



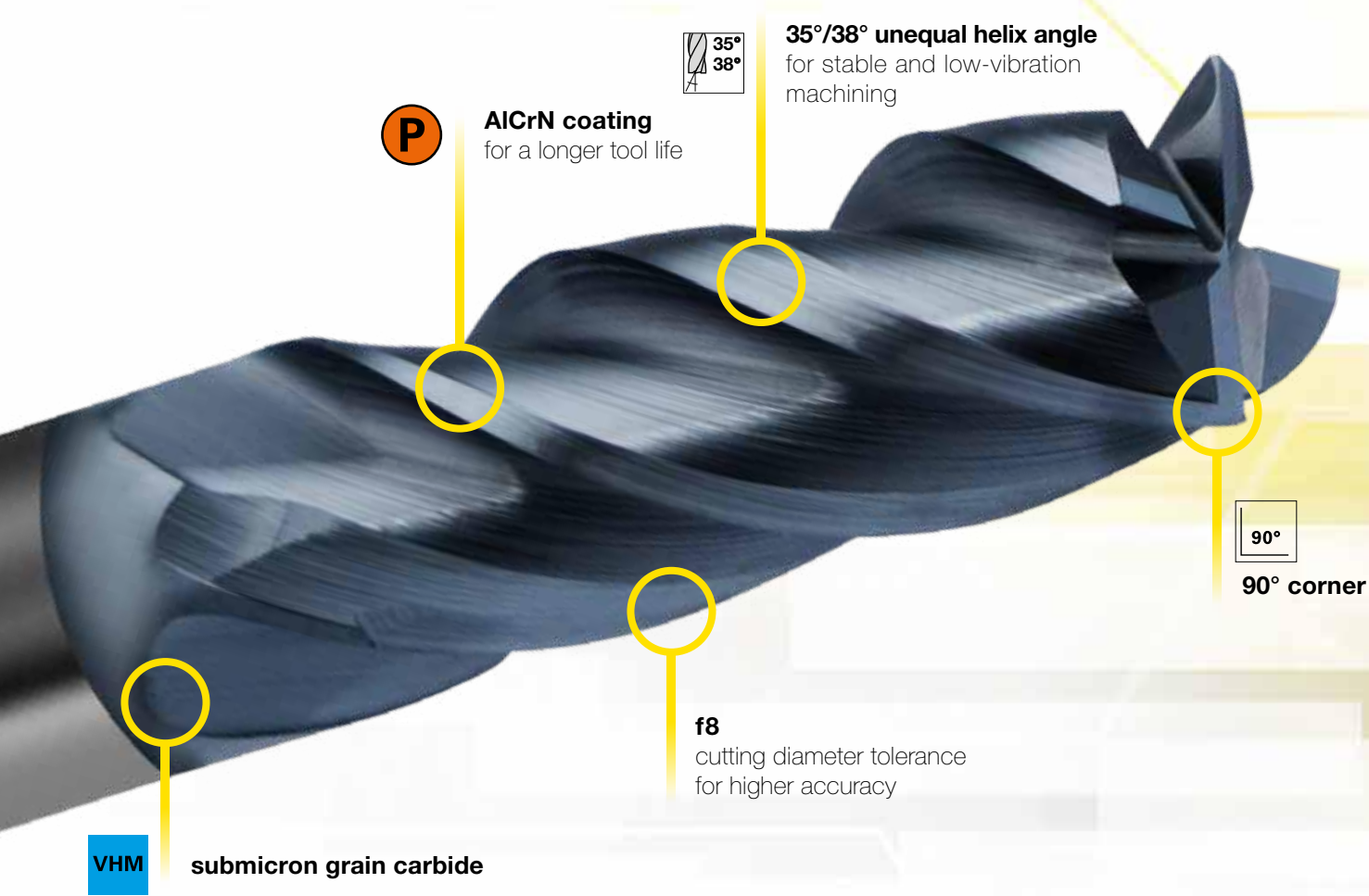
## **The perfect all-round end mill**

- universally applicable in almost any material and application
- excellent performance even with unstable machine conditions
- very durable thanks to a robust and break-resistant cutting edge

**The all-round end mill** For most materials and applications

# HPC end mill

## THE ALL-ROUND END MILL. For most materials and applications.



**P**

**AICrN coating**  
for a longer tool life



**35°/38° unequal helix angle**  
for stable and low-vibration  
machining



**90° corner**

**f8**  
cutting diameter tolerance  
for higher accuracy

**VHM** submicron grain carbide



Face cutting edges with  
unequal distribution for  
soft, stable cutting with  
large chip space for out-  
standing chip evacuation



## All advantages at a glance:

- suitable for a wide variety of applications and materials – even stainless and difficult to machine materials
- higher process reliability and durability ensures better performance even with less powerful machines or unstable machining conditions
- unequal helix reduces cutting force and vibration for better finishing and longer tool life
- ultra-robust and durable thanks to a submicron grain carbide substrate and a longlasting AlCrN coating
- excellent price-performance-ratio

## Universally applicable

### Material classes



steel



special alloys



stainless steel



cast iron



aluminium >7% Si

### Fields of applications



slotting | roughing | ramping | helix | finishing

### Milling conditions

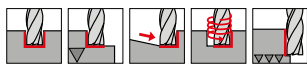
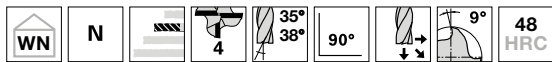
**HPC**

high performance cutting

**M7C**

instable conditions

HPC end mills (4-fluted)



P	•
M	•
K	•
N	○
S	•
H	○

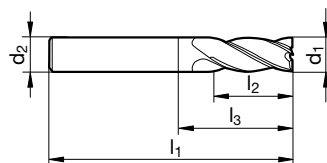
- high-performance end mills with variable helix angle
- centre cutting

Tool material **Solid carbide**

Surface **P**

Type **N**

Shank form **~ HA**

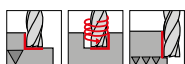


Article no. **19950**

Discount group **206**

d1 f8	d2 h6	l1	l2	l3	Z	Code no.	Availability
mm	mm	mm	mm	mm			
3.000	4.000	50.000	8.000	11.400	4	3.000	●
4.000	4.000	50.000	11.000	18.000	4	4.000	●
5.000	5.000	50.000	13.000	18.000	4	5.000	●
6.000	6.000	50.000	15.000	20.000	4	6.000	●
8.000	8.000	60.000	20.000	29.000	4	8.000	●
10.000	10.000	70.000	27.000	34.000	4	10.000	●
12.000	12.000	75.000	30.000	39.000	4	12.000	●
14.000	14.000	75.000	30.000	39.000	4	14.000	●
16.000	16.000	75.000	30.000	39.000	4	16.000	●
20.000	20.000	100.000	40.000	54.000	4	20.000	●

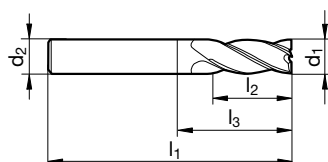
HPC end mills (4-fluted) long



P	•
M	•
K	•
N	○
S	•
H	○

- high-performance end mills with variable helix angle
- centre cutting

Tool material	<b>Solid carbide</b>
Surface	<b>P</b>
Type	N
Shank form	~ HA

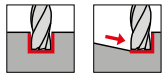


Article no. **19951**

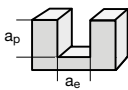
Discount group **206**

d1 f8	d2 h6	l1	l2	l3	Z	Code no.	Availability
mm	mm	mm	mm	mm			
3.000	4.000	60.000	16.000	19.400	4	3.000	●
4.000	4.000	60.000	20.000	23.000	4	4.000	●
5.000	6.000	68.000	24.000	28.400	4	5.000	●
6.000	6.000	68.000	24.000	32.000	4	6.000	●
8.000	8.000	88.000	38.000	52.000	4	8.000	●
10.000	10.000	100.000	50.000	60.000	4	10.000	●
12.000	12.000	100.000	53.000	61.000	4	12.000	●
14.000	14.000	100.000	53.000	62.000	4	14.000	●
16.000	16.000	125.000	63.000	77.000	4	16.000	●
20.000	20.000	141.000	75.000	91.000	4	20.000	●

Article no. 19950 HPC end mills (4-fluted)

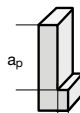


slotting / ramping

 $a_e = 1 \times D$ $a_p = 1 \times D$	$\emptyset$	P carbon steel (C45)				P alloyed steel (16MnCr5)				P tool steels (42CrMo4)			
	D (mm)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)
	4	120	120	9549	611	0.016	105	8356	535	0.016	90	7162	430
6	6366			611	0.024	5570		535	0.024	4775		439	0.023
8	4775			611	0.032	4178		535	0.032	3581		430	0.030
10	3820			688	0.045	3342		602	0.045	2865		481	0.042
12	3183			688	0.054	2785		602	0.054	2387		477	0.050
16	2387			668	0.070	2089		585	0.070	1790		501	0.070
20	1910			688	0.090	1671		602	0.090	1432		458	0.080

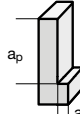


side milling (roughing)

 $a_e = 0.05-0.15 \times D$ $a_p = \text{flute length (l)}$	D (mm)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	
	4	228	228	18144	2685	0.037	200	15915	2355	0.037	171	13608	1905	0.035
	6			12096	2661	0.055		10610	2122	0.050		9072	1923	0.053
8	9072			2685	0.074	7958		2356	0.074	6804		1878	0.069	
10	7257			2903	0.100	6366		2546	0.100	5443		2112	0.097	
12	6048			2903	0.120	5305		2546	0.120	4536		2177	0.120	
16	4536			2903	0.160	3979		2547	0.160	3402		2177	0.160	
20	3629			3048	0.210	3183		2674	0.210	2722		1960	0.180	



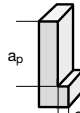
side milling (finishing)

 $a_e = 0.01-0.03 \times D$ $a_p = \text{flute length (l)}$	D (mm)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	
	4	240	240	19099	1375	0.018	210	16711	1203	0.018	180	14324	974	0.017
	6			12732	1324	0.026		11141	1159	0.026		9549	955	0.025
8	9549			1337	0.035	8356		1170	0.035	7162		945	0.033	
10	7639			1528	0.050	6685		1337	0.050	5730		1054	0.046	
12	6366			1502	0.059	5570		1315	0.059	4775		1051	0.055	
16	4775			1471	0.077	4178		1287	0.077	3581		1103	0.077	
20	3820			1513	0.099	3342		1323	0.099	2865		1008	0.088	

Article no. 19951 HPC end mills (4-fluted) long

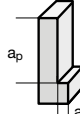


side milling (roughing)

 $a_e = 0.05-0.15 \times D$ $a_p = \text{flute length (l)}$	$\emptyset$	P carbon steel (C45)				P alloyed steel (16MnCr5)				P tool steels (42CrMo4)			
	D (mm)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)
	4	137	137	10902	959	0.022	120	9549	840	0.022	103	8196	688
6	7268			959	0.033	6366		764	0.030	5464		699	0.032
8	5451			959	0.044	4775		840	0.044	4098		672	0.041
10	4361			1047	0.060	3820		917	0.060	3279		761	0.058
12	3634			1047	0.072	3183		917	0.072	2732		787	0.072
16	2726			1047	0.096	2387		917	0.096	2049		787	0.096
20	2180			1134	0.130	1910		993	0.130	1639		721	0.110



side milling (finishing)

 $a_e = 0.01-0.03 \times D$ $a_p = \text{flute length (l)}$	D (mm)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	$v_c$ (m/min)	S (min <sup>-1</sup> )	$v_f$ (mm/min)	$f_z$ (mm/z)	
	4	144	144	11459	504	0.011	126	10027	441	0.011	108	8594	344	0.010
	6			7639	489	0.016		6685	428	0.016		5730	344	0.015
8	5730			481	0.021	5013		421	0.021	4297		344	0.020	
10	4584			550	0.030	4011		481	0.030	3438		385	0.028	
12	3820			550	0.036	3342		481	0.036	2865		378	0.033	
16	2865			527	0.046	2507		461	0.046	2149		395	0.046	
20	2292			541	0.059	2005		473	0.059	1719		364	0.053	



	Ø	M stainless steel (304 / 1.4301)				S special alloys				K cast iron			
		D (mm)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)
	4	60	4775	267	0.014	30	2387	105	0.011	100	7958	541	0.017
	6		3183	267	0.021		1592	108	0.017		5305	509	0.024
	8		2387	267	0.028		1194	110	0.023		3979	509	0.032
	10		1910	290	0.038		955	130	0.034		3183	573	0.045
	12		1592	293	0.046		796	131	0.041		2653	573	0.054
	16		1194	287	0.060		597	131	0.055		1989	557	0.070
	20		955	306	0.080		477	134	0.070		1592	573	0.090

	D (mm)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)
	4	90	7162	917	0.032	50	3979	398	0.025	125	9947	1512	0.038
	6		4775	917	0.048		2653	414	0.039		6631	1459	0.055
	8		3581	917	0.064		1989	422	0.053		4974	1472	0.074
	10		2865	997	0.087		1592	497	0.078		3979	1592	0.100
	12		2387	1050	0.110		1326	499	0.094		3316	1592	0.120
	16		1790	1002	0.140		995	517	0.130		2487	1592	0.160
	20		1432	1031	0.180		796	509	0.160		1989	1671	0.210

	D (mm)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)
	4	120	9549	573	0.015	60	4775	229	0.012	200	15915	1210	0.019
	6		6366	586	0.023		3183	242	0.019		10610	1103	0.026
	8		4775	592	0.031		2387	239	0.025		7958	1114	0.035
	10		3820	642	0.042		1910	283	0.037		6366	1273	0.050
	12		3183	649	0.051		1592	287	0.045		5305	1252	0.059
	16		2387	630	0.066		1194	291	0.061		3979	1226	0.077
	20		1910	672	0.088		955	294	0.077		3183	1260	0.099



	Ø	M stainless steel (304 / 1.4301)				S special alloys				K cast iron			
		D (mm)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)
	4	54	4297	327	0.019	30	2387	143	0.015	75	5968	549	0.023
	6		2865	332	0.029		1592	146	0.023		3979	525	0.033
	8		2149	327	0.038		1194	153	0.032		2984	525	0.044
	10		1719	358	0.052		955	180	0.047		2387	573	0.060
	12		1432	378	0.066		796	178	0.056		1989	573	0.072
	16		1074	361	0.084		597	186	0.078		1492	573	0.096
	20		859	378	0.110		477	183	0.096		1194	621	0.130

	D (mm)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)	v <sub>c</sub> (m/min)	S (min <sup>-1</sup> )	v <sub>f</sub> (mm/min)	f <sub>z</sub> (mm/z)
	4	72	5730	206	0.009	36	2865	80	0.007	120	9549	420	0.011
	6		3820	214	0.014		1910	84	0.011		6366	407	0.016
	8		2865	206	0.018		1432	86	0.015		4775	401	0.021
	10		2292	229	0.025		1146	101	0.022		3820	458	0.030
	12		1910	229	0.030		955	103	0.027		3183	458	0.036
	16		1432	229	0.040		716	103	0.036		2387	439	0.046
	20		1146	243	0.053		573	105	0.046		1910	451	0.059



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