



## Trochoidal Shank End Mill with variable Helix

- 5 flutes  $37^{\circ}/38^{\circ} + 41^{\circ}/42^{\circ}$  right-hand helix



Ideally suited for machining steel ( $37/38^{\circ}$ ) as well as stainless steel or heat resistant steel alloys ( $41/42^{\circ}$ ) with trochoidal milling techniques.

### Trochoidal milling

static



dynamic



- ➔ Extra long cutting length  
3 x D
- ➔ Chip breaker for short chips and smooth chip removal to achieve high cutting speeds when using the entire cutting length
- ➔ With corner radius or chamfer

# Carbide Trochoidal Shank End Mill, 5 flutes, 37°/38°, extra long, AlCrN

VHM
Z 5
37/38°
DIN 6535HA
Tol. e8/h5
45°  
0,12-0,50
AlCrN



Article-No.	d <sub>1</sub> (e8) mm	d <sub>3</sub> mm	l <sub>2</sub> mm	l <sub>3</sub> mm	d <sub>2</sub> (h5) mm	l <sub>1</sub> mm	chamfer 45°	Z	Unit price 1 – 4 pcs €	Unit price 5 – 9 pcs €	Unit price 10 pcs + €
201 400	6	5,7	18	24	6	62	0,12	5			
201 401	8	7,6	24	30	8	68	0,16	5			
201 402	10	9,5	30	38	10	80	0,20	5			
201 403	12	11,5	36	46	12	93	0,24	5			
201 404	14	13,0	42	50	14	100	0,28	5			
201 405	16	15,5	48	58	16	108	0,32	5			
201 406	18	17,0	54	67	18	115	0,36	5			
201 407	20	19,5	60	74	20	126	0,40	5			
201 408	25	24,0	75	92	25	150	0,50	5			

As well suppliable with shank to DIN 6535 HB

# Carbide Trochoidal Shank End Mill, 5 flutes, 37°/38°, extra long, AlCrN



Article-No.	d <sub>1</sub> (e8) mm	d <sub>3</sub> mm	l <sub>2</sub> mm	l <sub>3</sub> mm	d <sub>2</sub> (h5) mm	l <sub>1</sub> mm	r	Z	Unit price 1 – 4 pcs €	Unit price 5 – 9 pcs €	Unit price 10 pcs + €
201 410	6	5,7	18	24	6	62	0,5	5			
201 411	6	5,7	18	24	6	62	1,0	5			
201 412	8	7,6	24	30	8	68	0,5	5			
201 413	8	7,6	24	30	8	68	1,0	5			
201 414	10	9,5	30	38	10	80	0,5	5			
201 415	10	9,5	30	38	10	80	1,0	5			
201 416	10	9,5	30	38	10	80	2,0	5			
201 417	12	11,5	36	46	12	93	0,5	5			
201 418	12	11,5	36	46	12	93	1,0	5			
201 419	12	11,5	36	46	12	93	2,0	5			
201 420	16	15,5	48	58	16	108	0,5	5			
201 421	16	15,5	48	58	16	108	1,0	5			
201 422	16	15,5	48	58	16	108	2,0	5			
201 423	20	19,5	60	74	20	126	1,0	5			
201 424	20	19,5	60	74	20	126	2,0	5			
201 425	20	19,5	60	74	20	126	3,0	5			

As well suppliable with shank to DIN 6535 HB

# Cutting data

	Material	Rm (N/mm <sup>2</sup> )	Hardness HB/HRC	Cutting speed		
				min	opt	max
<b>P</b>	Steel	<600	<230	220	300	380
	Alloy steel	<1200	<350	200	250	300
	High alloy steel, tool steel	<1400	<380	180	210	250
<b>M</b>	Aust. and ferrit. stainless steel	<680	<220	-	-	-
	Martensitic stainless steel	<820	<240	-	-	-
<b>K</b>	Grey cast iron	-	<280	-	-	-
	Ductile cast iron	-	<320	-	-	-
<b>H</b>	Hardened steel	-	<54 HRC	70	100	130
		-	52-60 HRC	50	90	120
		-	>58HRC	-	-	-

TROCHOIDAL MILLING

d <sub>1</sub>	A <sub>p</sub> (3xD)	A <sub>e1</sub> (0,1xD)	A <sub>e2</sub> (0,2xD)	f <sub>z1</sub>	f <sub>z2</sub>	h <sub>m</sub>
6	18	0,6	1,2	0,087	0,062	0,028
8	24	0,8	1,6	0,117	0,083	0,037
10	30	1,0	2,0	0,146	0,104	0,046
12	36	1,2	2,4	0,175	0,125	0,055
14	42	1,4	2,8	0,204	0,146	0,065
16	48	1,6	3,2	0,233	0,166	0,074
18	54	1,8	3,6	0,262	0,187	0,083
20	60	2,0	4,0	0,292	0,208	0,092
25	75	2,5	5,0	0,365	0,260	0,115

## Cutting formula

Average chip thickness


$$h_m = f_z \times \sqrt{\frac{A_e}{d_1}} \text{ (mm)}$$


h<sub>m</sub> average chip thickness(mm)  
 f<sub>z</sub> feed per tooth (mm)  
 A<sub>e</sub> cutting width (mm)  
 d<sub>1</sub> cutting diameter (mm)

# Carbide Trochoidal Shank End Mill, 5 flutes, 41°/42°, extra long, Helica


VHM

Z 5


  
41/42°


  
DIN  
6535HA

Tol.  
e8/h5


  
45°  
0,12-0,50


  
Helica





Article-No.	d <sub>1</sub> (e8) mm	d <sub>3</sub> mm	l <sub>2</sub> mm	l <sub>3</sub> mm	d <sub>2</sub> (h5) mm	l <sub>1</sub> mm	chamfer 45°	Z	Unit price 1 – 4 pcs €	Unit price 5 – 9 pcs €	Unit price 10 pcs + €
201 430	6	5,7	18	24	6	62	0,12	5			
201 431	8	7,6	24	30	8	68	0,16	5			
201 432	10	9,5	30	38	10	80	0,20	5			
201 433	12	11,5	36	46	12	93	0,24	5			
201 434	14	13,0	42	50	14	100	0,28	5			
201 435	16	15,5	48	58	16	108	0,32	5			
201 436	18	17,0	54	67	18	115	0,36	5			
201 437	20	19,5	60	74	20	126	0,40	5			
201 438	25	24,0	75	92	25	150	0,50	5			

As well suppliable with shank to DIN 6535 HB

# VHM-Trochoidal-Schaftfräser, 5 Schneiden, 41°/42°, extra lang, AlCrN



Article-No.	d <sub>1</sub> (e8) mm	d <sub>3</sub> mm	l <sub>2</sub> mm	l <sub>3</sub> mm	d <sub>2</sub> (h5) mm	l <sub>1</sub> mm	r	Z	Unit price 1 – 4 pcs €	Unit price 5 – 9 pcs €	Unit price 10 pcs + €
201 440	6	5,7	18	24	6	62	0,1	5			
201 441	6	5,7	18	24	6	62	0,5	5			
201 442	6	5,7	18	24	6	62	1,0	5			
201 443	8	7,6	24	30	8	68	0,2	5			
201 444	8	7,6	24	30	8	68	0,5	5			
201 445	8	7,6	24	30	8	68	1,0	5			
201 446	10	9,5	30	38	10	80	0,2	5			
201 447	10	9,5	30	38	10	80	0,5	5			
201 448	10	9,5	30	38	10	80	1,0	5			
201 449	10	9,5	30	38	10	80	2,0	5			
201 450	12	11,5	36	46	12	93	0,3	5			
201 451	12	11,5	36	46	12	93	0,5	5			
201 452	12	11,5	36	46	12	93	1,0	5			
201 453	12	11,5	36	46	12	93	2,0	5			
201 454	16	15,5	48	58	16	108	0,3	5			
201 455	16	15,5	48	58	16	108	0,5	5			
201 456	16	15,5	48	58	16	108	1,0	5			
201 457	16	15,5	48	58	16	108	2,0	5			
201 458	20	19,5	60	74	20	126	0,3	5			
201 459	20	19,5	60	74	20	126	1,0	5			
201 460	20	19,5	60	74	20	126	2,0	5			
201 461	20	19,5	60	74	20	126	3,0	5			

As well suppliable with shank to DIN 6535 HB

# Cutting Data

	Material	Rm (N/mm <sup>2</sup> )	Hardness HB/HRC	Cutting speed		
				min	opt	max
<b>P</b>	steel	<600	<230	-	-	-
	Alloy steel	<1200	<350	-	-	-
	High alloy steel, tool steel	<1400	<380	-	-	-
<b>M</b>	Aust. and ferrit. stainless steel	<680	<220	150	190	230
	Martensitic stainless steel	<820	<240	130	170	200
<b>S</b>	High temperature alloys Fe, Ni + Co	<3300	<350	50	80	100
	Titanium alloys Alpha + Beta	<2100	<400	80	130	170
<b>H</b>	Hardened steel	-	<54 HRC	-	-	-
		-	52-60 HRC	-	-	-
		-	>58HRC	-	-	-

TROCHOIDAL MILLING

d <sub>1</sub>	A <sub>p</sub> (3xD)	A <sub>e1</sub> (0,06xD)	A <sub>e2</sub> (0,12xD)	f <sub>z1</sub>	f <sub>z2</sub>	h <sub>m</sub>
6	18	0,36	0,72	0,072	0,030	0,032
8	24	0,48	0,96	0,096	0,040	0,043
10	30	0,60	1,20	0,120	0,050	0,054
12	36	0,72	1,44	0,144	0,060	0,065
14	42	0,84	1,68	0,168	0,070	0,076
16	48	0,96	1,92	0,192	0,080	0,086
18	54	1,08	2,16	0,216	0,090	0,097
20	60	1,20	2,40	0,240	0,100	0,108
25	75	1,50	3,00	0,300	0,125	0,135

## Cutting formula

Average chip thickness

$$h_m = f_z \times \sqrt{\frac{A_e}{d_1}} \text{ (mm)}$$

- h<sub>m</sub> average chip thickness (mm)
- f<sub>z</sub> feed per tooth (mm)
- A<sub>e</sub> cutting width (mm)
- d<sub>1</sub> cutting diameter (mm)