●	●
N									○	○
S									○	○
H										
O									○	○

1) Factory standard

Double angle milling cutter HSS

▲ with keyway to DIN 138

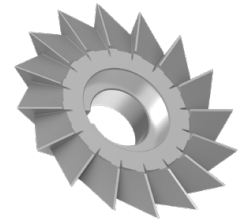
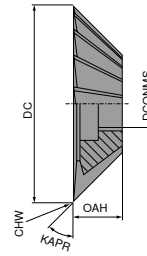
N	$\lambda_s=0^\circ$
	$\gamma_s=0^\circ$



Shell type single angle milling cutter HSS

▲ with keyway to DIN 138

N	$\lambda_s=0^\circ$
	$\gamma_s=2^\circ$



DIN 847

50 360 ...

PNA °	DC mm	OAH mm	DCONMS mm	ZEFP	
45	50	8	16	22	045
	63	10	22	24	145
	80	12	27	26	245
	100	18	32	28	345
60	50	10	16	18	060
	63	14	22	20	160
	80	18	27	22	260
	100	25	32	24	360
90	50	14	16	16	090
	63	20	22	18	190
	80	22	27	20	290
	100	32	32	24	390
120	50	14	16	16	120 ¹⁾
	63	20	22	16	121 ¹⁾

P	●
M	○
K	●
N	○
S	○
H	○
O	○

1) Factory standard

→ v_c/f_z Page 37

DIN 842 A

50 362 ...

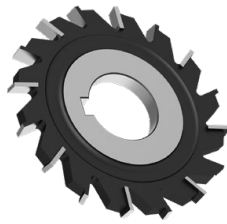
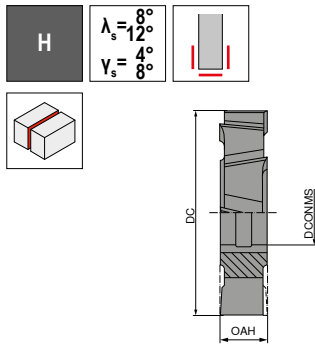
KAPR °	DC mm	OAH mm	DCONMS mm	CHW mm	ZEFP	
45	40	10	10	0,3	14	045
	50	13	13	0,3	16	145
	63	18	16	0,3	18	245
	80	22	22	0,3	20	345
	100	28	27	0,3	22	445
50	50	16	13	0,3	16	150
60	40	13	10	0,3	14	060
	50	16	13	0,3	16	160
	63	20	16	0,3	18	260
	80	25	22	0,3	20	360
	100	32	27	0,3	22	460
125	40	32	0,3	28	560	

P	●
M	○
K	●
N	○
S	○
H	○
O	○

→ v_c/f_z Page 37

Side and face milling cutter HSS-E Co 5

- ▲ Fine cross-pitched version
- ▲ with keyway to DIN 138



DIN 885 A

50 349 ...

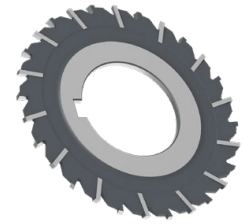
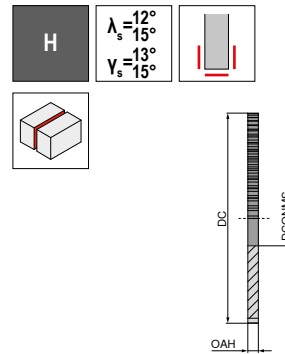
DC _{js16} mm	OAH _{k11} mm	DCONMS _{H7} mm	ZEFP	
50	4	16	16	100
50	5	16	16	102
50	6	16	16	104
50	8	16	16	106
50	10	16	16	108
63	4	22	18	200
63	5	22	18	202
63	6	22	18	204
63	8	22	18	206
63	10	22	18	208
63	12	22	18	210
63	14	22	18	212
80	5	27	20	300
80	6	27	20	302
80	8	27	20	304
80	10	27	18	306
80	12	27	18	308
80	14	27	18	310
80	16	27	18	312
80	18	27	18	314
80	20	27	18	316
100	6	32	22	400
100	8	32	22	402
100	10	32	20	404
100	12	32	20	406
100	14	32	20	408
100	16	32	20	410
100	18	32	20	412
100	20	32	20	414
100	25	32	20	418
125	8	32	24	500
125	10	32	22	502
125	12	32	22	504
125	14	32	22	506
125	16	32	22	508
125	18	32	22	510
125	20	32	22	512
125	25	32	22	516
160	10	40	26	600
160	12	40	26	602
160	14	40	26	604
160	16	40	26	606
160	18	40	26	608
160	20	40	26	610
160	25	40	26	614
160	32	40	26	618

P	●
M	○
K	●
N	●
S	○
H	
O	●

→ v_c/f_z Page 38

Narrow side and face milling cutter HSS-E Co 5

- ▲ Fine cross-pitched version
- ▲ with keyway to DIN 138



DIN 1834 A

50 340 ...

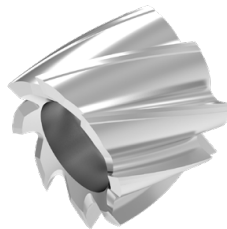
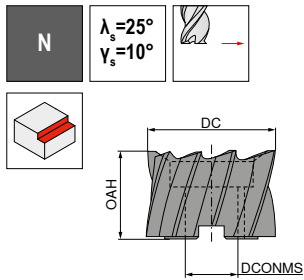
DC _{js16} mm	OAH _{k11} mm	DCONMS _{H7} mm	ZEFP	
63	1,6	22	28	200
63	2,0	22	28	202
63	2,5	22	28	204
63	3,0	22	28	206
80	1,6	27	32	300
80	2,0	27	32	302
80	2,5	27	32	304
80	3,0	27	32	306
80	4,0	27	32	310
100	1,6	32	36	400
100	2,0	32	36	402
100	2,5	32	36	404
100	3,0	32	36	406
100	4,0	32	36	410
100	5,0	32	36	414
125	1,6	32	40	500
125	2,0	32	40	502
125	2,5	32	40	504
125	3,0	32	40	506
125	4,0	32	40	510
125	5,0	32	40	514
125	6,0	32	40	516
160	2,0	40	48	600
160	2,5	40	48	602
160	3,0	40	48	604
160	4,0	40	48	606
160	5,0	40	48	608
160	6,0	40	48	610
160	8,0	40	36	612

P	●
M	
K	●
N	●
S	●
H	
O	●

→ v_c/f_z Page 38

Face milling cutters HSS-E Co 5

▲ with keyway to DIN 138



DIN 1880

50 250 ...

DC _{k10} mm	OAH mm	DCONMS mm	ZEFP	
40	32	16	8	040
50	36	22	8	050
63	40	27	8	063
80	45	27	10	080

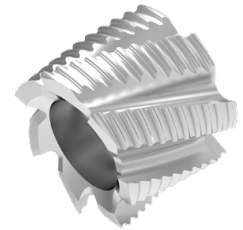
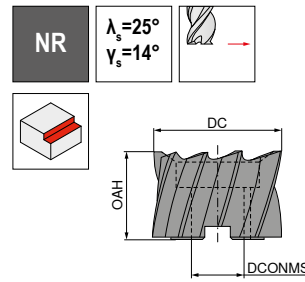
P	●
M	●
K	●
N	●
S	○
H	●
O	●

→ v_c/f_z Page 39+40

Roughing face milling cutters HSS-E Co 5

▲ with keyway to DIN 138

▲ Manufacturing tolerance lies on the plus range of the tolerance js14



DIN 1880

50 260 ...

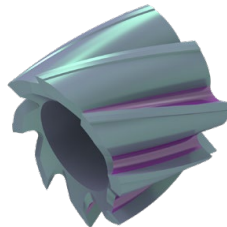
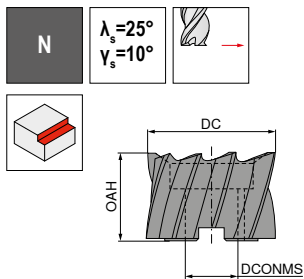
DC _{js14} mm	OAH mm	DCONMS mm	ZEFP	
40	32	16	7	040
50	36	22	8	050
63	40	27	8	063
80	45	27	10	080

P	●
M	●
K	●
N	●
S	○
H	●
O	●

→ v_c/f_z Page 39+40

Face milling cutters HSS-E Co 5

▲ with keyway to DIN 138



Ti100 Pro

DIN 1880

54 035 ...

DC _{k10} mm	OAH mm	DCONMS mm	ZEFP	
40	32	16	8	040
50	36	22	8	050
63	40	27	8	063
80	45	27	10	080

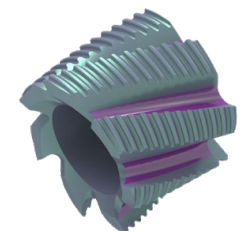
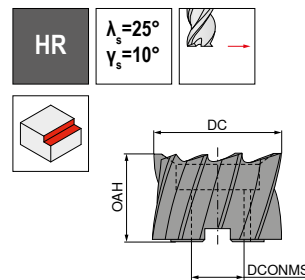
P	●
M	●
K	●
N	●
S	○
H	●
O	●

→ v_c/f_z Page 39+40

Roughing-finishing face milling cutters HSS-E Co 8

▲ with keyway to DIN 138

▲ Manufacturing tolerance lies on the plus range of the tolerance js14



Ti100 Pro

DIN 1880

54 037 ...

DC _{js14} mm	OAH mm	DCONMS mm	ZEFP	
40	32	16	7	040
50	36	22	8	050
63	40	27	8	063
80	45	27	10	080

P	●
M	●
K	●
N	●
S	○
H	●
O	●

→ v_c/f_z Page 39+40


Material examples for cutting data tables

	Material sub-group	Index	Composition / Structure / Heat treatment	Tensile strength N/mm ² / HB / HRC	Material number	Material designation	Material number	Material designation
P	Unalloyed steel	P.1.1	< 0,15 % C Annealed	420 N/mm ² / 125 HB	1.0401	C15	1.1141	Ck15
		P.1.2	< 0,45 % C Annealed	640 N/mm ² / 190 HB	1.1191	C45E	1.0718	9SMnPb28
		P.1.3	< 0,45 % C Tempered	840 N/mm ² / 250 HB	1.1191	C45E	1.0535	C55
		P.1.4	< 0,75 % C Annealed	910 N/mm ² / 270 HB	1.1223	C60R	1.0535	C55
		P.1.5	< 0,75 % C Tempered	1010 N/mm ² / 300 HB	1.1223	C60R	1.0727	45S20
	Low-alloy steel	P.2.1	Annealed	610 N/mm ² / 180 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.2	Tempered	930 N/mm ² / 275 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.3	Tempered	1010 N/mm ² / 300 HB	1.7225	42CrMo4	1.3505	100Cr6
		P.2.4	Tempered	1200 N/mm ² / 375 HB	1.7225	42CrMo4	1.3505	100Cr6
	High-alloy steel and high-alloy tool steel	P.3.1	Annealed	680 N/mm ² / 200 HB	1.4021	X20Cr13	1.4034	X46Cr13
		P.3.2	Hardened and tempered	1100 N/mm ² / 300 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
		P.3.3	Hardened and tempered	1300 N/mm ² / 400 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
	Stainless steel	P.4.1	Ferritic / martensitic Annealed	680 N/mm ² / 200 HB	1.4016	X6Cr17	1.2316	X36CrMo16
		P.4.2	Martensitic Tempered	1010 N/mm ² / 300 HB	1.4112	X90CrMoV18	1.2316	X36CrMo16
M	Stainless steel	M.1.1	Austenitic / austenitic-ferritic Quenched	610 N/mm ² / 180 HB	1.4301	X5CrNi18-10	1.4571	X6CrNiMoTi17-12-2
		M.2.1	Austenitic Tempered	300 HB	1.4841	X15CrNiSi25-21	1.4539	X1NiCrMoCu25-20-5
		M.3.1	Austenitic / ferritic (Duplex)	780 N/mm ² / 230 HB	1.4462	X2CrNiMoN22-5-3	1.4501	X2CrNiMoCuWN25-7-4
K	Grey cast iron	K.1.1	Pearlitic / ferritic	350 N/mm ² / 180 HB	0.6010	GG-10	0.6025	GG-25
		K.1.2	Pearlitic (martensitic)	500 N/mm ² / 260 HB	0.6030	GG-30	0.6045	GG-45
	Spherulitic graphite cast iron	K.2.1	Ferritic	540 N/mm ² / 160 HB	0.7040	GGG-40	0.7060	GGG-60
		K.2.2	Pearlitic	845 N/mm ² / 250 HB	0.7070	GGG-70	0.7080	GGG-80
	Malleable iron	K.3.1	Ferritic	440 N/mm ² / 130 HB	0.8035	GTW-35-04	0.8045	GTW-45
		K.3.2	Pearlitic	780 N/mm ² / 230 HB	0.8165	GTS-65-02	0.8170	GTS-70-02
N	Aluminium wrought alloy	N.1.1	Non-hardenable	60 HB	3.0255	Al99,5	3.3315	AlMg1
		N.1.2	Hardenable Age-hardened	340 N/mm ² / 100 HB	3.1355	AlCuMg2	3.2315	AlMgSi1
	Cast aluminium alloy	N.2.1	≤ 12 % Si, non-hardenable	250 N/mm ² / 75 HB	3.2581	G-AlSi12	3.2163	G-AlSi9Cu3
		N.2.2	≤ 12 % Si, hardenable Age-hardened	300 N/mm ² / 90 HB	3.2134	G-AlSi5Cu1Mg	3.2373	G-AlSi9Mg
		N.2.3	> 12 % Si, non-hardenable	440 N/mm ² / 130 HB		G-AlSi17Cu4Mg		G-AlSi18CuNiMg
	Copper and copper alloys (bronze/brass)	N.3.1	Free-machining alloys, PB > 1 %	375 N/mm ² / 110 HB	2.0380	CuZn39Pb2 (Ms58)	2.0410	CuZn44Pb2
		N.3.2	CuZn, CuSnZn	300 N/mm ² / 90 HB	2.0331	CuZn15	2.4070	CuZn28Sn1As
		N.3.3	CuSn, lead-free copper and electrolytic copper	340 N/mm ² / 100 HB	2.0060	E-Cu57	2.0590	CuZn40Fe
Magnesium alloys	N.4.1	Magnesium and magnesium alloys	70 HB	3.5612	MgAl6Zn	3.5312	MgAl3Zn	
S	Heat-resistant alloys	S.1.1	Fe - basis Annealed	680 N/mm ² / 200 HB	1.4864	X12NiCrSi 36-16	1.4865	G-X40NiCrSi38-18
		S.1.2	Fe - basis Age-hardened	950 N/mm ² / 280 HB	1.4980	X6NiCrTiMoVB25-15-2	1.4876	X10NiCrAlTi32-20
		S.2.1	Ni or Co basis Annealed	840 N/mm ² / 250 HB	2.4631	NiCr20TiAl (Nimonic80A)	3.4856	NiCr22Mo9Nb
		S.2.2	Ni or Co basis Age-hardened	1180 N/mm ² / 350 HB	2.4668	NiCr19Nb5Mo3 (Inconel 718)	2.4955	NiFe25Cr20NbTi
		S.2.3	Ni or Co basis Cast	1080 N/mm ² / 320 HB	2.4765	CoCr20W15Ni	1.3401	G-X120Mn12
	Titanium alloys	S.3.1	Pure titanium	400 N/mm ²	3.7025	Ti99,8	3.7034	Ti99,7
		S.3.2	Alpha + beta alloys Age-hardened	1050 N/mm ² / 320 HB	3.7165	TiAl6V4	Ti-6246	Ti-6Al-2Sn-4Zr-6Mo
S.3.3	Beta alloys	1400 N/mm ² / 410 HB	Ti555.3	Ti-5Al-5V-5Mo-3Cr	R56410	Ti-10V-2Fe-3Al		
H	Hardened steel	H.1.1	Hardened and tempered	46–55 HRC				
		H.1.2	Hardened and tempered	56–60 HRC				
		H.1.3	Hardened and tempered	61–65 HRC				
		H.1.4	Hardened and tempered	66–70 HRC				
	Chilled iron	H.2.1	Cast	400 HB				
Hardened cast iron	H.3.1	Hardened and tempered	55 HRC					
O	Non-metal materials	O.1.1	Plastics, duroplastic	≤ 150 N/mm ²				
		O.1.2	Plastics, thermoplastic	≤ 100 N/mm ²				
		O.2.1	Aramid fibre-reinforced	≤ 1000 N/mm ²				
		O.2.2	Glass/carbon-fibre reinforced	≤ 1000 N/mm ²				
		O.3.1	Graphite					

* Tensile strength

Cutting speeds – slot, end milling and ball-nosed end milling cutters

Index	Kf f _z	uncoated	Ti100 Pro	Ti100 Pro	● 1st choice ○ suitable		
				Powder steel	Emulsion	Compressed air	MMS
		v _c (m/min)					
P.1.1	1,2	20	45	50	●		
P.1.2	1,2	20	45	50	●		
P.1.3	1,2	20	45	50	●		
P.1.4	1,0	15	30	35	●		
P.1.5	1,0	15	30	35	●		
P.2.1	1,2	20	40	45	●		
P.2.2	1,0	15	40	45	●		
P.2.3	0,8	15	30	35	●		
P.2.4	0,8	15	30	35	●		
P.3.1	1,0	15	30	35	●		
P.3.2	0,8	12	25	30	●		
P.3.3	0,8	10	20	25	●		
P.4.1	1,0	10	20	25	●		
P.4.2	1,0	10	20	25	●		
M.1.1	1,0	10	20	25	●		
M.2.1	0,9	7	15	20	●		
M.3.1	1,0	5	10	15	●		
K.1.1	1,0	18	35	40	●		
K.1.2	1,0	18	25	30	●		
K.2.1	1,0	15	30	35	●		
K.2.2	1,0	15	30	35	●		
K.3.1	1,0	15	35	40	●		
K.3.2	0,8	12	25	30	●		
N.1.1	1,9	150	240	260	●		
N.1.2	1,9	100	130	150	●		
N.2.1	1,8		100	140	●		
N.2.2	1,7		60	80	●		
N.2.3							
N.3.1	1,1		100	130	●		
N.3.2	1,2	30	60	80	●		
N.3.3	1,2	30	60	80	●		
N.4.1	1,8	90	140	160		●	
S.1.1							
S.1.2							
S.2.1							
S.2.2							
S.2.3							
S.3.1	1,0	10	15	25	●		
S.3.2	1,1	10	15	25	●		
S.3.3							
H.1.1							
H.1.2							
H.1.3							
H.1.4							
H.2.1							
H.3.1							
O.1.1	2,0	30	50	70	●		
O.1.2	2,0	20	25	40	●		
O.2.1							
O.2.2							
O.3.1	1,0		30	40	○		

 For full slot milling reduce the cutting speed (v_c), indicated in this table by approx. 15 – 20%!
Kf f_z = Correction factor for feed per tooth

Feed per tooth for HSS end mills

Approximate values (in mm) for the feed per tooth (f_z)

Ø DC mm	Finish milling						Rough machining					
	Peripheral milling						Full slot milling					
	f_z in mm		f_z in mm		f_z in mm		f_z in mm		f_z in mm		f_z in mm	
	uncoated	coated	uncoated	coated	uncoated	coated	uncoated	coated	uncoated	coated	uncoated	coated
2	0,008	0,009	0,008	0,009	0,008	0,009						
3	0,011	0,012	0,009	0,010	0,010	0,012						
4	0,017	0,018	0,013	0,014	0,014	0,015	0,015	0,016	0,013	0,014	0,011	0,012
5	0,024	0,026	0,014	0,015	0,018	0,020	0,019	0,021	0,016	0,018	0,014	0,016
6	0,032	0,035	0,015	0,017	0,022	0,024	0,024	0,027	0,020	0,022	0,018	0,019
8	0,047	0,051	0,020	0,022	0,029	0,032	0,032	0,036	0,027	0,030	0,024	0,026
10	0,065	0,072	0,026	0,028	0,037	0,041	0,042	0,047	0,035	0,039	0,031	0,034
12	0,084	0,091	0,031	0,034	0,044	0,049	0,051	0,057	0,043	0,047	0,037	0,041
14	0,100	0,106	0,037	0,041	0,054	0,059	0,063	0,069	0,053	0,058	0,045	0,050
16	0,111	0,121	0,042	0,046	0,061	0,067	0,072	0,079	0,060	0,066	0,052	0,057
18	0,126	0,136	0,048	0,053	0,070	0,077	0,084	0,093	0,071	0,078	0,061	0,067
20	0,141	0,151	0,052	0,057	0,076	0,083	0,092	0,101	0,077	0,084	0,066	0,073
22	0,160	0,166	0,059	0,065	0,085	0,094	0,104	0,114	0,087	0,096	0,075	0,082
25	0,170	0,188	0,065	0,072	0,095	0,104	0,117	0,129	0,098	0,108	0,084	0,093
28	0,196	0,210	0,075	0,083	0,109	0,120	0,136	0,150	0,114	0,125	0,098	0,108
32	0,212	0,240	0,086	0,094	0,124	0,137	0,157	0,173	0,131	0,145	0,113	0,125
36	0,224	0,240	0,099	0,109	0,144	0,159	0,170	0,194	0,142	0,162	0,126	0,140
40	0,240	0,240	0,108	0,119	0,157	0,173	0,184	0,202	0,154	0,169	0,132	0,146
45	0,240	0,240	0,108	0,119	0,157	0,173	0,200	0,220	0,170	0,180	0,140	0,160
50	0,240	0,240	0,108	0,119	0,157	0,173	0,200	0,220	0,170	0,180	0,140	0,160

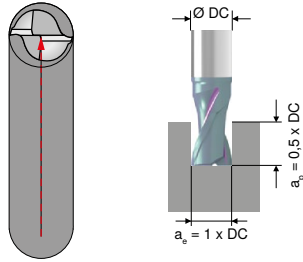
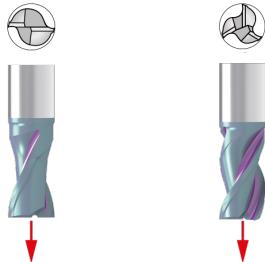
Attention: In the case of uncoated milling cutters climb milling is preferred to conventional milling. When using coated milling cutters climb milling is necessary in order to achieve optimum results.

Feed rate correction: Please multiply the f_z value in the table above with the corresponding **correction factor Kf f_z** from the table on → **page 33**.

In general the following is valid:
 f_z (milling) = $f_z \times Kf f_z$
 f_z (drilling) = f_z (milling) ÷ no. of teeth

Feed per tooth when milling parallel key slots with HSS slot drills

Approximate values (in mm) for the feed per tooth (f_z)

Ø DC mm	Full slot milling (in one cut)		Profile slot milling (internal profile milling)				Circular ramping			
			Roughing cut		Finishing cut					
	f_z in mm		f_z in mm				f_z in mm			
	uncoated	coated	uncoated	coated	uncoated	coated	uncoated	coated	uncoated	coated
2	0,005	0,006	0,005	0,006	0,008	0,009	0,003	0,003	0,002	0,002
3	0,009	0,010	0,009	0,010	0,015	0,016	0,004	0,005	0,003	0,003
4	0,012	0,013	0,012	0,013	0,022	0,024	0,006	0,007	0,004	0,004
5	0,016	0,017	0,016	0,017	0,030	0,033	0,008	0,009	0,005	0,006
6	0,020	0,022	0,020	0,022	0,039	0,043	0,010	0,011	0,007	0,007
8	0,026	0,029	0,026	0,029	0,055	0,061	0,013	0,014	0,009	0,010
10	0,034	0,037	0,034	0,037	0,075	0,082	0,017	0,019	0,011	0,012
12	0,040	0,044	0,040	0,044	0,093	0,101	0,020	0,022	0,013	0,015
14	0,049	0,054	0,049	0,054	0,117	0,118	0,024	0,027	0,016	0,018
16	0,056	0,062	0,056	0,062	0,135	0,135	0,028	0,031	0,019	0,021
18	0,065	0,072	0,065	0,072	0,151	0,151	0,033	0,036	0,022	0,024
20	0,071	0,078	0,071	0,078	0,167	0,167	0,035	0,039	0,024	0,026
22	0,080	0,088	0,080	0,088	0,184	0,184	0,040	0,044	0,027	0,029
25	0,089	0,098	0,089	0,098	0,208	0,208	0,044	0,049	0,030	0,033
28	0,103	0,113	0,103	0,113	0,233	0,233	0,051	0,056	0,034	0,037
32	0,118	0,130	0,118	0,130	0,260	0,260	0,060	0,065	0,040	0,043
36	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
40	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
45	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043
50	0,130	0,143	0,130	0,143	0,260	0,260	0,060	0,065	0,040	0,043

Attention:
In the case of uncoated milling cutters climb milling is preferred to conventional milling. When using coated milling cutters climb milling is necessary in order to achieve optimum results.

Feed rate correction:
Please multiply the f_z value in the table above with the corresponding **correction factor Kf f_z** from the table on → **page 33**.

In general the following is valid:
 f_z (milling) = $f_z \times Kf f_z$
 f_z (drilling) = f_z (milling) ÷ no. of teeth

Cutting data standard values – Form cutters

Index	v _c (m/min)	50 241 ...			50 240 ...					v _c (m/min)	50 234 ...				50 248 ...				● 1st choice ○ suitable		
		Ø DC (mm) =			Ø DC (mm) =						Ø DC (mm) =				Ø DCX (mm) =				Emulsion	Compressed air	MMS
		21-25	28-36	40-45	11-16	18-22	25-32	36-45	50-60		10-17	19-26	28-33	33-46	8-11	12-24	26-34	46-48			
		f (mm)			f (mm)						f (mm)				f (mm)						
P.1.1	28	0,07	0,1	0,12	0,015	0,03	0,03	0,03	0,04	28	0,02	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
P.1.2	28	0,07	0,1	0,12	0,015	0,03	0,03	0,03	0,04	28	0,02	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
P.1.3	28	0,07	0,1	0,12	0,015	0,03	0,03	0,03	0,04	28	0,02	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
P.1.4	22	0,06	0,08	0,1	0,015	0,03	0,03	0,03	0,04	22	0,02	0,03	0,035	0,045	0,025	0,055	0,08	0,1	●		
P.1.5	22	0,06	0,08	0,1	0,015	0,03	0,03	0,03	0,04	22	0,02	0,03	0,035	0,045	0,025	0,055	0,08	0,1	●		
P.2.1	22	0,06	0,08	0,1	0,015	0,03	0,03	0,03	0,04	22	0,02	0,03	0,035	0,045	0,025	0,055	0,08	0,1	●		
P.2.2	28	0,07	0,1	0,12	0,015	0,03	0,03	0,03	0,04	28	0,02	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
P.2.3	20	0,06	0,08	0,1	0,015	0,03	0,03	0,03	0,04	20	0,02	0,03	0,035	0,045	0,025	0,055	0,08	0,1	●		
P.2.4	20	0,06	0,08	0,1	0,015	0,03	0,03	0,03	0,04	20	0,02	0,03	0,035	0,045	0,025	0,055	0,08	0,1	●		
P.3.1																					
P.3.2																					
P.3.3																					
P.4.1	10	0,06	0,08	0,1	0,01	0,025	0,025	0,025	0,03	10	0,02	0,025	0,03	0,04	0,02	0,045	0,08	0,09	●		
P.4.2	10	0,06	0,08	0,1	0,01	0,025	0,025	0,025	0,03	10	0,02	0,025	0,03	0,04	0,02	0,045	0,08	0,09	●		
M.1.1	10	0,06	0,08	0,1	0,01	0,025	0,025	0,025	0,03	10	0,02	0,025	0,03	0,04	0,02	0,045	0,08	0,09	●		
M.2.1																					
M.3.1																					
K.1.1	28	0,07	0,1	0,12	0,015	0,03	0,025	0,04	0,035	24	0,025	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
K.1.2																					
K.2.1	22	0,07	0,1	0,12	0,015	0,03	0,025	0,04	0,035	22	0,025	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
K.2.2	20	0,07	0,1	0,12	0,015	0,03	0,025	0,04	0,035	20	0,025	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
K.3.1	15	0,07	0,1	0,12	0,015	0,03	0,025	0,04	0,035	15	0,025	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
K.3.2	15	0,07	0,1	0,12	0,015	0,03	0,025	0,04	0,035	15	0,025	0,03	0,04	0,05	0,03	0,06	0,1	0,12	●		
N.1.1	100	0,1	0,12	0,15	0,02	0,045	0,045	0,045	0,055	90	0,03	0,04	0,06	0,07	0,035	0,07	0,14	0,15	●		
N.1.2	100	0,1	0,12	0,15	0,02	0,045	0,045	0,045	0,055	90	0,03	0,04	0,06	0,07	0,035	0,07	0,14	0,15	●		
N.2.1	80	0,09	0,11	0,13	0,015	0,04	0,035	0,04	0,045	80	0,03	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.2.2	60	0,09	0,11	0,13	0,015	0,04	0,035	0,04	0,045	60	0,03	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.2.3																					
N.3.1	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03	0,035	25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.3.2	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03		25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.3.3	25	0,08	0,1	0,12	0,015	0,04	0,035	0,03		25	0,02	0,035	0,045	0,055	0,03	0,06	0,12	0,12	●		
N.4.1	70	0,1	0,12	0,15	0,018	0,04	0,03	0,035	0,045	70	0,03	0,035	0,05	0,06	0,025	0,06	0,1	0,12	●		
S.1.1																					
S.1.2																					
S.2.1																					
S.2.2																					
S.2.3																					
S.3.1	20	0,06	0,08	0,1	0,012	0,025	0,025	0,025	0,035	20	0,015	0,025	0,035	0,045	0,02	0,05	0,07	0,09	●		
S.3.2																					
S.3.3																					
H.1.1																					
H.1.2																					
H.1.3																					
H.1.4																					
H.2.1																					
H.3.1																					
O.1.1	65	0,12	0,15	0,18		0,06	0,055	0,055	0,07	65	0,04	0,05	0,07	0,09	0,045	0,1	0,18	0,18	●		
O.1.2	80	0,12	0,15	0,18		0,06	0,055	0,055	0,07	80	0,04	0,05	0,07	0,09	0,045	0,1	0,18	0,18	●		
O.2.1																					
O.2.2																					
O.3.1																					



The cutting data depends largely on the external conditions, e.g. stability of the tools and tool clamping, material and machine type. The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Cutting data standard values – Form cutters


Index	v _c (m/min)	50 245 ... / 50 246 ...			v _c (m/min)	50 360 ...				50 362 ...				● 1st choice ○ suitable		
		Ø DC (mm) =				Ø DC (mm) =				Ø DC (mm) =				Emulsion	Compressed air	MMS
		16	20	25		50	63	80	100	40-50	63	80	100			
		a _e =3,2	a _e =4	a _e =5		a _e =5	a _e =6,3	a _e =8	a _e =10	f (mm)						
P.1.1	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.2	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.3	28	0,01	0,015	0,018	22	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.1.4	22	0,01	0,015	0,018	20	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.1.5	22	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.1	22	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.2	28	0,01	0,015	0,018	22	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.2.3	20	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.2.4	20	0,01	0,015	0,018	20	0,01	0,01	0,015	0,02	0,005	0,008	0,01	0,012	●		
P.3.1																
P.3.2																
P.3.3																
P.4.1	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
P.4.2	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
M.1.1	10	0,007	0,01	0,012	10	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
M.2.1																
M.3.1																
K.1.1	24	0,01	0,012	0,015	19	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.1.2					12	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.2.1	22	0,01	0,012	0,015	15	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.2.2	20	0,01	0,012	0,015	12	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.3.1	15	0,01	0,012	0,015	16	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
K.3.2	15	0,01	0,012	0,015	13	0,008	0,01	0,012	0,018	0,005	0,008	0,01	0,012	●		
N.1.1	90	0,01	0,015	0,02										●		
N.1.2	90	0,01	0,015	0,02	70	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.1	80	0,01	0,015	0,02	60	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.2	60	0,01	0,015	0,02	60	0,012	0,015	0,02	0,024	0,008	0,012	0,014	0,018	●		
N.2.3																
N.3.1	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.3.2	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.3.3	25	0,01	0,015	0,02	20	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,012	●		
N.4.1	70	0,01	0,015	0,0175	45	0,01	0,012	0,015	0,018	0,005	0,008	0,01	0,01	●		
S.1.1																
S.1.2																
S.2.1																
S.2.2																
S.2.3																
S.3.1	20	0,008	0,01	0,015	20	0,008	0,01	0,012	0,016	0,005	0,007	0,009	0,012	●		
S.3.2																
S.3.3																
H.1.1																
H.1.2																
H.1.3																
H.1.4																
H.2.1																
H.3.1																
O.1.1	65	0,018	0,02	0,025	60	0,015	0,02	0,025	0,03	0,008	0,012	0,018	0,022	●		
O.1.2	80	0,018	0,02	0,025	65	0,015	0,02	0,025	0,03	0,008	0,012	0,018	0,022	●		
O.2.1																
O.2.2																
O.3.1																



The cutting data depends largely on the external conditions, e.g. stability of the tools and tool clamping, material and machine type. The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Cutting data - side and face cutters

Index	v _c (m/min)	50 340 ... / 50 349 ...						● 1st choice ○ suitable		
		Ø DC (mm) =						Emulsion	Compressed air	MMS
		50	63	80	100	125	160			
f (mm)										
P.1.1	30	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060	●		
P.1.2	20	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060	●		
P.1.3	20	0,025-0,035	0,030-0,040	0,035-0,045	0,040-0,050	0,047-0,060	0,050-0,065	●		
P.1.4	15	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.1.5	15	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.2.1	20	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.2.2	20	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.2.3	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
P.2.4	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
P.3.1	15	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.3.2	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
P.3.3	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
P.4.1	10	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
P.4.2	10	0,020-0,030	0,025-0,035	0,030-0,040	0,035-0,045	0,040-0,050	0,045-0,100	●		
M.1.1	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
M.2.1	10	0,015-0,020	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	●		
M.3.1	8	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.1.1	20	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.1.2	18	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.2.1	18	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.2.2	15	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.3.1	18	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
K.3.2	18	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
N.1.1	150	0,030-0,037	0,037-0,045	0,045-0,050	0,050-0,060	0,060-0,067	0,067-0,075	●		
N.1.2	100	0,030-0,037	0,037-0,045	0,045-0,050	0,050-0,060	0,060-0,067	0,067-0,075	●		
N.2.1	80	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060	●		
N.2.2	40	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060	●		
N.2.3										
N.3.1	80	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
N.3.2	30	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060	●		
N.3.3	30	0,025-0,035	0,030-0,040	0,035-0,045	0,040-0,050	0,047-0,060	0,050-0,065	●		
N.4.1	90	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,047-0,055	0,050-0,060		●	
S.1.1										
S.1.2										
S.2.1										
S.2.2										
S.2.3										
S.3.1	10	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
S.3.2	10	0,020-0,025	0,025-0,030	0,030-0,035	0,035-0,040	0,040-0,045	0,045-0,050	●		
S.3.3										
H.1.1										
H.1.2										
H.1.3										
H.1.4										
H.2.1										
H.3.1										
O.1.1	30	0,040-0,050	0,050-0,060	0,060-0,070	0,070-0,080	0,080-0,090	0,090-0,100	●		
O.1.2	20	0,040-0,050	0,050-0,060	0,060-0,070	0,070-0,080	0,080-0,090	0,090-0,100	●		
O.2.1										
O.2.2										
O.3.1										

 Feed correction factor (Kf f_z) for side and face cutters in relation to the cutting depth (a_e)

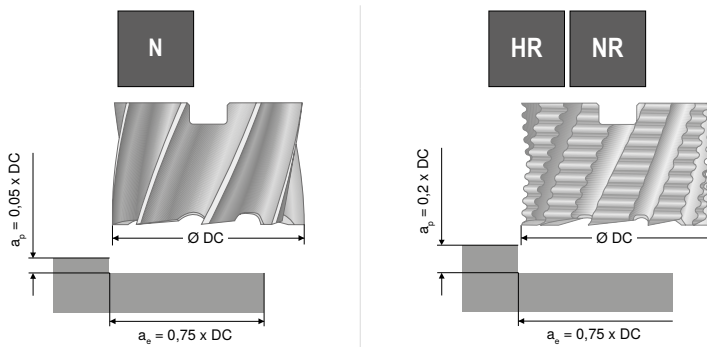
a _e	Kf f _z
0,05 x DC	1,4
0,1 x DC	1,0
0,15 x DC	0,8
0,2 x DC	0,7
0,25 x DC	0,6

Cutting data – face mills

Index	Kf f _z	50 250 ... / 50 260 ...	54 035 ... / 54 037 ...	● 1st choice ○ suitable		
		uncoated	Ti100 Pro	Emulsion	Compressed air	MMS
		v _c (m/min)	v _c (m/min)			
P.1.1	1,2	25	45	●		
P.1.2	1,2	20	40	●		
P.1.3	1,2	20	40	●		
P.1.4	1,0	15	30	●		
P.1.5	1,0	15	30	●		
P.2.1	1,2	20	40	●		
P.2.2	1,0	20	40	●		
P.2.3	0,8	10	20	●		
P.2.4	0,8	10	20	●		
P.3.1	1,0	15	30	●		
P.3.2	0,8	10	20	●		
P.3.3	0,8	10	20	●		
P.4.1	1,0	10	15	●		
P.4.2	1,0	10	15	●		
M.1.1	1,0	10	15	●		
M.2.1	0,9	7	15	●		
M.3.1	1,0	5	10	●		
K.1.1	1,0	20	30	●		
K.1.2	1,0	18	30	●		
K.2.1	1,0	18	30	●		
K.2.2	1,0	15	25	●		
K.3.1	1,0	18	30	●		
K.3.2	1,0	18	30	●		
N.1.1	1,5	150				
N.1.2	1,5	100				
N.2.1	1,3	80				
N.2.2	1,3	40				
N.2.3						
N.3.1	1,1	80	110	●		
N.3.2	1,2	30	60	●		
N.3.3	1,2	30	60	●		
N.4.1	1,3	90	120		●	
S.1.1						
S.1.2						
S.2.1						
S.2.2						
S.2.3						
S.3.1	1,0	10	15	●		
S.3.2	1,1	10	15	●		
S.3.3	0,8		10	●		
H.1.1						
H.1.2						
H.1.3						
H.1.4						
H.2.1						
H.3.1						
O.1.1	2,0	30	50	●		
O.1.2	2,0	20	25	●		
O.2.1						
O.2.2						
O.3.1						

Feed per tooth for HSS face mills

Approximate values (in mm) for the feed per tooth (f_z)



Ø DC mm	f_z in mm		f_z in mm	
	uncoated	Ti100 Pro	uncoated	Ti100 Pro
40	0,049	0,054	0,064	0,070
50	0,055	0,060	0,071	0,078
63	0,061	0,067	0,079	0,087
80	0,065	0,071	0,084	0,092



Feed rate correction:

Please multiply the f_z value in the table above with the corresponding **correction factor $K_f f_z$** from the table on → **page 39**.

In general the following is valid:

$$f_z \text{ (milling)} = f_z \times K_f f_z$$

$$f_z \text{ (drilling)} = f_z \text{ (milling)} \div \text{no. of teeth}$$

Formula for cutting data calculation

Designation	Abbreviation	Unit	Formula
Number of revolutions	n	min ⁻¹	$n = \frac{v_c \times 1000}{DC \times \pi}$
Cutting speed	v_c	m/min	$v_c = \frac{DC \times \pi \times n}{1000}$
Feed per tooth	f_z	mm	$f_z = \frac{v_f}{ZEFP \times n}$ $f_z = h_m \times \sqrt{\frac{DC}{a_e}}$
Feed per revolution	f	mm	$f = f_z \times ZEFP$
Feed rate	v_f	mm/min.	$v_f = f_z \times ZEFP \times n$
Average chip thickness	h_m	mm	$h_m = f_z \times \sqrt{\frac{a_e}{DC}}$

ZEFP = Number of flutes

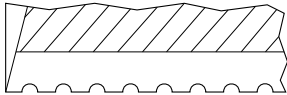
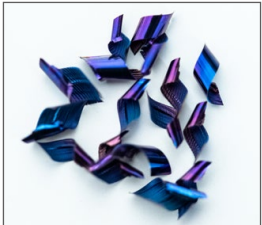
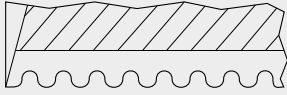

a_e = cutting width (for side milling cutter cutting depth)

DC = Cutting diameter

Version description

H	For high-strength steels and tempered materials	N	For machining steel and cast materials, as well as stainless steels
HF	For high-strength steels and tempered materials – with roughing-finishing profile	NF	For machining steel and cast materials, as well as stainless steels – with roughing-finishing profile
HR	For high-strength steels and tempered materials – with roughing profile	NR	For machining steel and cast materials, as well as stainless steels – with roughing profile
		W	For soft materials and non-ferrous metals (aluminium, copper, brass)

Differences between the milling cutter types

Designation	Type	Shape of the chip breaker	Application description	Chip shape
Rough and finish milling cutters	NF		<ul style="list-style-type: none"> ▲ High chip volume, even on less powerful machines ▲ Surface quality mostly sufficient ▲ Lower cutting pressure compared to smooth-edged milling cutters ▲ Finish machining not needed 	
	HF			
Rough milling cutters	NR		<ul style="list-style-type: none"> ▲ Produces very small and short chips ▲ Problem-solver in unstable conditions ▲ High chip volume, even on the weakest machines ▲ Exceptionally well suited to full slot milling ▲ Additional finish machining needed ▲ High feeds possible 	
	HR			

Coating

Ti100 Pro	<ul style="list-style-type: none"> ▲ Ti multilayer coating ▲ HV_{0.05} = 3500 ▲ Coefficient of friction (against steel) = 0.7 ▲ Maximum application temperature: 900°C
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