



Your technology partner for cost-effective machining

OptiMill<sup>®</sup>-HPC-Pocket

# OptiMill®-HPC-Pocket

## Maximum efficiency in pocket plunge milling

The milling tools OptiMill-Uni-HPC-Pocket and OptiMill-Alu-HPC-Pocket offer the ultimate in precision and efficiency in pocket milling. Both tools are equipped with a built-in drill tip that is particularly well suited to versatile applications such as helix milling, grooving and inclined plunging. In both milling cutters, large chip spaces ensure rapid and reliable chip removal, even at high machining volumes.

A special cutting-edge preparation and wear-resistant coating ensure a long tool life and maximum process reliability. The innovative milling cutter geometry prevents chip congestion and enables quiet machining, leading to outstanding surface quality.

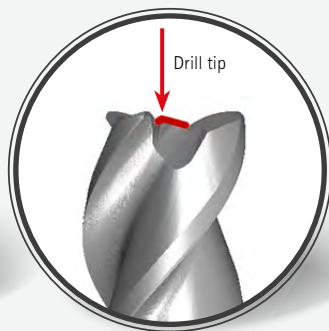
**These advanced technical features make the OptiMill-Uni-HPC-Pocket and OptiMill-Alu-HPC-Pocket ideal tools for efficient and precise machining of steel, cast iron and aluminium.**

### ✓ INNOVATIVE POINT THINNING

### ✓ WIDE RANGE OF APPLICATIONS



**Grooving (drilling)  
and ramps with very  
high feed rates**



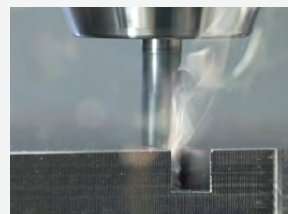
**Integrated drill tip  
specifically for plunge  
milling**



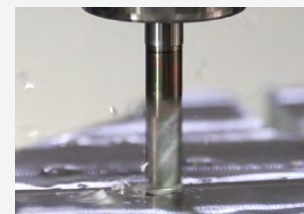
**Ramps**



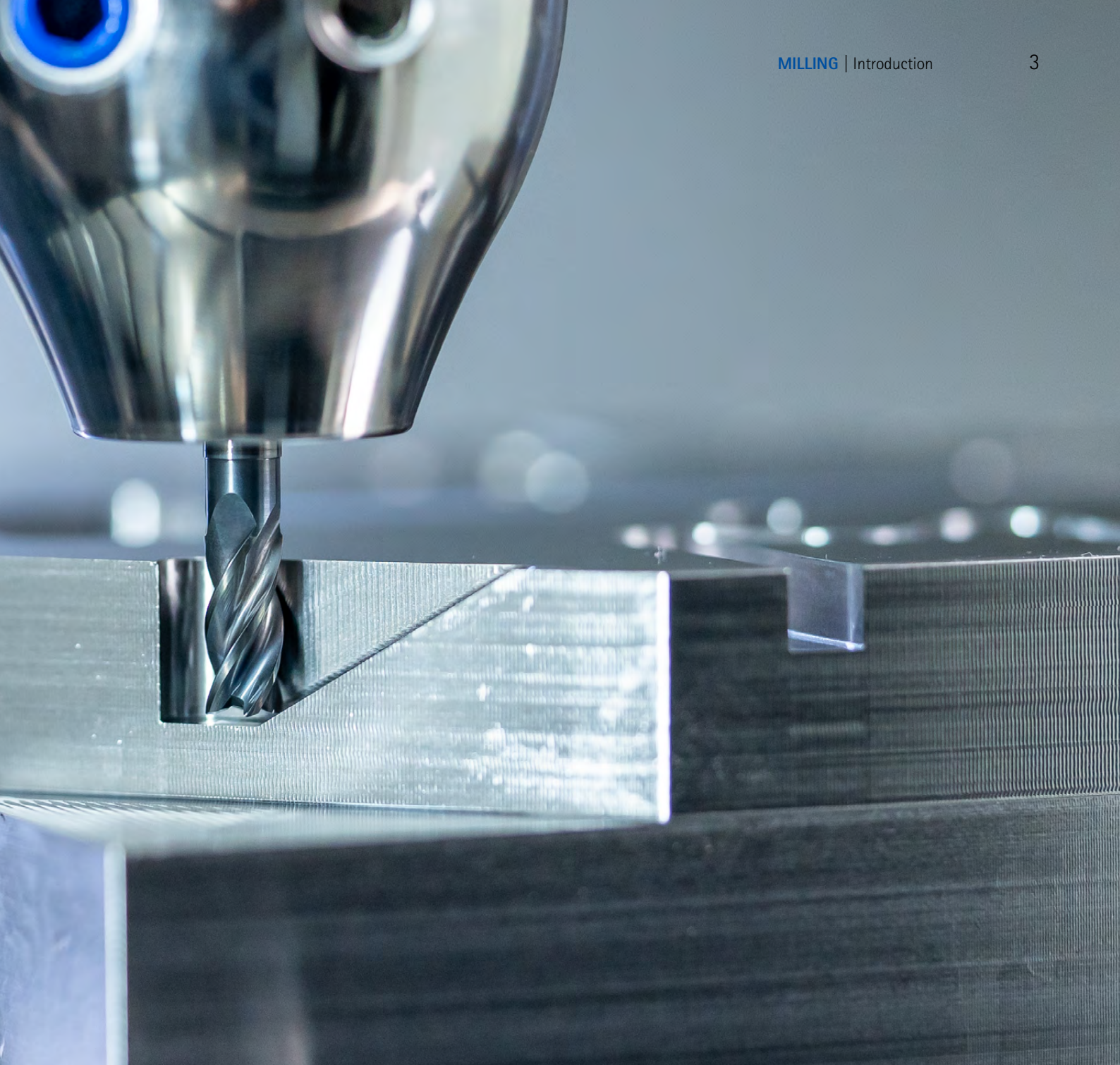
**Pocket milling**



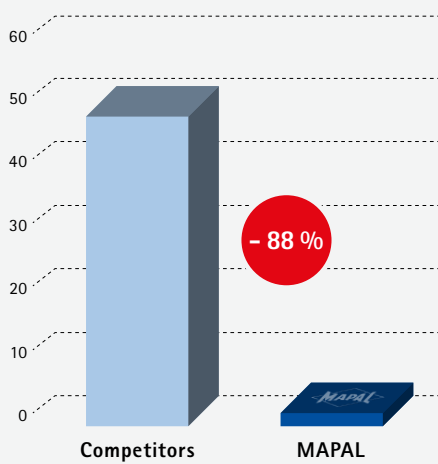
**Groove milling**



**Helix milling**



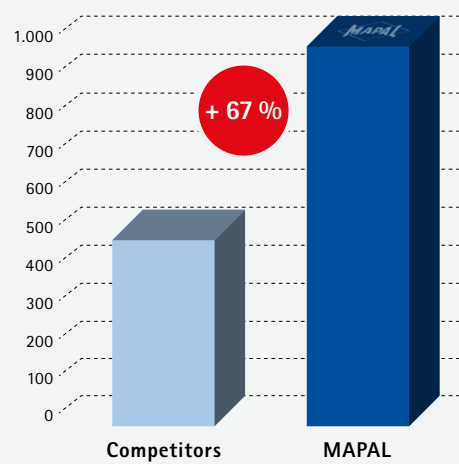
## MACHINING TIME [SEC.]



RESULT: 88% faster machining time.



## TOOL LIFE [SEC.]

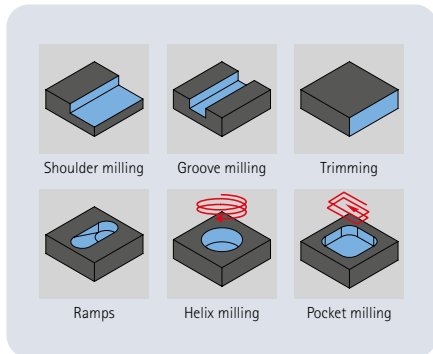


RESULT: 67% longer tool life.

# PRODUCT OVERVIEW

High performance in steel, stainless steel, cast iron and aluminium

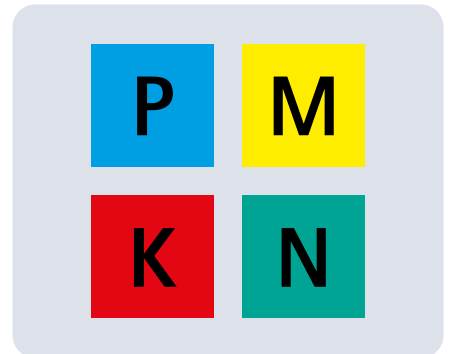
## Application



## Product category



## Material suitability



## Product portfolio

### OptiMill-Uni-HPC-Pocket



Material suitability:



>> From page 6

### OptiMill-Alu-HPC-Pocket



Material suitability:



>> From page 13

# CONFIGURATION

## Configuration for OptiMill-HPC-Pocket – quick, simple and flexible

### Available now or individually configurable

- **Rapid availability:** Products of the preferred series are in stock and available at short notice. They can be ordered directly on the product page via the material number.
- **Individual configuration:** If you need another shank or milling cutter design, you can individually configure the milling cutter.

### Configurable features



### Configurable corner radius

OptiMill-Uni-HPC-Pocket

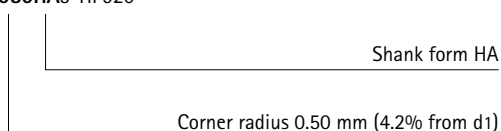
Series	Radius in %	
	Limit min.	Limit max.
SCM840	1.0% from d1	6.0% from d1
SCM800		
SCM810		
SCM813		
SCM814		
SCM815		
SCM816		

OptiMill-Alu-HPC-Pocket

Series	Radius in %	
	Limit min.	Limit max.
SCM850	1.0% from d1	17.0% from d1
SCM854	1.0% from d1	6.0% from d1
SCM855		
SCM856		

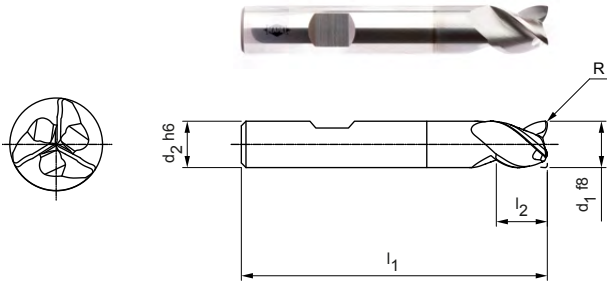
#### Example:

SCM815-1200Z04R-R0050HA3-HP920



# OptiMill®-Uni-HPC-Pocket

Shoulder milling cutter, short design  
SCM840

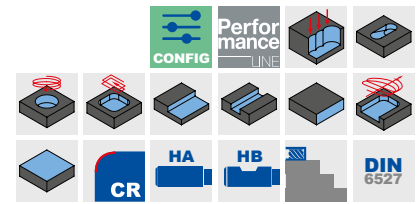


## Design:

Diameter of milling cutter: 3.80 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 3  
Helix angle: ~ 42°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions						z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	l <sub>1</sub>	l <sub>2</sub>	l <sub>5</sub>	R*			
3,80	6	54	5	10,5	0,12	3	SCM840-0380Z03R-R0012HB-HP920	31031129
4,00	6	54	5	10,5	0,12	3	SCM840-0400Z03R-R0012HB-HP920	31031140
4,80	6	54	6	12,5	0,2	3	SCM840-0480Z03R-R0020HB-HP920	31031141
5,00	6	54	6	12,5	0,2	3	SCM840-0500Z03R-R0020HB-HP920	31031142
5,70	6	54	7	14,5	0,2	3	SCM840-0570Z03R-R0020HB-HP920	30965832
6,00	6	54	7	-	0,2	3	SCM840-0600Z03R-R0020HB-HP920	30965833
6,70	8	58	8	16,5	0,2	3	SCM840-0670Z03R-R0020HB-HP920	30965834
7,00	8	58	8	17	0,2	3	SCM840-0700Z03R-R0020HB-HP920	30965835
7,70	8	58	9	18,5	0,2	3	SCM840-0770Z03R-R0020HB-HP920	30965836
8,00	8	58	9	-	0,2	3	SCM840-0800Z03R-R0020HB-HP920	30965837
8,70	10	66	10	20,5	0,32	3	SCM840-0870Z03R-R0032HB-HP920	30965838
9,00	10	66	10	21	0,32	3	SCM840-0900Z03R-R0032HB-HP920	30965839
9,70	10	66	11	22,5	0,32	3	SCM840-0970Z03R-R0032HB-HP920	30965840
10,00	10	66	11	-	0,32	3	SCM840-1000Z03R-R0032HB-HP920	30953712
11,70	12	73	12	24,5	0,32	3	SCM840-1170Z03R-R0032HB-HP920	30965841
12,00	12	73	12	-	0,32	3	SCM840-1200Z03R-R0032HB-HP920	30948678
13,70	14	75	14	26,5	0,32	3	SCM840-1370Z03R-R0032HB-HP920	30965842
14,00	14	75	14	-	0,32	3	SCM840-1400Z03R-R0032HB-HP920	30965843
15,50	16	82	16	30	0,32	3	SCM840-1550Z03R-R0032HB-HP920	30965844
16,00	16	82	16	-	0,32	3	SCM840-1600Z03R-R0032HB-HP920	30965845
17,50	18	84	18	32	0,32	3	SCM840-1750Z03R-R0032HB-HP920	30965846
19,50	20	92	20	38	0,5	3	SCM840-1950Z03R-R0050HB-HP920	30965848
20,00	20	92	20	-	0,5	3	SCM840-2000Z03R-R0050HB-HP920	30965849

\* Corner radius especially for feather key milling according to DIN 6885.

## Available on request

18.00	18	84	18	-	0.32	3	SCM840-1800Z03R-R0032HB-HP920	30965847
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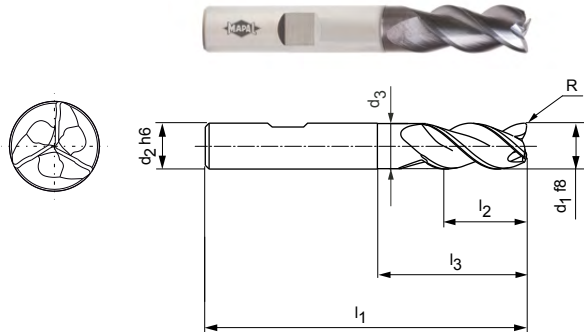
Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

Shoulder milling cutter, long design with neck  
SCM810

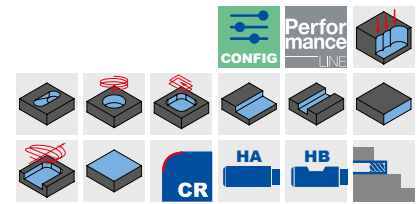


## Design:

Diameter of milling cutter: 3.80 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 3  
Helix angle: ~ 42°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
3,80	6	3,6	57	10	13	0,19	3	SCM810-0380Z03R-R0019HB-HP920	31031147
4,00	6	3,8	57	11	13	0,2	3	SCM810-0400Z03R-R0020HB-HP920	31031148
4,80	6	4,6	57	11	15,5	0,24	3	SCM810-0480Z03R-R0024HB-HP920	31031149
5,00	6	4,8	57	13	15,5	0,25	3	SCM810-0500Z03R-R0025HB-HP920	31031150
5,70	6	5,5	57	13	19	0,29	3	SCM810-0570Z03R-R0029HB-HP920	30788023
6,00	6	5,8	57	13	19	0,3	3	SCM810-0600Z03R-R0030HB-HP920	30788024
6,70	8	6,5	63	16	25	0,34	3	SCM810-0670Z03R-R0034HB-HP920	30788025
7,00	8	6,8	63	16	25	0,35	3	SCM810-0700Z03R-R0035HB-HP920	30788026
7,70	8	7,5	63	19	25	0,39	3	SCM810-0770Z03R-R0039HB-HP920	30788027
8,00	8	7,8	63	19	25	0,4	3	SCM810-0800Z03R-R0040HB-HP920	30788028
8,70	10	8,5	72	22	30	0,44	3	SCM810-0870Z03R-R0044HB-HP920	30788029
9,00	10	8,8	72	22	30	0,45	3	SCM810-0900Z03R-R0045HB-HP920	30788030
9,70	10	9,5	72	22	30	0,49	3	SCM810-0970Z03R-R0049HB-HP920	30788031
10,00	10	9,8	72	22	30	0,5	3	SCM810-1000Z03R-R0050HB-HP920	30788032
11,70	12	11,5	83	26	36	0,59	3	SCM810-1170Z03R-R0059HB-HP920	30788033
12,00	12	11,8	83	26	36	0,6	3	SCM810-1200Z03R-R0060HB-HP920	30788034
13,70	14	13,5	83	26	36	0,69	3	SCM810-1370Z03R-R0069HB-HP920	30788035
14,00	14	13,8	83	26	36	0,7	3	SCM810-1400Z03R-R0070HB-HP920	30788036
15,50	16	15,3	92	31	42	0,78	3	SCM810-1550Z03R-R0078HB-HP920	30788037
16,00	16	15,8	92	31	42	0,8	3	SCM810-1600Z03R-R0080HB-HP920	30788038
17,50	18	17,3	92	31	42	0,88	3	SCM810-1750Z03R-R0088HB-HP920	30788039
18,00	18	17,8	92	31	42	0,9	3	SCM810-1800Z03R-R0090HB-HP920	30788040
19,50	20	19,3	104	41	52	0,98	3	SCM810-1950Z03R-R0098HB-HP920	30788041
20,00	20	19,8	104	41	52	1	3	SCM810-2000Z03R-R0100HB-HP920	30788042

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

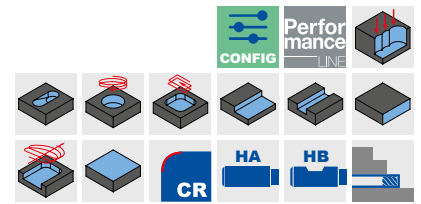
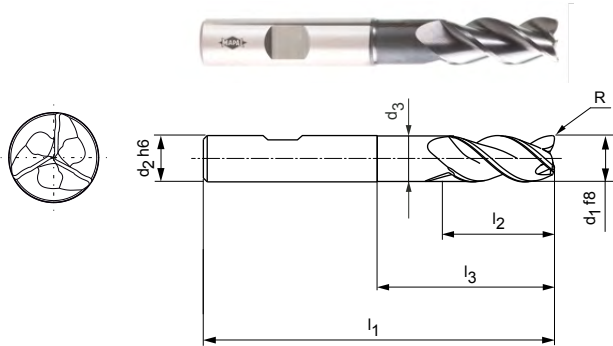
Shoulder milling cutter, overlong design with neck  
SCM800

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 3  
Helix angle: ~ 42°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d1 f8	d2 h6	d3	l1	l2	l3	R			
5,00	6	4,8	62	13	24	0,25	3	SCM800-0500Z03R-R0025HB-HP920	31031146
5,70	6	5,5	62	13	24	0,29	3	SCM800-0570Z03R-R0029HB-HP920	30787957
6,00	6	5,8	62	13	24	0,3	3	SCM800-0600Z03R-R0030HB-HP920	30787958
6,70	8	6,4	68	16	30	0,34	3	SCM800-0670Z03R-R0034HB-HP920	30787959
7,00	8	6,7	68	16	30	0,35	3	SCM800-0700Z03R-R0035HB-HP920	30787960
7,70	8	7,4	68	21	30	0,39	3	SCM800-0770Z03R-R0039HB-HP920	30787961
8,00	8	7,7	68	21	30	0,4	3	SCM800-0800Z03R-R0040HB-HP920	30787962
8,70	10	8,4	80	22	38	0,44	3	SCM800-0870Z03R-R0044HB-HP920	30787963
9,00	10	8,7	80	22	38	0,45	3	SCM800-0900Z03R-R0045HB-HP920	30787964
9,70	10	9,4	80	22	38	0,49	3	SCM800-0970Z03R-R0049HB-HP920	30787965
10,00	10	9,7	80	22	38	0,5	3	SCM800-1000Z03R-R0050HB-HP920	30787966
11,70	12	11,3	93	26	46	0,59	3	SCM800-1170Z03R-R0059HB-HP920	30787967
12,00	12	11,6	93	26	46	0,6	3	SCM800-1200Z03R-R0060HB-HP920	30787968
13,70	14	13,3	99	26	52	0,69	3	SCM800-1370Z03R-R0069HB-HP920	30787969
14,00	14	13,6	99	26	52	0,7	3	SCM800-1400Z03R-R0070HB-HP920	30787970
15,50	16	15	108	36	58	0,78	3	SCM800-1550Z03R-R0078HB-HP920	30787971
16,00	16	15,5	108	36	58	0,8	3	SCM800-1600Z03R-R0080HB-HP920	30787972
17,50	18	17	117	36	67	0,88	3	SCM800-1750Z03R-R0088HB-HP920	30787973
18,00	18	17,5	117	36	67	0,9	3	SCM800-1800Z03R-R0090HB-HP920	30787974
19,50	20	19	126	41	74	0,98	3	SCM800-1950Z03R-R0098HB-HP920	30787975
20,00	20	19,5	126	41	74	1	3	SCM800-2000Z03R-R0100HB-HP920	30787976

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

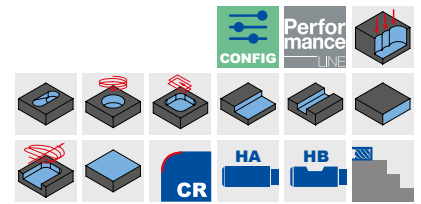
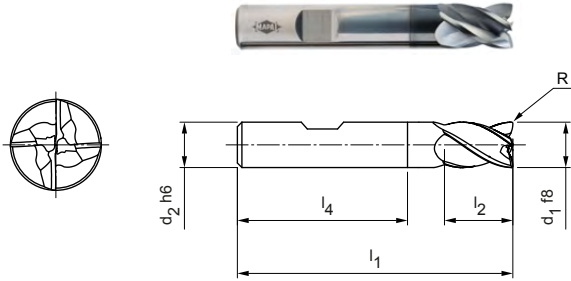
Shoulder milling cutter, short design  
SCM814

**Design:**

Diameter of milling cutter: 5.00 – 20.00 mm  
 Cutting material: HP920  
 Number of cutting edges: 4  
 Helix angle: ~ 35°/36°  
 Special feature: Face geometry with integrated drill tip

**Application:**

Perfect for inclined plunging up to 45°,  
 in helix milling and grooving.



**Preferred series available from stock**

Dimensions					z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	l <sub>1</sub>	l <sub>2</sub>	R			
5,00	6	54	9	0,20	4	SCM814-0500Z04R-R0020HB-HP920	31621146
6,00	6	54	10	0,20	4	SCM814-0600Z04R-R0020HB-HP920	31621148
8,00	8	58	12	0,20	4	SCM814-0800Z04R-R0020HB-HP920	31621152
10,00	10	66	14	0,32	4	SCM814-1000Z04R-R0032HB-HP920	31621156
12,00	12	73	16	0,32	4	SCM814-1200Z04R-R0032HB-HP920	31621158
16,00	16	82	22	0,32	4	SCM814-1600Z04R-R0032HB-HP920	31621162
20,00	20	92	26	0,50	4	SCM814-2000Z04R-R0050HB-HP920	31621166

Dimensions in mm.  
 For cutting data recommendations, see end of chapter.  
 Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

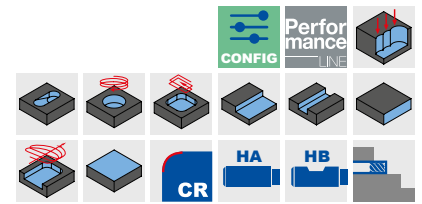
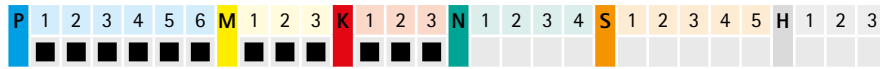
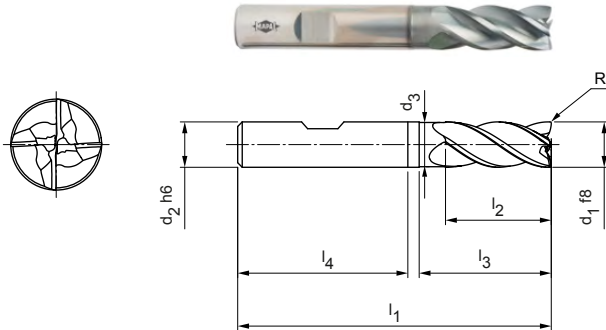
Shoulder milling cutter, long design with neck  
SCM816

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 4  
Helix angle: ~ 35°/36°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	57	13	19	0,20	4	SCM816-0500Z04R-R0020HB-HP920	31621192
6,00	6	5,8	57	13	19	0,20	4	SCM816-0600Z04R-R0020HB-HP920	31621195
8,00	8	7,8	63	19	25	0,20	4	SCM816-0800Z04R-R0020HB-HP920	31621199
10,00	10	9,8	72	22	30	0,32	4	SCM816-1000Z04R-R0032HB-HP920	31621203
12,00	12	11,8	83	26	36	0,32	4	SCM816-1200Z04R-R0032HB-HP920	31621205
14,00	14	13,8	83	26	36	0,32	4	SCM816-1400Z04R-R0032HB-HP920	31621207
16,00	16	15,8	92	32	42	0,32	4	SCM816-1600Z04R-R0032HB-HP920	31621209
20,00	20	19,8	104	38	52	0,50	4	SCM816-2000Z04R-R0050HB-HP920	31621213

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

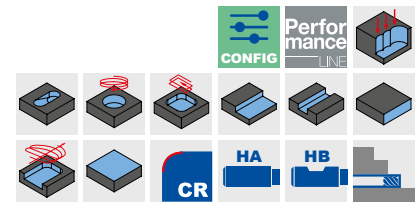
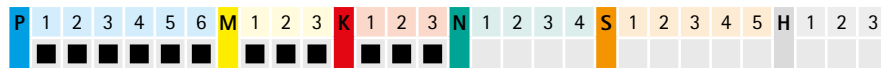
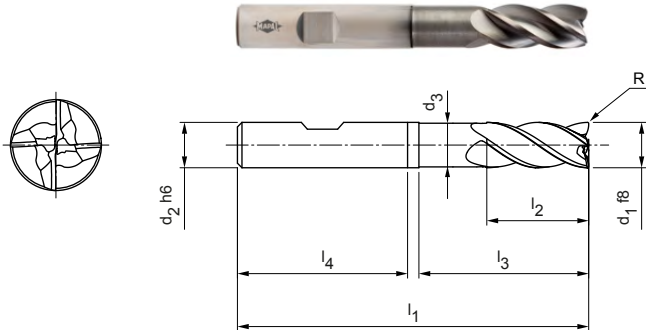
Shoulder milling cutter, overlong design with neck  
SCM815

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 4  
Helix angle: ~ 35°/36°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	62	13	24	0,20	4	SCM815-0500Z04R-R0020HB-HP920	31621169
6,00	6	5,8	62	13	24	0,20	4	SCM815-0600Z04R-R0020HB-HP920	31621171
8,00	8	7,7	68	21	30	0,20	4	SCM815-0800Z04R-R0020HB-HP920	31621175
10,00	10	9,7	80	22	38	0,32	4	SCM815-1000Z04R-R0032HB-HP920	31621179
12,00	12	11,6	93	26	46	0,32	4	SCM815-1200Z04R-R0032HB-HP920	31621181
16,00	16	15,5	108	36	58	0,32	4	SCM815-1600Z04R-R0032HB-HP920	31621185
20,00	20	19,5	126	41	74	0,50	4	SCM815-2000Z04R-R0050HB-HP920	31621189

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Uni-HPC-Pocket

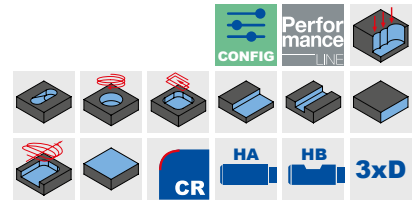
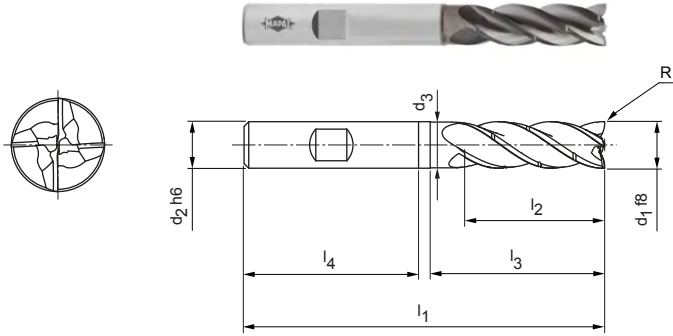
Shoulder milling cutter, 3xD design with neck, includes chip breaker  
SCM813

**Design:**

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP920  
Number of cutting edges: 4  
Helix angle: 35°/36°  
Special feature: Face geometry with integrated drill tip

**Application:**

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



**Preferred series available from stock**

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	62	17	-	0,20	4	SCM813-0500Z04R-R0020HB3-HP920	31515907
6,00	6	5,8	62	18	25	0,20	4	SCM813-0600Z04R-R0020HB3-HP920	31515908
8,00	8	7,7	68	24	30	0,20	4	SCM813-0800Z04R-R0020HB3-HP920	31515909
10,00	10	9,7	80	30	35	0,32	4	SCM813-1000Z04R-R0032HB3-HP920	31516050
12,00	12	11,6	93	36	45	0,32	4	SCM813-1200Z04R-R0032HB3-HP920	31516051
16,00	16	15,5	108	48	56	0,32	4	SCM813-1600Z04R-R0032HB3-HP920	31516053
20,00	20	19,5	126	60	70	0,50	4	SCM813-2000Z04R-R0050HB3-HP920	31516055

**Available on request**

14.00	14	13.6	99	42	50	0.32	4	SCM813-1400Z04R-R0032HB3-HP920	31516052
18.00	18	17.5	117	54	67	0.32	4	SCM813-1800Z04R-R0032HB3-HP920	31516054

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Alu-HPC-Pocket

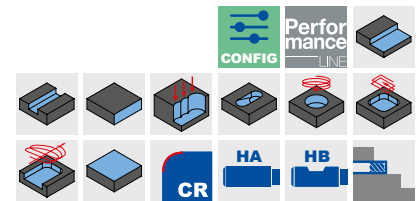
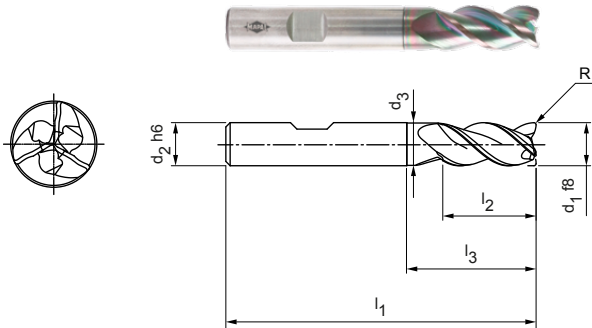
Shoulder milling cutter, long design with neck  
SCM850

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP913  
Number of cutting edges: 3  
Helix angle: 42°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	57	13	–	0,2	3	SCM850-0500Z03R-R0020HB-HP913	31054950
6,00	6	5,8	57	13	19	0,2	3	SCM850-0600Z03R-R0020HB-HP913	31054952
8,00	8	7,8	63	19	25	0,2	3	SCM850-0800Z03R-R0020HB-HP913	31054956
10,00	10	9,8	72	22	30	0,32	3	SCM850-1000Z03R-R0032HB-HP913	31054960
12,00	12	11,8	83	26	36	0,32	3	SCM850-1200Z03R-R0032HB-HP913	31054962
14,00	14	13,8	83	26	36	0,32	3	SCM850-1400Z03R-R0032HB-HP913	31054964
16,00	16	15,8	92	31	42	0,32	3	SCM850-1600Z03R-R0032HB-HP913	31054966
20,00	20	19,8	104	41	52	0,5	3	SCM850-2000Z03R-R0050HB-HP913	31054970

Undersize cutters available on request.

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Alu-HPC-Pocket

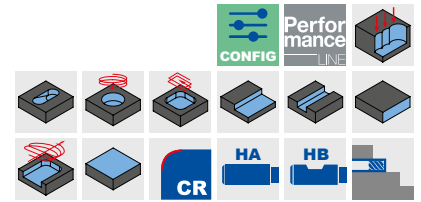
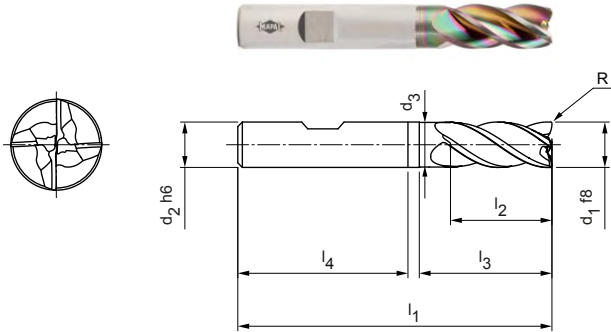
Shoulder milling cutter, long design with neck  
SCM856

**Design:**

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP913  
Number of cutting edges: 4  
Helix angle: ~ 36°  
Special feature: Face geometry with integrated drill tip

**Application:**

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



**Preferred series available from stock**

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	57	13	19	0,20	4	SCM856-0500Z04R-R0020HB-HP913	31621123
6,00	6	5,8	57	13	19	0,20	4	SCM856-0600Z04R-R0020HB-HP913	31621125
8,00	8	7,8	63	19	25	0,20	4	SCM856-0800Z04R-R0020HB-HP913	31621129
10,00	10	9,8	72	22	30	0,32	4	SCM856-1000Z04R-R0032HB-HP913	31621133
12,00	12	11,8	83	26	36	0,32	4	SCM856-1200Z04R-R0032HB-HP913	31621135
14,00	14	13,8	83	26	36	0,32	4	SCM856-1400Z04R-R0032HB-HP913	31621137
16,00	16	15,8	92	32	42	0,32	4	SCM856-1600Z04R-R0032HB-HP913	31621139
20,00	20	19,8	104	38	52	0,50	4	SCM856-2000Z04R-R0050HB-HP913	31621143

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Alu-HPC-Pocket

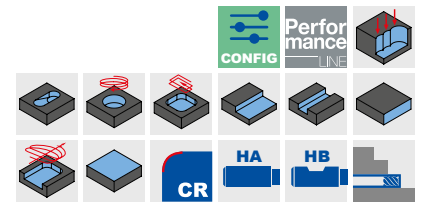
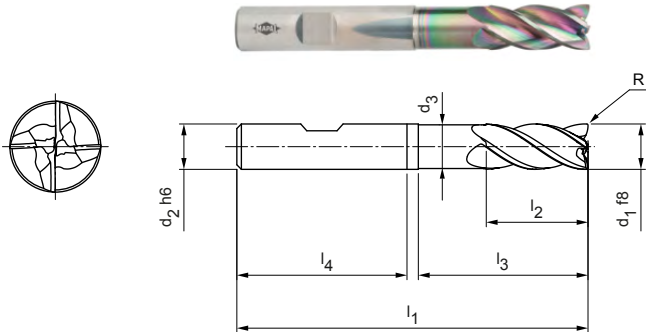
Shoulder milling cutter, overlong design with neck  
SCM855

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP913  
Number of cutting edges: 4  
Helix angle: ~ 36°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	62	13	24	0,20	4	SCM855-0500Z04R-R0020HB-HP913	31621102
6,00	6	5,8	62	13	24	0,20	4	SCM855-0600Z04R-R0020HB-HP913	31621104
8,00	8	7,7	68	21	30	0,20	4	SCM855-0800Z04R-R0020HB-HP913	31621108
10,00	10	9,7	80	22	38	0,32	4	SCM855-1000Z04R-R0032HB-HP913	31621112
12,00	12	11,6	93	26	46	0,32	4	SCM855-1200Z04R-R0032HB-HP913	31621114
16,00	16	15,5	108	36	58	0,32	4	SCM855-1600Z04R-R0032HB-HP913	31621118
20,00	20	19,5	126	41	74	0,50	4	SCM855-2000Z04R-R0050HB-HP913	31621122

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

# OptiMill®-Alu-HPC-Pocket

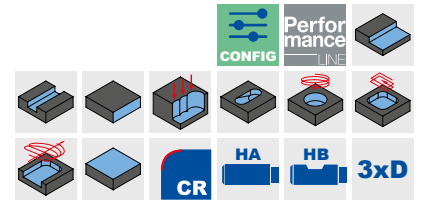
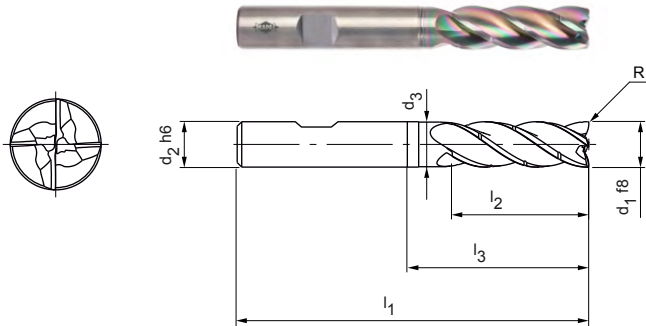
Shoulder milling cutter, 3xD design with neck, includes chip breaker  
SCM854

## Design:

Diameter of milling cutter: 5.00 – 20.00 mm  
Cutting material: HP913  
Number of cutting edges: 4  
Helix angle: 36°  
Special feature: Face geometry with integrated drill tip

## Application:

Perfect for inclined plunging up to 45°,  
in helix milling and grooving.



## Preferred series available from stock

Dimensions							z	Specification	Order no.
d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	R			
5,00	6	4,8	62	17	-	0,20	4	SCM854-0500Z04R-R0020HB-HP913	31302680
6,00	6	5,8	62	18	25	0,20	4	SCM854-0600Z04R-R0020HB-HP913	31302681
8,00	8	7,7	68	24	30	0,20	4	SCM854-0800Z04R-R0020HB-HP913	31302682
10,00	10	9,7	80	30	35	0,32	4	SCM854-1000Z04R-R0032HB-HP913	31302683
12,00	12	11,6	93	36	45	0,32	4	SCM854-1200Z04R-R0032HB-HP913	31302684
14,00	14	13,6	99	42	50	0,32	4	SCM854-1400Z04R-R0032HB-HP913	31302685
16,00	16	15,5	108	48	56	0,32	4	SCM854-1600Z04R-R0032HB-HP913	31302686
20,00	20	19,5	126	60	70	0,50	4	SCM854-2000Z04R-R0050HB-HP913	31302688

## Available on request

18.00	18	17.5	117	54	67	0.32	4	SCM854-1800Z04R-R0032HB-HP913	31302687
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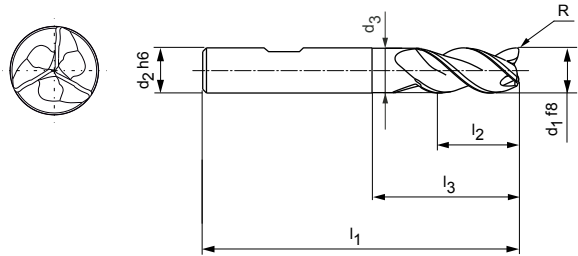
Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

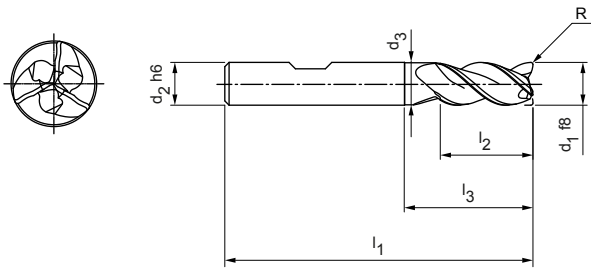
# OptiMill®-HPC-Pocket | Sets

Milling cutter sets Uni and Alu | Available from stock



## OptiMill-Uni-HPC-Pocket | Long design with neck

	Dimensions							z	Specification	Order no.
	d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Cx45°			
Set 1	6,00	6	5,8	57	13	19	0,30	3	SCM810-0600Z03R-R0030HB-HP920	30980462
	8,00	8	7,8	63	19	25	0,40	3	SCM810-0800Z03R-R0040HB-HP920	
	10,00	10	9,8	72	22	30	0,50	3	SCM810-1000Z03R-R0050HB-HP920	
	12,00	12	11,8	83	26	36	0,60	3	SCM810-1200Z03R-R0060HB-HP920	
Set 2	8,00	8	7,8	63	19	25	0,40	3	SCM810-0800Z03R-R0040HB-HP920	31575723
	10,00	10	9,8	72	22	30	0,50	3	SCM810-1000Z03R-R0050HB-HP920	
	12,00	12	11,8	83	26	36	0,60	3	SCM810-1200Z03R-R0060HB-HP920	
	16,00	16	15,8	92	31	42	0,80	3	SCM810-1600Z03R-R0080HB-HP920	



## OptiMill-Alu-HPC-Pocket | Long design with neck

	Dimensions							z	Specification	Order no.
	d <sub>1</sub> f8	d <sub>2</sub> h6	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Cx45°			
Set 1	6,00	6	5,8	57	13	19	0,20	3	SCM850-0600Z03R-R0020HB-HP913	31575722
	8,00	8	7,8	63	19	25	0,20	3	SCM850-0800Z03R-R0020HB-HP913	
	10,00	10	9,8	72	22	30	0,32	3	SCM850-1000Z03R-R0032HB-HP913	
	12,00	12	11,8	83	26	36	0,32	3	SCM850-1200Z03R-R0032HB-HP913	
Set 2	8,00	8	7,8	63	19	25	0,20	3	SCM850-0800Z03R-R0020HB-HP913	31575729
	10,00	10	9,8	72	22	30	0,32	3	SCM850-1000Z03R-R0032HB-HP913	
	12,00	12	11,8	83	26	36	0,32	3	SCM850-1200Z03R-R0032HB-HP913	
	16,00	16	15,8	92	31	42	0,32	3	SCM850-1600Z03R-R0032HB-HP913	

# A strong team: OptiMill®-HPC-Pocket and MillChuck HB

## 1 Decentralised coolant supply channels

- Optimum coolant supply

## 2 Differential screw

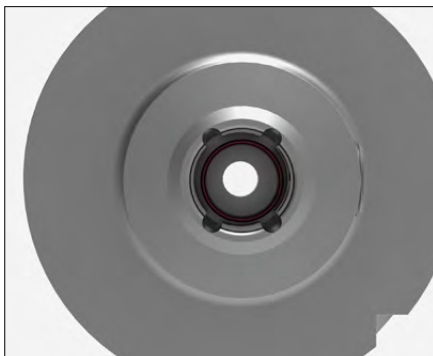
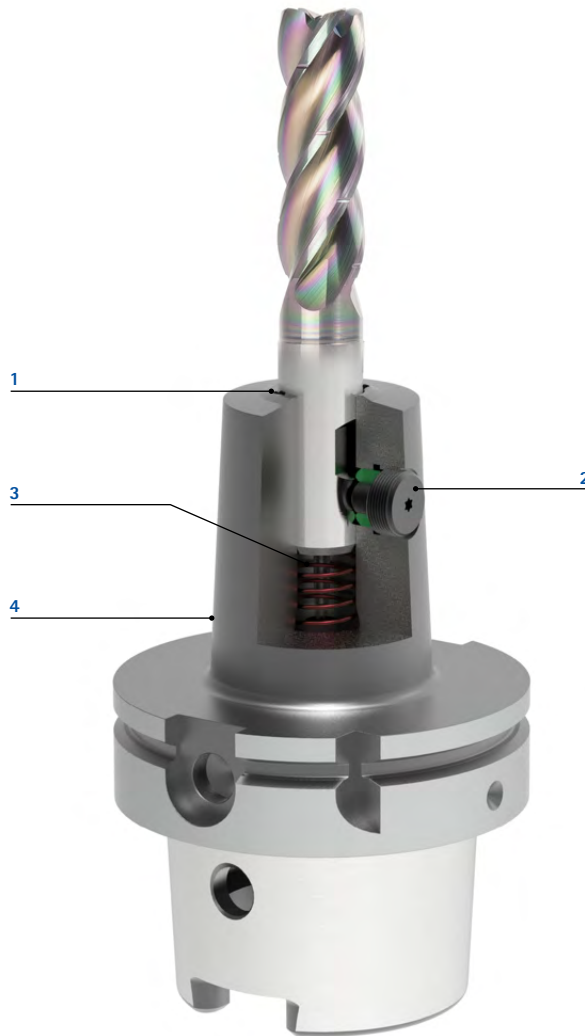
- Easy to handle

## 3 Spring package

- Perfect connection to the HB clamping surface

## 4 Contour

- Application-optimised contour for maximum rigidity



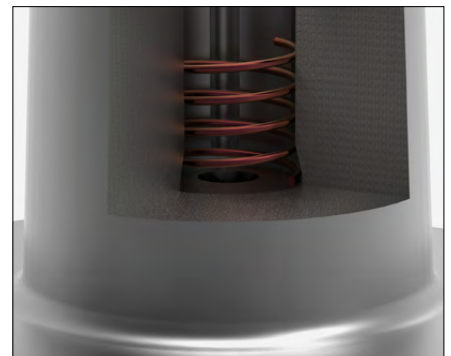
### Optimum coolant supply

- Decentralised coolant supply channels
- Use of standard tools without internal cooling
- Tool life improved thanks to optimal cooling



### Process-reliable tool clamping

- High clamping force thanks to two-part clamping element
- Differential screw for reduced tightening torque
- Process-reliable clamping through self-locking

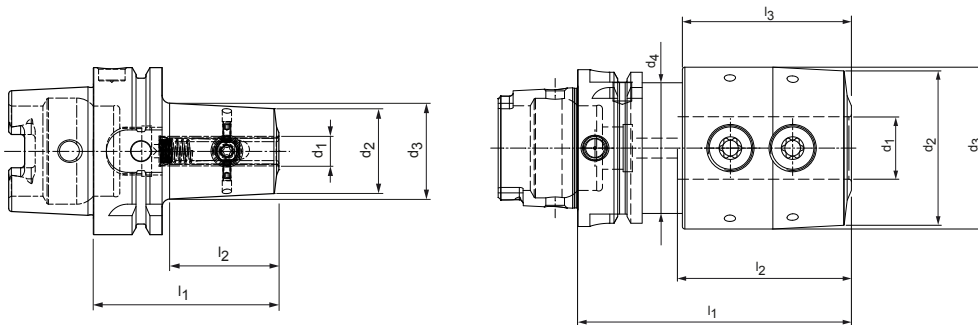


### Defined milling cutter positioning

- Perfect connection to the HB clamping surface
- Form fit between tool and connection
- Prevents any pull-out during machining

# MillChuck, HB

HSK-A (hollow shank taper form A) shank according to DIN 69893-1



HSK-A	Dimensions							Specification	Order no.
	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		
63	6,0	22,5	26,2	-	65,0	36,2	-	MWC-HSK-A063-06-065-1-0-W	30941344
63	8,0	25,0	28,7	-	65,0	36,2	-	MWC-HSK-A063-08-065-1-0-W	30941345
63	10,0	32,0	36,2	-	70,0	41,2	-	MWC-HSK-A063-10-070-1-0-W	30941346
63	12,0	37,5	42,7	-	80,0	51,2	-	MWC-HSK-A063-12-080-1-0-W	30941347
63	16,0	43,0	48,3	-	80,0	52,2	-	MWC-HSK-A063-16-080-1-0-W	30941349
63	20,0	46,5	52,0	-	80,0	54,0	-	MWC-HSK-A063-20-080-1-0-W	30941371
63	25,0	62,0	65,0	52,5	110,0	69,9	68,0	MWC-HSK-A063-25-110-1-0-W	30941372
63	32,0	69,0	72,0	52,5	110,0	69,9	68,0	MWC-HSK-A063-32-110-1-0-W	30941373
100	6,0	22,5	27,5	-	80,0	48,2	-	MWC-HSK-A100-06-080-1-0-W	30941374
100	8,0	25,0	30,0	-	80,0	48,2	-	MWC-HSK-A100-08-080-1-0-W	30941375
100	10,0	32,0	36,9	-	80,0	48,2	-	MWC-HSK-A100-10-080-1-0-W	30941376
100	12,0	37,5	42,9	-	85,0	53,2	-	MWC-HSK-A100-12-085-1-0-W	30941377
100	16,0	43,0	50,0	-	100,0	68,2	-	MWC-HSK-A100-16-100-1-0-W	30941379
100	20,0	46,5	53,5	-	100,0	68,2	-	MWC-HSK-A100-20-100-1-0-W	30941381
100	25,0	62,0	65,0	-	100,0	68,1	-	MWC-HSK-A100-25-100-1-0-W	30941382
100	32,0	69,0	72,0	-	110,0	78,1	-	MWC-HSK-A100-32-110-1-0-W	30925430

Dimensions in mm.

Additional dimensions available upon request.

Use: For connecting milling cutters with cylindrical shank and lateral drive area according to DIN 1835 Form B and DIN 6535 Form HB.

Scope of delivery: With built-in clamping screw, without coolant tube.

Design: Permissible run-out variation of the taper to the clamping bore  $d_1 = 3 \mu\text{m}$ .

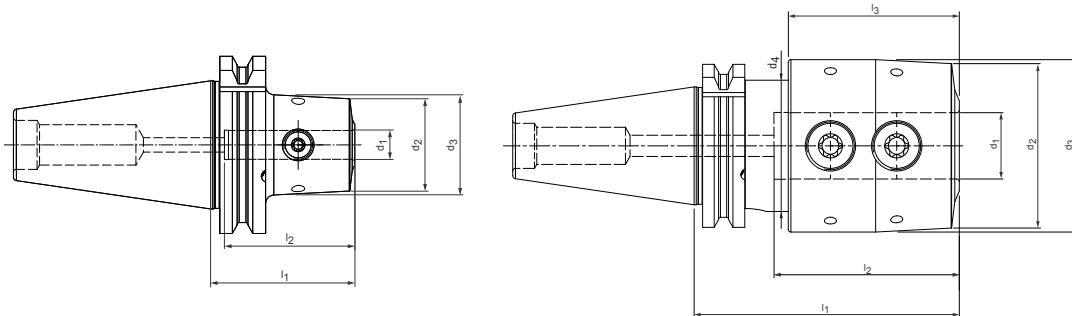
The bore tolerance is much more restricted than DIN 1835 in order to achieve machining accuracies of the highest quality.

Note: There are two clamping screws from clamping diameter  $d_1 = 25 \text{ mm}$ .

Balancing quality: G 2.5 with 16,000 rpm in delivery status.

# MillChuck, HB

SK shank according to ISO 7388-1 Form AD/AF



Steep taper	Dimensions							Specification	Order no.
	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		
40	6,0	22,5	25,4	-	50,0	28,1	-	MWC-SK040-06-050-3-0-W	31059420
40	8,0	25,0	27,9	-	50,0	28,1	-	MWC-SK040-08-050-3-0-W	31059421
40	10,0	32,0	34,8	-	50,0	28,1	-	MWC-SK040-10-050-3-0-W	31059422
40	12,0	37,5	40,3	-	50,0	28,1	-	MWC-SK040-12-050-3-0-W	31059423
40	16,0	43,0	47,3	-	63,0	43,0	-	MWC-SK040-16-063-3-0-W	31059425
40	20,0	46,5	49,5	-	63,0	43,0	-	MWC-SK040-20-063-3-0-W	31059427
40	25,0	62,0	65,0	49,5	100,0	69,9	64,5	MWC-SK040-25-100-3-0-W	31059428
40	32,0	69,0	72,0	49,5	100,0	69,9	64,5	MWC-SK040-32-100-3-0-W	31059429
50	6,0	22,5	26,7	-	63,0	41,1	-	MWC-SK050-06-063-3-0-W	31059430
50	8,0	25,0	29,2	-	63,0	41,1	-	MWC-SK050-08-063-3-0-W	31059431
50	10,0	32,0	36,2	-	63,0	41,1	-	MWC-SK050-10-063-3-0-W	31059432
50	12,0	37,5	41,7	-	63,0	41,1	-	MWC-SK050-12-063-3-0-W	31059433
50	16,0	43,0	47,1	-	63,0	41,1	-	MWC-SK050-16-063-3-0-W	31059435
50	20,0	46,5	50,6	-	63,0	41,1	-	MWC-SK050-20-063-3-0-W	31059437
50	25,0	62,0	67,8	-	80,0	58,1	-	MWC-SK050-25-080-3-0-W	31059438
50	32,0	69,0	76,9	-	100,0	78,1	-	MWC-SK050-32-100-3-0-W	31059439

Dimensions in mm.

Additional dimensions available upon request.

Use: For connecting milling cutters with cylindrical shank and lateral drive area according to DIN 1835 Form B and DIN 6535 Form HB.

Scope of delivery: Built-in clamping screw, does not include pull stud.

Design: Permissible run-out variation of the taper to the clamping bore  $d_1 = 3 \mu\text{m}$ .

The bore tolerance is much more restricted than DIN 1835 in order to achieve machining accuracies of the highest quality.

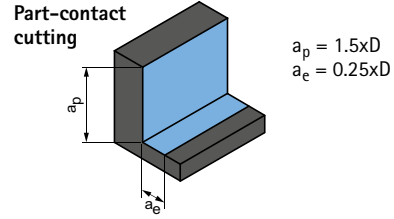
Note: There are two clamping screws from clamping diameter  $d_1 = 25 \text{ mm}$ .

Balancing quality: G 2.5 with 16,000 rpm in delivery status.



# Cutting data recommendations for shoulder milling cutters

Feed and cutting speed



## OptiMill-Uni-HPC-Pocket | SCM800, 810, 813, 814, 815, 816, 840

MMG*	Workpiece material	Strength/hardness [N/mm <sup>2</sup> ] [HRC]	Cooling			v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]							
			MQL/Air	Dry	KSS		Diameter of milling cutter [mm]							
							3.80	6.00	8.00	10.00	12.00	16.00	20.00	
P	P1	P1.1 Structural, machining, case hardened and tempering steels, unalloyed	< 700	✓	✓	✓	465	0.053	0.079	0.101	0.122	0.140	0.171	0.195
		P1.2 Structural, machining, case hardened and tempering steels, unalloyed	< 1,200	✓	✓	✓	380	0.049	0.074	0.095	0.113	0.130	0.159	0.182
	P2	P2.1 Nitriding, hardening and tempering steels, alloyed	< 900	✓	✓	✓	425	0.053	0.079	0.101	0.122	0.140	0.171	0.195
		P2.2 Nitriding, hardening and tempering steels, alloyed	< 1,400	✓		✓	295	0.044	0.066	0.085	0.101	0.116	0.142	0.163
	P3	P3.1 Tool, bearing, spring and high-speed steels**	< 800	✓	✓	✓	275	0.051	0.077	0.098	0.117	0.135	0.165	0.189
		P3.2 Tool, bearing, spring and high-speed steels**	< 1,000	✓		✓	255	0.048	0.073	0.093	0.111	0.128	0.156	0.179
		P3.3 Tool, bearing, spring and high-speed steels**	< 1,500	✓		✓	235	0.046	0.069	0.088	0.105	0.121	0.148	0.169
	P4	P4.1 Stainless steels, ferritic and martensitic		✓		✓	190	0.035	0.053	0.068	0.081	0.093	0.114	0.130
	P5	P5.1 Cast steel				✓	285	0.051	0.077	0.098	0.117	0.135	0.165	0.189
P6	P6.1 Stainless cast steels, ferritic and martensitic				✓	190	0.025	0.037	0.047	0.057	0.065	0.080	0.091	
M	M1	M1.1 Stainless steels, austenitic	< 700	✓		✓	125	0.031	0.046	0.059	0.071	0.081	0.100	0.114
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1,000			✓	120	0.025	0.038	0.049	0.059	0.068	0.082	0.094
	M2	M2.1 Stainless cast steel, austenitic	< 700	✓		✓	140	0.033	0.050	0.064	0.077	0.088	0.108	0.124
	M3	M3.1 Stainless cast steel, ferritic/austenitic (duplex)	< 1,000			✓	125	0.026	0.040	0.051	0.061	0.070	0.085	0.098
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	510	0.088	0.132	0.169	0.203	0.233	0.284	0.325
		K2.1 Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓	465	0.075	0.113	0.144	0.172	0.198	0.242	0.276
	K2	K2.2 Cast iron with spheroidal graphite, GJS	≤ 800	✓	✓	✓	380	0.062	0.093	0.118	0.142	0.163	0.199	0.228
		K2.3 Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	210	0.035	0.053	0.068	0.081	0.093	0.114	0.130
	K3	K3.1 Cast iron with vermicular graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	340	0.062	0.093	0.118	0.142	0.163	0.199	0.228
		K3.2 Cast iron with vermicular graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	315	0.053	0.079	0.101	0.122	0.140	0.171	0.195

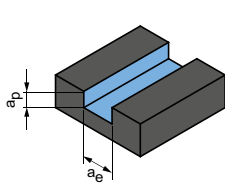
### Tool length/correction factor

Length	f <sub>z</sub> & v <sub>c</sub>
Short	1
Long	1
Overlong	0.8
Extra long	-

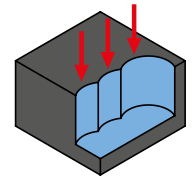
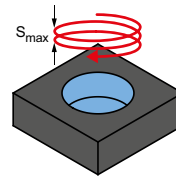
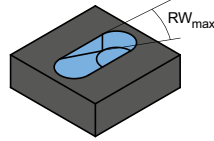
\* MAPAL machining groups

\*\* If the alloy parts Cr, Mo, Ni, V, W in total > 8%, then select the next highest MAPAL machining group.

Full cutting



$a_p = 1xD$   
 $a_e = 1xD$



$v_c$ [m/min]	$f_z$ [mm]							Ramps	Helix milling				Drilling		
	Diameter of milling cutter [mm]							$RW_{max}$	$S_{max}$ at G = 1.5	$EW_{max}$				$f_z$ factor	
	3.80	6.00	8.00	10.00	12.00	16.00	20.00			G = 1.5		G = 1.8		z3	z4
								z3	z4	z3	z4				
230	0.031	0.047	0.060	0.072	0.082	0.101	0.115	45°	0.75xD	25°				0.9	0.5
185	0.029	0.044	0.056	0.067	0.077	0.094	0.107	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
205	0.031	0.047	0.060	0.072	0.082	0.101	0.115	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
145	0.026	0.039	0.050	0.060	0.069	0.084	0.096	45°	0.75xD	25°	20°	35°	30°	0.7	0.4
135	0.030	0.045	0.058	0.069	0.080	0.097	0.111	30°	0.5xD	18°	15°	25°	20°	0.8	0.45
125	0.029	0.043	0.055	0.066	0.075	0.092	0.105	30°	0.5xD	18°	15°	25°	20°	0.7	0.4
115	0.027	0.041	0.052	0.062	0.071	0.087	0.100	30°	0.5xD	18°	15°	25°	20°	0.7	0.4
95	0.021	0.031	0.040	0.048	0.055	0.067	0.077	15°	0.5xD	18°	15°	25°	20°		
140	0.030	0.045	0.058	0.069	0.080	0.097	0.111	30°	0.5xD	18°	15°	25°	20°		
95	0.015	0.022	0.028	0.033	0.038	0.047	0.054	15°	0.5xD	18°	15°	25°	20°		
60	0.018	0.027	0.035	0.042	0.048	0.059	0.067	15°	0.5xD	18°	15°	25°	20°		
60	0.015	0.023	0.029	0.035	0.040	0.049	0.056	15°	0.5xD	18°	15°	25°	20°		
70	0.020	0.030	0.038	0.045	0.052	0.064	0.073	15°	0.5xD	18°	15°	25°	20°		
60	0.016	0.023	0.030	0.036	0.041	0.050	0.058	15°	0.5xD	18°	15°	25°	20°		
250	0.052	0.078	0.100	0.119	0.137	0.168	0.192	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
230	0.044	0.066	0.085	0.102	0.117	0.143	0.163	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
185	0.036	0.055	0.070	0.084	0.096	0.117	0.134	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
105	0.021	0.031	0.040	0.048	0.055	0.067	0.077	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
165	0.036	0.055	0.070	0.084	0.096	0.117	0.134	45°	0.75xD	25°	20°	35°	30°	0.8	0.45
155	0.031	0.047	0.060	0.072	0.082	0.101	0.115	45°	0.75xD	25°	20°	35°	30°	0.8	0.45

Explanation of terms:

$RW_{max}$  = maximum angle of the ramp

$S_{max}$  = maximum slope of the helix

G = Ratio of circular pocket  $\phi$  when plunging into the tool  $\phi$

E.g.: Tool  $\phi$  12 mm at G=1.5 results in a pocket  $\phi$  of 18 mm

$EW_{max}$  = slope angle of the helix (results from G and  $S_{max}$ )

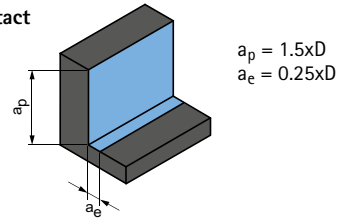
The specified machining values are guide values.

The optimum data for the respective machining task should be determined during the test or machining.

# Cutting data recommendations for shoulder milling cutters

Feed and cutting speed

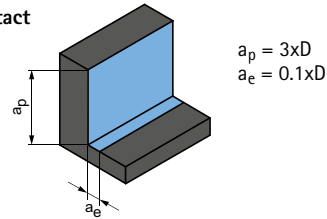
Part-contact cutting



## OptiMill-Alu-HPC-Pocket | SCM850

MMG*	Workpiece material	Strength/hardness [N/mm <sup>2</sup> ] [HRC]	Cooling			v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]						
			MQL/Air	Dry	KSS		Diameter of milling cutter [mm]						
							5.00	8.00	10.00	12.00	16.00	20.00	
N	N1	N1.1 Aluminium, unalloyed and alloyed < 3% Si	✓	✓	✓	945	0.080	0.120	0.145	0.169	0.210	0.243	
		N1.2 Aluminium, alloyed < 7% Si	✓	✓	✓	625	0.084	0.126	0.152	0.177	0.221	0.256	
		N1.3 Aluminium, alloyed > 7 - 12% Si	✓	✓	✓	500	0.088	0.132	0.160	0.186	0.231	0.268	
		N1.4 Aluminium, alloyed > 12% Si	✓	✓	✓	360	0.096	0.144	0.174	0.202	0.252	0.292	
	N2	N2.1 Copper, unalloyed and low alloyed	< 300	✓	✓	✓	360	0.064	0.096	0.116	0.135	0.168	0.195
		N2.2 Copper, alloyed	> 300	✓	✓	✓	270	0.064	0.096	0.116	0.135	0.168	0.195
		N2.3 Brass, bronze, gunmetal	< 1,200	✓	✓	✓	450	0.040	0.060	0.073	0.084	0.105	0.122
	N4	N4.1 Plastic, thermoplastics		✓	✓	✓	125	0.040	0.060	0.073	0.084	0.105	0.122
		N4.2 Plastic, duroplastics		✓	✓	✓	185	0.040	0.060	0.073	0.084	0.105	0.122
		N4.3 Plastic, foam materials		✓	✓		565	0.024	0.036	0.044	0.051	0.063	0.073

Part-contact cutting



## OptiMill-Alu-HPC-Pocket | SCM854, 855, 856

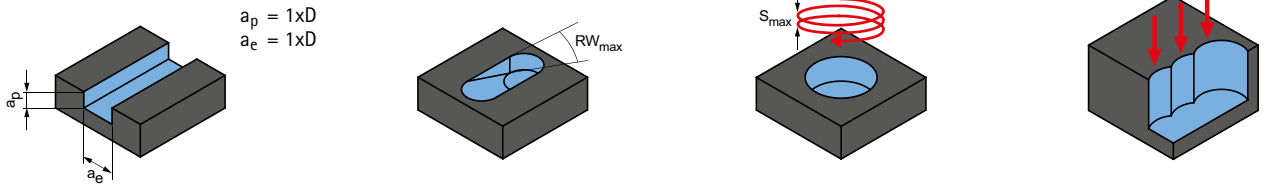
MMG*	Workpiece material	Strength/hardness [N/mm <sup>2</sup> ] [HRC]	Cooling			v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]								
			MQL/Air	Dry	KSS		Diameter of milling cutter [mm]								
							5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	
N	N1	N1.1 Aluminium, unalloyed and alloyed < 3% Si	✓	✓	✓	915	0.061	0.091	0.110	0.126	0.141	0.154	0.166	0.176	
		N1.2 Aluminium, alloyed < 7% Si	✓	✓	✓	610	0.064	0.096	0.115	0.132	0.148	0.162	0.174	0.185	
		N1.3 Aluminium, alloyed > 7 - 12% Si	✓	✓	✓	485	0.067	0.101	0.121	0.139	0.155	0.169	0.182	0.193	
		N1.4 Aluminium, alloyed > 12% Si	✓	✓	✓	350	0.073	0.110	0.131	0.151	0.169	0.185	0.199	0.211	
	N2	N2.1 Copper, unalloyed and low alloyed	< 300	✓	✓	✓	350	0.049	0.073	0.088	0.101	0.113	0.123	0.132	0.141
		N2.2 Copper, alloyed	> 300	✓	✓	✓	265	0.049	0.073	0.088	0.101	0.113	0.123	0.132	0.141
		N2.3 Brass, bronze, gunmetal	< 1,200	✓	✓	✓	440	0.030	0.046	0.055	0.063	0.070	0.077	0.083	0.088
	N4	N4.1 Plastic, thermoplastics		✓	✓	✓	120	0.030	0.046	0.055	0.063	0.070	0.077	0.083	0.088
		N4.2 Plastic, duroplastics		✓	✓	✓	180	0.030	0.046	0.055	0.063	0.070	0.077	0.083	0.088
		N4.3 Plastic, foam materials		✓	✓		315	0.018	0.027	0.033	0.038	0.042	0.046	0.050	0.053

### Tool length/correction factor

Length	f <sub>z</sub> & v <sub>c</sub>
Short	1
Long	1
Overlong	0.8
Extra long	-

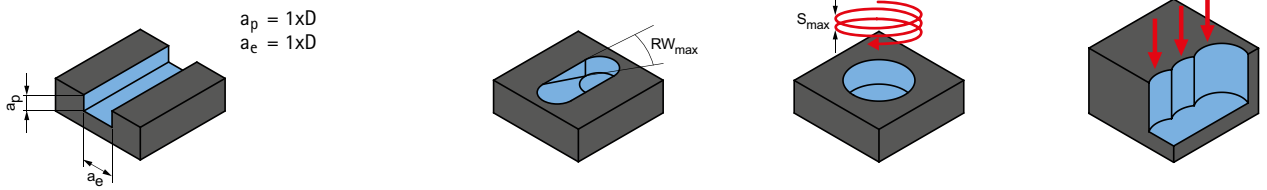
\* MAPAL machining groups

Full cutting



$v_c$ [m/min]	$f_z$ [mm]						Ramps	Helix milling		Drilling	
	Diameter of milling cutter [mm]						$RW_{max}$	$S_{max}$	$EW_{max}$		$f_z$ factor
	5.00	8.00	10.00	12.00	16.00	20.00		at G = 1.5	G = 1.5	G = 1.8	
610	0.047	0.071	0.086	0.099	0.124	0.144	45°	0.75xD	25°	60°	0.8
405	0.049	0.074	0.090	0.104	0.130	0.151	45°	0.75xD	25°	60°	0.8
325	0.052	0.078	0.094	0.109	0.136	0.158	45°	0.75xD	25°	60°	0.8
235	0.057	0.085	0.103	0.119	0.149	0.172	45°	0.75xD	25°	60°	0.8
235	0.038	0.057	0.068	0.080	0.099	0.115	45°	0.75xD	25°	60°	0.8
175	0.038	0.057	0.068	0.080	0.099	0.115	45°	0.75xD	25°	60°	0.8
295	0.024	0.035	0.043	0.050	0.062	0.072	45°	0.75xD	25°	60°	0.8
80	0.024	0.035	0.043	0.050	0.062	0.072	45°	0.75xD	25°	60°	0.8
120	0.024	0.035	0.043	0.050	0.062	0.072	45°	0.75xD	25°	60°	0.8
365	0.014	0.021	0.026	0.030	0.037	0.043	45°	0.75xD	25°	60°	0.8

Full cutting



$v_c$ [m/min]	$f_z$ [mm]								Ramps	Helix milling		Grooving	
	Diameter of milling cutter [mm]								$RW_{max}$	$S_{max}$	$EW_{max}$		$f_z$ factor
	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00		at G = 1.5	G = 1.5	G = 1.8	
495	0.045	0.068	0.081	0.093	0.104	0.114	0.123	0.130	45°	0.75xD	25°	45°	0.5
330	0.047	0.071	0.085	0.098	0.109	0.120	0.129	0.137	45°	0.75xD	25°	45°	0.5
265	0.050	0.075	0.089	0.103	0.115	0.125	0.135	0.143	45°	0.75xD	25°	45°	0.5
190	0.054	0.081	0.097	0.112	0.125	0.137	0.147	0.156	45°	0.75xD	25°	45°	0.5
190	0.036	0.054	0.065	0.075	0.083	0.091	0.098	0.104	45°	0.75xD	25°	45°	0.5
145	0.036	0.054	0.065	0.075	0.083	0.091	0.098	0.104	45°	0.75xD	25°	45°	0.5
240	0.023	0.034	0.041	0.047	0.052	0.057	0.061	0.065	45°	0.75xD	25°	45°	0.5
65	0.023	0.034	0.041	0.047	0.052	0.057	0.061	0.065	45°	0.75xD	25°	45°	0.5
100	0.023	0.034	0.041	0.047	0.052	0.057	0.061	0.065	45°	0.75xD	25°	45°	0.5
170	0.014	0.020	0.024	0.028	0.031	0.034	0.037	0.039	45°	0.75xD	25°	45°	0.5

Explanation of terms:

$RW_{max}$  = maximum angle of the ramp

$S_{max}$  = maximum slope of the helix

G = Ratio of circular pocket  $\phi$  when plunging into the tool  $\phi$

E.g.: Tool  $\phi$  12 mm at G=1.5 results in a pocket  $\phi$  of 18 mm

$EW_{max}$  = slope angle of the helix (results from G and  $S_{max}$ )

# Cutting data recommendations for shoulder milling cutters

Feed and cutting speed

## OptiMill-Uni-HPC-Pocket | SCM800, 810, 813, 814, 815, 816, 840

MMG*	Workpiece material		Strength/hardness [N/mm <sup>2</sup> ] [HRC]	Cooling				
				MQL/Air	Dry	KSS		
P	P1	P1.1	Structural, machining, case hardened and tempering steels, unalloyed	< 700	✓	✓	✓	
		P1.2	Structural, machining, case hardened and tempering steels, unalloyed	< 1,200	✓	✓	✓	
	P2	P2.1	Nitriding, hardening and tempering steels, alloyed	< 900	✓	✓	✓	
		P2.2	Nitriding, hardening and tempering steels, alloyed	< 1,400	✓		✓	
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	✓	✓	✓	
		P3.2	Tool, bearing, spring and high-speed steels**	< 1,000	✓		✓	
		P3.3	Tool, bearing, spring and high-speed steels**	< 1,500	✓		✓	
	P4	P4.1	Stainless steels, ferritic and martensitic		✓		✓	
	P5	P5.1	Cast steel					
	P6	P6.1	Stainless cast steels, ferritic and martensitic				✓	
	K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓
			K2.1	Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓
K2		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	✓	✓	✓	
		K2.3	Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	
K3		K3.1	Cast iron with vermicular graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	
		K3.2	Cast iron with vermicular graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	

## OptiMill-Alu-HPC-Pocket | SCM854, 855, 856

MMG*	Workpiece material		Strength/hardness [N/mm <sup>2</sup> ] [HRC]	Cooling			
				MQL/Air	Dry	KSS	
N	N1	N1.1	Aluminium, unalloyed and alloyed < 3% Si		✓	✓	✓
		N1.2	Aluminium, alloyed < 7% Si		✓	✓	✓
		N1.3	Aluminium, alloyed > 7 - 12% Si		✓	✓	✓
		N1.4	Aluminium, alloyed > 12% Si		✓	✓	✓
	N2	N2.1	Copper, unalloyed and low alloyed	< 300	✓	✓	✓
		N2.2	Copper, alloyed	> 300	✓	✓	✓
		N2.3	Brass, bronze, gunmetal	< 1,200	✓	✓	✓
	N4	N4.1	Plastic, thermoplastics		✓	✓	✓
		N4.2	Plastic, duroplastics		✓	✓	✓
		N4.3	Plastic, foam materials		✓	✓	

### Calculation example for 42CrMo4 ø 12 mm:

$$f_z | a_e | h_m \text{ max.} = \frac{D}{100} \cdot \text{See table for value}$$

P2.2	Nitriding, hardening and tempering steels, alloyed	< 1400	✓	✓	<b>280 - 380</b>	<b>1</b> 1.0 - 1.6	<b>2</b> 8 - 12	<b>3</b> 0.56 - 0.68
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**1**  $f_z = \frac{12 \text{ mm}}{100} \cdot 1,2 = 0,144 \text{ mm}$

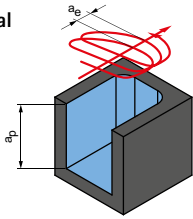
**2**  $a_e = \frac{12 \text{ mm}}{100} \cdot 10 = 1,2 \text{ mm}$

**3**  $h_m \text{ max.} = \frac{12 \text{ mm}}{100} \cdot 0,6 = 0,072 \text{ mm}$

\* MAPAL machining groups

\*\* If the alloy parts Cr, Mo, Ni, V, W in total > 8%, then select the next highest MAPAL machining group.

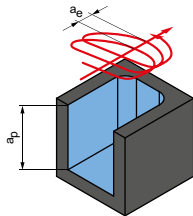
**Trochoidal milling**



$a_p$  = depending on max. machining depth of the tool  
 $a_e$  = depending on the workpiece material

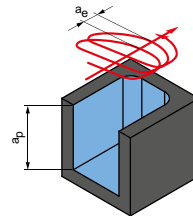
$v_c$ [m/min]	$f_z$ [mm] in % of D	$a_e$ [mm] in % of D	$h_m$ max. [mm] in % of D
380 - 520	1.4 - 2.0	14 - 18	0.66 - 0.80
320 - 460	1.2 - 1.8	12 - 16	0.62 - 0.76
340 - 480	1.2 - 1.8	10 - 14	0.58 - 0.71
280 - 380	1.0 - 1.6	8 - 12	0.56 - 0.68
250 - 360	1.1 - 1.7	9 - 15	0.56 - 0.67
230 - 340	0.9 - 1.5	8 - 13	0.54 - 0.64
210 - 320	0.8 - 1.4	6 - 12	0.52 - 0.62
180 - 260	0.8 - 1.2	6 - 12	0.50 - 0.60
220 - 300	1.2 - 1.8	8 - 12	0.54 - 0.62
160 - 240	0.8 - 1.4	6 - 12	0.50 - 0.60
400 - 500	2.0 - 2.6	15 - 20	0.64 - 0.78
340 - 500	1.8 - 2.4	12 - 16	0.62 - 0.7
300 - 440	1.6 - 2.2	10 - 14	0.58 - 0.68
180 - 260	1.4 - 2.0	8 - 12	0.56 - 0.68
280 - 360	1.6 - 2.2	10 - 16	0.6 - 0.68
210 - 340	1.4 - 2.0	10 - 16	0.58 - 0.66

**Trochoidal milling**



$a_p = 3xD$   
 $a_e = 0.1xD$

**Trochoidal milling**



$a_p = 3xD$   
 $a_e = 0.2xD$

$v_c$ [m/min]	$f_z$ [mm] in % of D	$a_e$ [mm] in % of D	$h_{max}$ [mm] in % of D	$v_c$ [m/min]	$f_z$ [mm] in % of D	$a_e$ [mm] in % of D	$h_{max}$ [mm] in % of D
915	0.1 - 1.4	10	0.84	810	0.7 - 0.9	20	1.12
610	0.1 - 1.5	10	0.90	540	0.7 - 1.0	20	1.20
485	1.0 - 1.3	10	0.78	430	0.8 - 1.0	20	1.04
350	1.1 - 1.5	10	0.90	310	0.8 - 1.1	20	1.20
350	0.7 - 1.0	10	0.60	310	0.5 - 0.8	20	0.80
265	0.7 - 1.0	10	0.60	235	0.5 - 0.8	20	0.80
440	0.4 - 0.6	10	0.36	390	0.3 - 0.5	20	0.48
120	0.4 - 0.6	10	0.36	105	0.3 - 0.5	20	0.48
180	0.4 - 0.6	10	0.36	160	0.3 - 0.5	20	0.48
315	0.3 - 0.4	10	0.24	280	0.2 - 0.3	20	0.32

**Note:**

In the case of trochoidal milling, the specified cutting conditions change during the machining process. This also depends on the CAM software used and the machining position of the tool in the workpiece. The feed and cutting width or contact angle are constantly changing during machining in order to achieve, as far as is possible, the most constant average chip thickness depending on the contour.

The specified machining values are guide values.  
 The optimum data for the respective machining task should be determined during the test or machining.



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