



Your technology partner for cost-effective machining

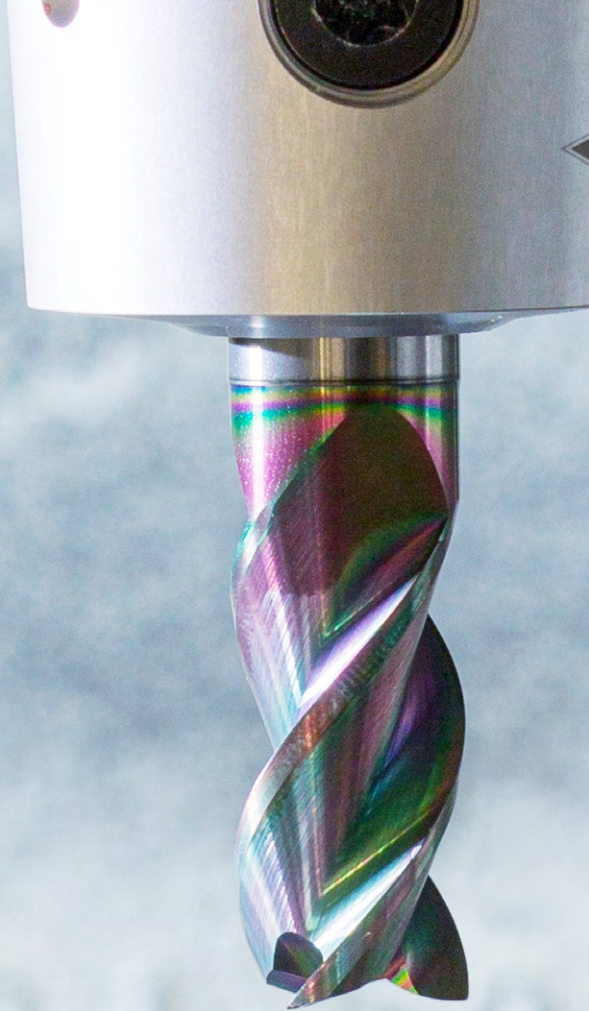
OptiMill[®]-HPC-Pocket

OptiMill®-HPC-Pocket

Maximum efficiency in pocket milling

The OptiMill-Uni-HPC-Pocket and OptiMill-Alu-HPC-Pocket milling tools stand for maximum precision and efficiency in pocket milling. Both tools are equipped with an integrated drill point, which is particularly suitable for versatile applications such as helical milling, grooving and inclined plunging. Large chip spaces on both milling cutters ensure fast and reliable chip evacuation, even with high cutting volumes, while a special cutting edge preparation and wear-resistant coating guarantee a long tool life and maximum process reliability.

The innovative geometry of the milling cutters prevents chip build-up and enables smooth machining, resulting in outstanding surface quality. Thanks to these advanced technical features, the OptiMill-Uni-HPC-Pocket and the OptiMill-Alu-HPC-Pocket are ideal tools for the efficient and precise machining of steel, cast iron and aluminium.

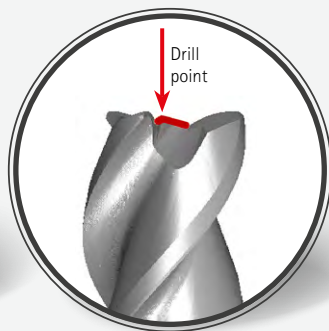


✓ INNOVATIVE SHARPENING

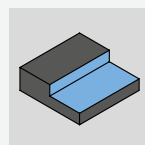
✓ BROAD FIELD OF APPLICATION



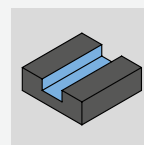
**Grooving (drilling)
and ramps with
very high feed rates**



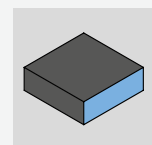
**Integrated
drill point especially
for plunge milling**



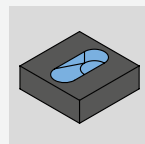
Shoulder milling



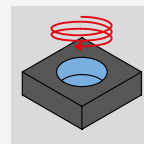
Groove milling



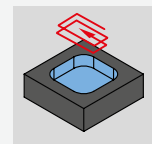
Trimming



Ramps



Helix milling



Pocket milling

| | |
|----------|-----------------|
| P | Steel |
| M | Stainless steel |
| K | Cast iron |
| N | Aluminum |



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Online-Shop

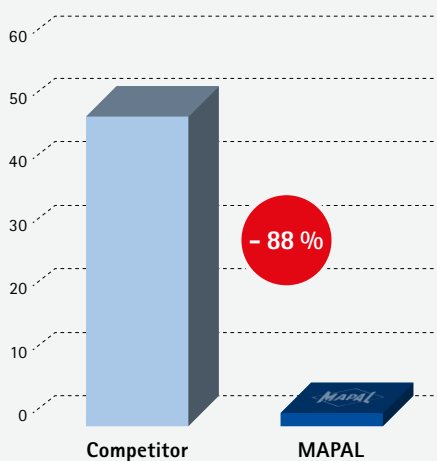


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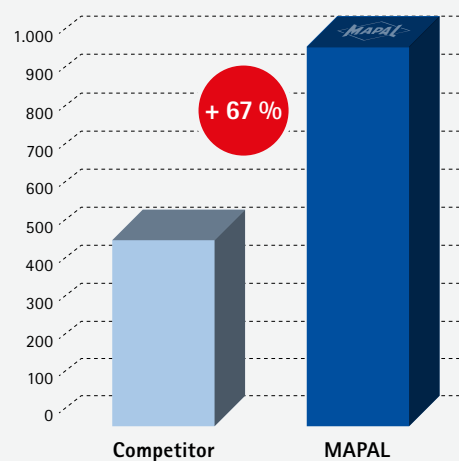
PROCESSING TIME [SEC.]



RESULT: 88 % faster processing time.



TOOL LIFE [SEC.]



RESULT: 67 % longer tool life.

OptiMill®-Uni-HPC-Pocket

Efficient pocket milling

The OptiMill-Uni-HPC-Pocket corner milling cutter with integrated drill point was specially developed for pocket milling steel and cast iron. The specially developed pointing, together with three large chip spaces, guarantees optimum chip evacuation. The special core rise ensures optimum stability in the machining process, making the tool ideal for helical milling and grooving.

1 Integrated drill point

- Suitable for inclined plunging up to 45°, for helical milling and grooving

2 Large chip spaces

- Fast and reliable chip removal with large chip volumes

3 Special cutting edge preparation and wear-resistant coating

- Long tool life and maximum process safety

4 Innovative pointing

- Grooving (drilling) & ramping with very high feed rates

5 Three chip breakers per cutting edge with dimension 3xD

- Short chips for maximum process reliability



Features

Preferred series in stock:

- Design z=3: short, long, extra-long
- Design z=4: 3xD with neck
- ϕ -range: 3,80 - 20,00 mm
- Shank form: HB

Configurable features:

- ϕ -range: 3,80 - 20,00 mm
- Shank form: HA

OptiMill-Uni-HPC-Pocket



Short design, z=3

Long design with neck, z=3

Overlong design with neck, z=3

Maximum performance for peripheral milling.
3xD design, z=4

OptiMill®-Uni-HPC-Pocket

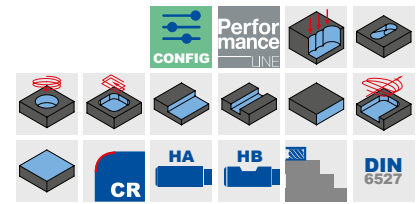
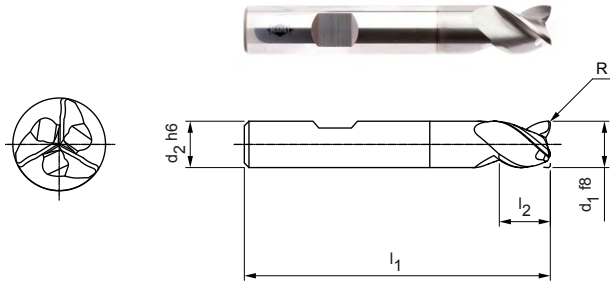
Shoulder milling cutter, short design
SCM840

Design:

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

Application:

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



Preferred series in stock

| Dimensions | | | | | | z | Specification | Order no. |
|-------------------|-------------------|----------------|----------------|----------------|------|---|-------------------------------|-----------|
| d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₅ | 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 |
|-------|----|----|----|---|------|---|-------------------------------|----------|

Configurable features



Shank form:
Shank form: HA



Shank form HA

Specification:

SCM840-0380Z03R-R0012[shank form]-HP920

Example:

SCM840-0380Z03R-R0012HA-HP920

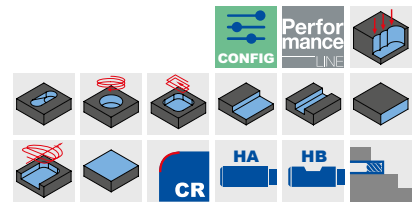
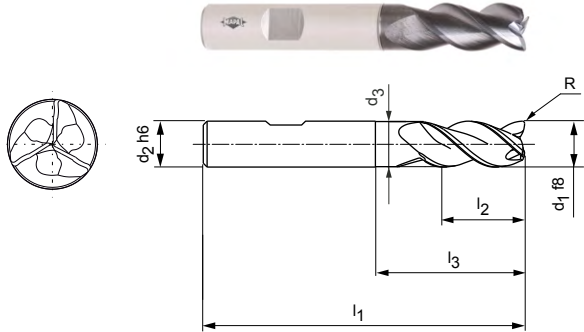
Dimensions in mm.

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 features: Face geometry with integrated drill tip

Application:

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

Preferred series in stock

| Dimensions | | | | | | | z | Specification | Order no. |
|------------|-------|------|-----|----|------|------|---|-------------------------------|-----------|
| d1 f8 | d2 h6 | d3 | l1 | l2 | l3 | 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 |

Configurable features

Shank form:
Shank form: HA

Specification:
SCM810-0380Z03R-R0019[shank form]-HP920

Example:

SCM810-0380Z03R-R0019HA-HP920

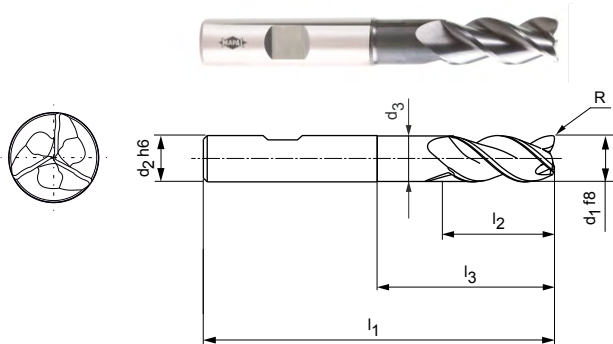


Dimensions in mm.

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

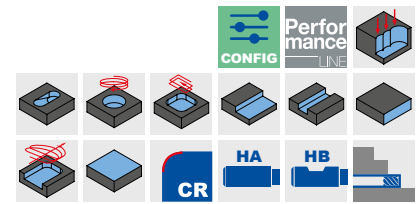


Design:

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

Application:


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




Preferred series in stock

| Dimensions | | | | | | | z | Specification | Order no. |
|-------------------|-------------------|----------------|----------------|----------------|----------------|------|---|-------------------------------|-----------|
| d ₁ f8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | 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 |

Configurable features



Shank form:
Shank form: HA



Specification:
SCM800-0500Z03R-R0025[shank form]-HP920

Example:

SCM800-0500Z03R-R0025HA-HP920

Shank form HA

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.

OptiMill®-Uni-HPC-Pocket

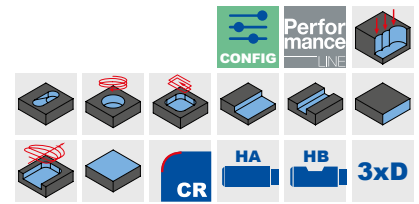
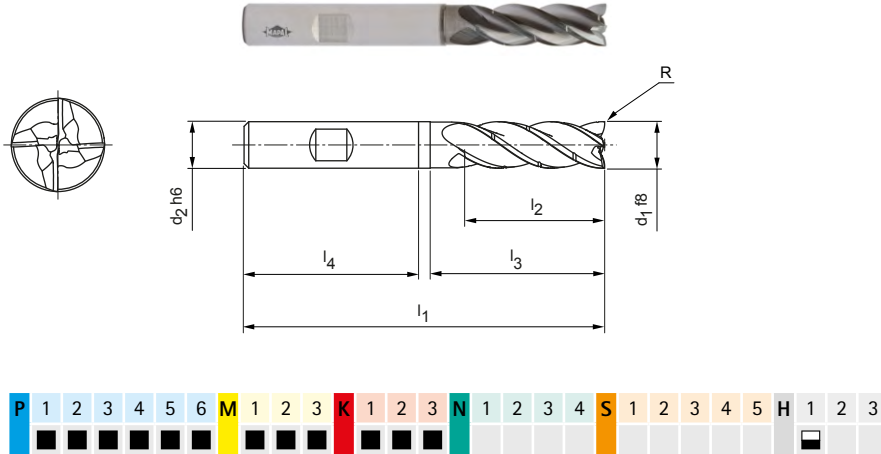
Shoulder milling cutter, 3xD design
SCM813

Design:

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

Application:

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



Preferred series in stock

| Dimensions | | | | | | | z | Specification | Order no. |
|-------------------|-------------------|----------------|----------------|----------------|----------------|------|---|--------------------------------|-----------|
| d ₁ f8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | 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 |

Configurable features

Shank form:
Shank form: HA

Specification:
SCM813-1200Z03R-R0032[shank form]3-HP920

Example:

SCM813-1200Z03R-R0032HA3-HP920

Shank form HA

Dimensions in mm.

For cutting data recommendations, see end of chapter.

Special designs and other coatings available upon request.



OptiMill®-Alu-HPC-Pocket

Unique face geometry with integrated drill point

The three-edged solid carbide milling cutter OptiMill-Alu-HPC-Pocket has an integrated drill point and is extremely versatile. The OptiMill-Alu-HPC-Pocket is particularly efficient when it comes to producing pockets, inclined plunging or so-called plunging.

1 Innovative face geometry

- Prevents chip build-up during grooving

2 Adapted pitch

- Smooth machining in all applications for the best possible surface quality

3 Ultra-fine ground flutes

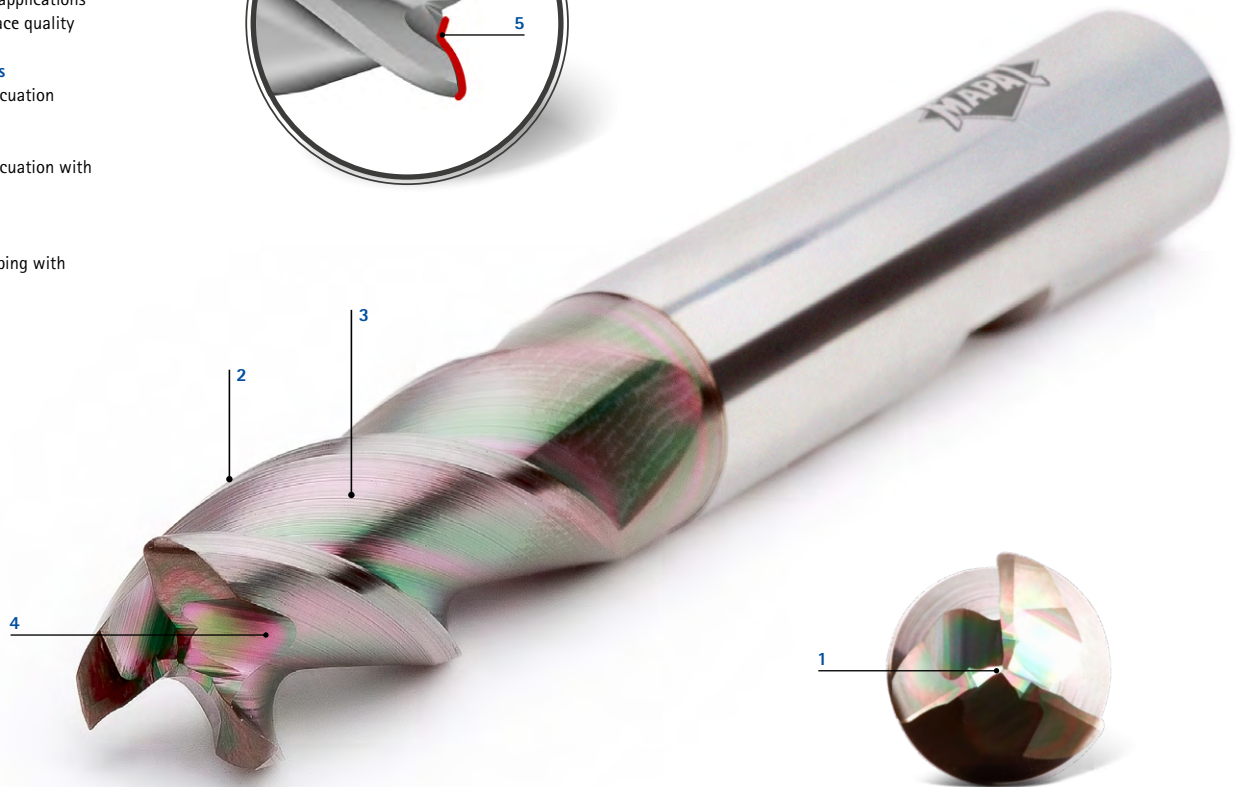
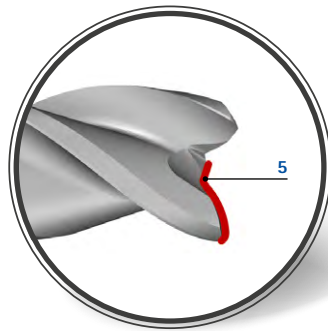
- Fast and reliable chip evacuation

4 Large chip spaces

- Fast and reliable chip evacuation with large chip volumes

5 Innovative pointing

- Grooving (drilling) Et ramping with very high feed rates



Features

Preferred series in stock:

- Design: long version with neck, 3xD with neck and chip breaker
- \varnothing -range: 5,00 - 20,00 mm
- Number of cutting edges: 3 / 4
- Shank form: HB

Configurable features:

- \varnothing -range: 5,00 - 20,00 mm
- Shank form: HA

OptiMill-Alu-HPC-Pocket



Long design with neck, z=3



Maximum performance for peripheral milling.
3xD design, z=4

OptiMill®-Alu-HPC-Pocket

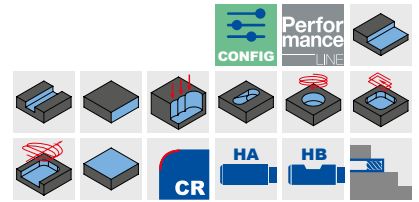
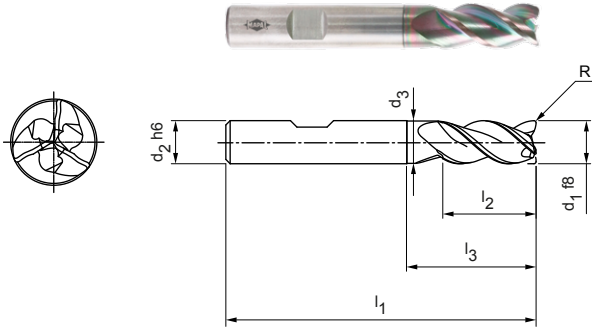
Shoulder milling cutter, long design with neck
SCM850

Design:

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

Application:

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




Preferred series in stock


| Dimensions | | | | | | | z | Specification | Order no. |
|-------------------|-------------------|----------------|----------------|----------------|----------------|------|---|-------------------------------|-----------|
| d ₁ f8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | 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.

Configurable features



Shank form:
Shank form: HA



Specification:
SCM850-0500Z03R-R0020[shank form]-HP913

Example:

SCM850-0500Z03R-R0020HA-HP913



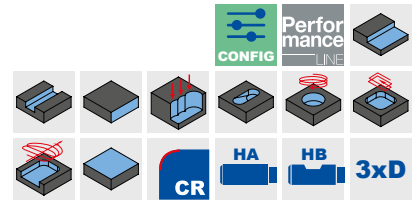
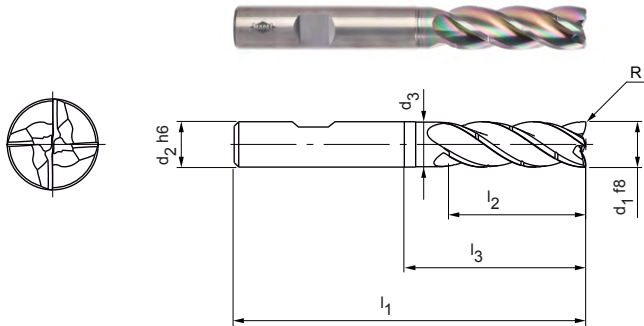
Dimensions in mm.

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 features: Face geometry with integrated drill tip

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


Preferred series in stock

| Dimensions | | | | | | | z | Specification | Order no. |
|-------------------|-------------------|----------------|----------------|----------------|----------------|------|---|-------------------------------|-----------|
| d ₁ f8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | 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 |
|-------|----|------|-----|----|----|------|---|-------------------------------|----------|

Configurable features



Shank form:
Shank form: HA



Specification:
SCM854-0500Z04R-R0020[shank form]-HP913

Example:
 SCM854-0500Z04R-R0020**HA**-HP913

Shank form HA

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

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

1 Decentralised coolant channels

- Optimal coolant supply

2 Differential screw

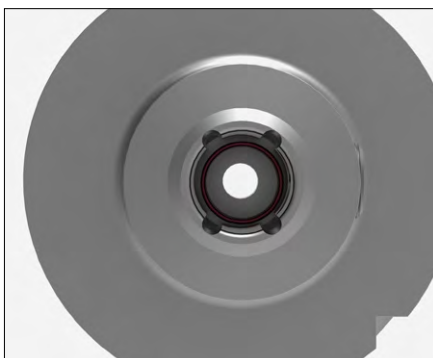
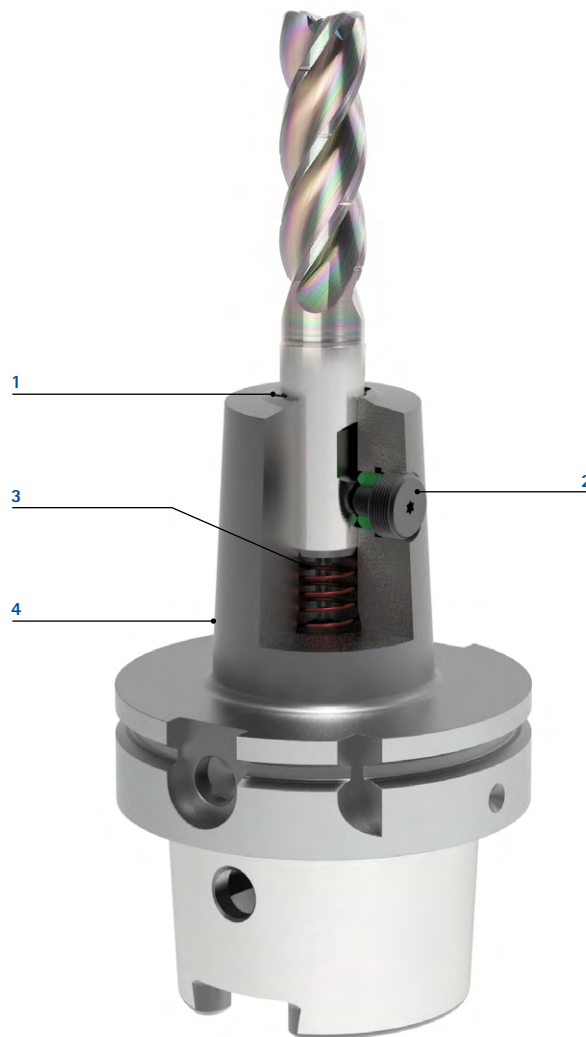
- Easy to handle

3 Spring package

- Perfect connection to the HB clamping surface

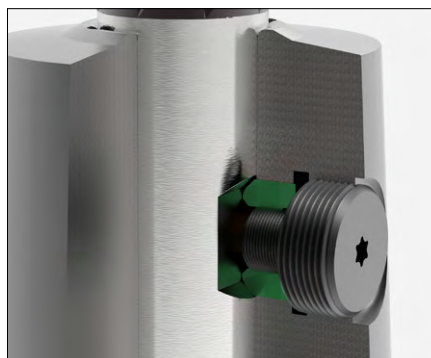
4 Contour

- Application-optimised contour for maximum rigidity



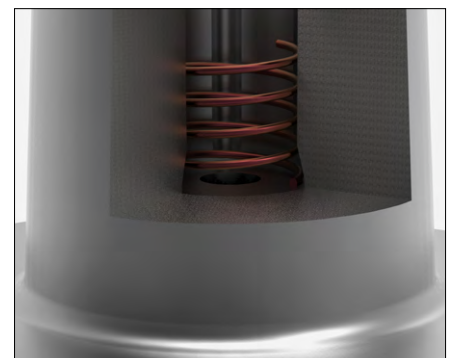
Optimal coolant supply

- Decentralised coolant 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

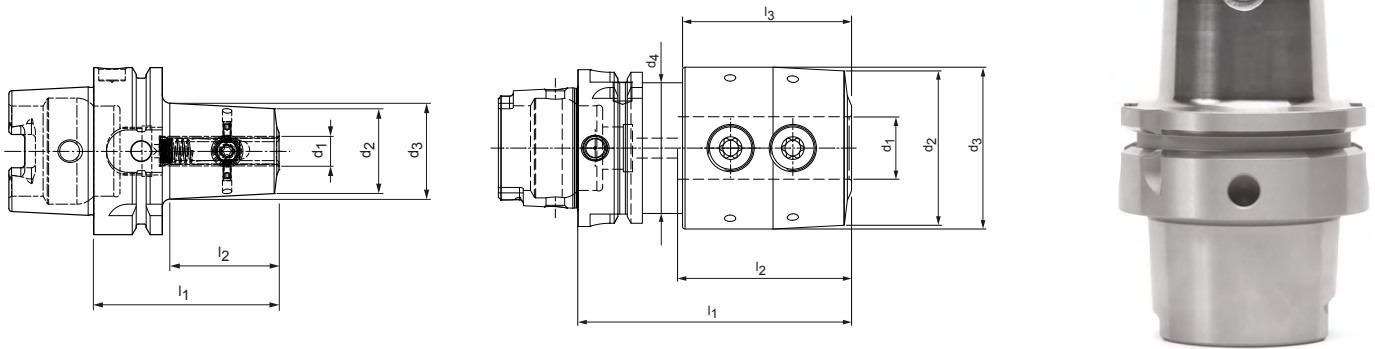


Defined milling cutter positioning

- Perfect connection to the HB clamping surface
- Form fit between tool and adapter
- 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 ₁ | d ₂ | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | | |
| 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 clamping 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 location bore d₁ = 3 µm.

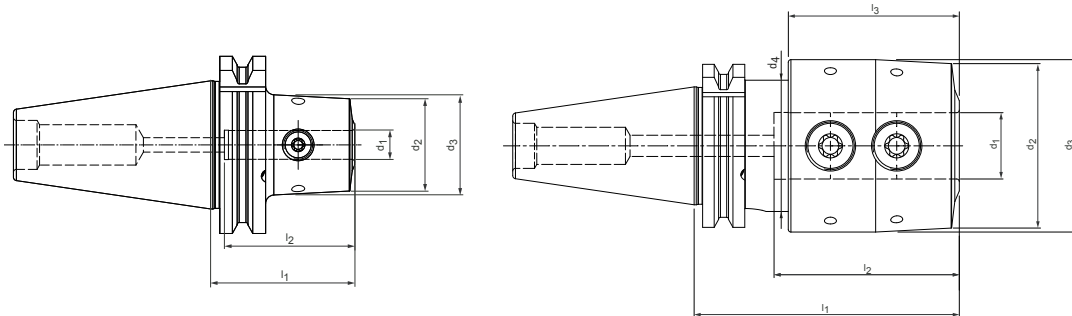
The bore tolerance is much more restricted than DIN 1835 in order to achieve machining accuracies of the highest quality.

Note: There are two clamping screws from clamping diameter d₁ = 25 mm.

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

MillChuck, HB

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



| Steep taper | Dimensions | | | | | | | Specification | Order no. |
|-------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------|-----------|
| | d ₁ | d ₂ | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | | |
| 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 clamping 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 location bore $d_1 = 3 \mu\text{m}$.

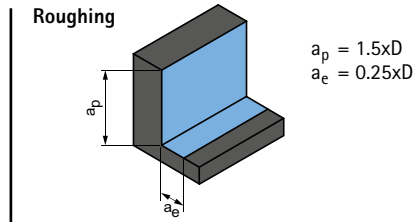
The bore tolerance is much more restricted than DIN 1835 in order to achieve machining accuracies of the highest quality.

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, 840

| MMG* | Workpiece material | Strength/hardness [N/mm ²] [HRC] | Cooling | | | v _c [m/min] | f _z [mm] | | | | | | | |
|------|--------------------|----------------------------------------------------------------------------|---------|-----|---------|------------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | MQL/Air | Dry | Coolant | | Diameter of milling cutter [mm] | | | | | | | |
| | | | | | | | 3.80 | 6.00 | 8.00 | 10.00 | 12.00 | 16.00 | 20.00 | |
| P | P1.1 | Structural, free-cutting, case hardened and heat-treated steels, non-alloy | < 700 | ✓ | ✓ | ✓ | 465 | 0.053 | 0.079 | 0.101 | 0.122 | 0.140 | 0.171 | 0.195 |
| | P1.2 | Structural, free-cutting, case hardened and heat-treated steels, non-alloy | < 1,200 | ✓ | ✓ | ✓ | 380 | 0.049 | 0.074 | 0.095 | 0.113 | 0.130 | 0.159 | 0.182 |
| | P2.1 | Nitrided, case hardened and heat-treated steels, alloy | < 900 | ✓ | ✓ | ✓ | 425 | 0.053 | 0.079 | 0.101 | 0.122 | 0.140 | 0.171 | 0.195 |
| | P2.2 | Nitrided, case hardened and heat-treated steels, alloy | < 1,400 | ✓ | | ✓ | 295 | 0.044 | 0.066 | 0.085 | 0.101 | 0.116 | 0.142 | 0.163 |
| | 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 |
| | P4.1 | Stainless steels, ferritic and martensitic | | ✓ | | ✓ | 190 | 0.035 | 0.053 | 0.068 | 0.081 | 0.093 | 0.114 | 0.130 |
| | P5.1 | Cast steel | | | | ✓ | 285 | 0.051 | 0.077 | 0.098 | 0.117 | 0.135 | 0.165 | 0.189 |
| | P6.1 | Stainless cast steel, ferritic and martensitic | | | | ✓ | 190 | 0.025 | 0.037 | 0.047 | 0.057 | 0.065 | 0.080 | 0.091 |
| M | 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 |
| | M2.1 | Stainless/heat-resistant cast steel, austenitic | < 700 | ✓ | | ✓ | 140 | 0.033 | 0.050 | 0.064 | 0.077 | 0.088 | 0.108 | 0.124 |
| | 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 | K1.1 | 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 |
| | K2.2 | 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 |
| | K3.1 | Cast iron with spheroidal 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 spheroidal graphite, GJV; malleable cast iron, GJM | > 500 | ✓ | ✓ | ✓ | 315 | 0.053 | 0.079 | 0.101 | 0.122 | 0.140 | 0.171 | 0.195 |

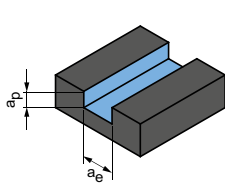
Tool length/correction factor

| Length | f _z & v _c |
|------------|---------------------------------|
| Short | 1 |
| Long | 1 |
| Overlong | 0.8 |
| Extra long | - |

* MAPAL machining groups

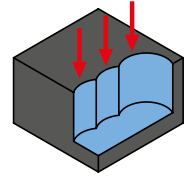
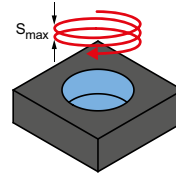
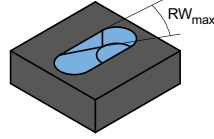
** If the alloy parts Cr, Mo, Ni, V, W in total > 8%, then select the next highest MAPAL machining group.

Groove milling



$$a_p = 1 \times D$$

$$a_e = 1 \times D$$



| 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 |
| | 3.80 | 6.00 | 8.00 | 10.00 | 12.00 | 16.00 | 20.00 | G = 1.5 | | | G = 1.8 | | |
| 230 | 0.031 | 0.047 | 0.060 | 0.072 | 0.082 | 0.101 | 0.115 | 45° | 0.75xD | 25° | 16° | 0.9 | |
| 185 | 0.029 | 0.044 | 0.056 | 0.067 | 0.077 | 0.094 | 0.107 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 205 | 0.031 | 0.047 | 0.060 | 0.072 | 0.082 | 0.101 | 0.115 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 145 | 0.026 | 0.039 | 0.050 | 0.060 | 0.069 | 0.084 | 0.096 | 45° | 0.75xD | 25° | 16° | 0.7 | |
| 135 | 0.030 | 0.045 | 0.058 | 0.069 | 0.080 | 0.097 | 0.111 | 30° | 0.5xD | 18° | 11° | 0.8 | |
| 125 | 0.029 | 0.043 | 0.055 | 0.066 | 0.075 | 0.092 | 0.105 | 30° | 0.5xD | 18° | 11° | 0.7 | |
| 115 | 0.027 | 0.041 | 0.052 | 0.062 | 0.071 | 0.087 | 0.100 | 30° | 0.5xD | 18° | 11° | 0.7 | |
| 95 | 0.021 | 0.031 | 0.040 | 0.048 | 0.055 | 0.067 | 0.077 | 15° | 0.5xD | 18° | 11° | | |
| 140 | 0.030 | 0.045 | 0.058 | 0.069 | 0.080 | 0.097 | 0.111 | 30° | 0.5xD | 18° | 11° | | |
| 95 | 0.015 | 0.022 | 0.028 | 0.033 | 0.038 | 0.047 | 0.054 | 15° | 0.5xD | 18° | 11° | | |
| 60 | 0.018 | 0.027 | 0.035 | 0.042 | 0.048 | 0.059 | 0.067 | 15° | 0.5xD | 18° | 11° | | |
| 60 | 0.015 | 0.023 | 0.029 | 0.035 | 0.040 | 0.049 | 0.056 | 15° | 0.5xD | 18° | 11° | | |
| 70 | 0.020 | 0.030 | 0.038 | 0.045 | 0.052 | 0.064 | 0.073 | 15° | 0.5xD | 18° | 11° | | |
| 60 | 0.016 | 0.023 | 0.030 | 0.036 | 0.041 | 0.050 | 0.058 | 15° | 0.5xD | 18° | 11° | | |
| 250 | 0.052 | 0.078 | 0.100 | 0.119 | 0.137 | 0.168 | 0.192 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 230 | 0.044 | 0.066 | 0.085 | 0.102 | 0.117 | 0.143 | 0.163 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 185 | 0.036 | 0.055 | 0.070 | 0.084 | 0.096 | 0.117 | 0.134 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 105 | 0.021 | 0.031 | 0.040 | 0.048 | 0.055 | 0.067 | 0.077 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 165 | 0.036 | 0.055 | 0.070 | 0.084 | 0.096 | 0.117 | 0.134 | 45° | 0.75xD | 25° | 16° | 0.8 | |
| 155 | 0.031 | 0.047 | 0.060 | 0.072 | 0.082 | 0.101 | 0.115 | 45° | 0.75xD | 25° | 16° | 0.8 | |

Explanation of terms:

RW_{max} = Maximum angle of the ramp

S_{max} = Maximum slope of the helix

G = Ratio of circular pocket \emptyset when plunging to the tool \emptyset

E.g.: Tool \emptyset 12 mm at G=1.5 results in a pocket \emptyset 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

OptiMill-Uni-HPC-Pocket | SCM800, 810, 813, 840

| MMG* | Workpiece material | Strength/hardness [N/mm ²] [HRC] | Cooling | | | | |
|------|--------------------|----------------------------------------------------------------------------|--------------------------------------------------------|-------|---------|---|---|
| | | | MQL/Air | Dry | Coolant | | |
| P | P1.1 | Structural, free-cutting, case hardened and heat-treated steels, non-alloy | < 700 | ✓ | ✓ | ✓ | |
| | P1.2 | Structural, free-cutting, case hardened and heat-treated steels, non-alloy | < 1,200 | ✓ | ✓ | ✓ | |
| | P2.1 | Nitrided, case hardened and heat-treated steels, alloy | < 900 | ✓ | ✓ | ✓ | |
| | P2.2 | Nitrided, case hardened and heat-treated steels, alloy | < 1,400 | ✓ | | ✓ | |
| | 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 | ✓ | | ✓ | |
| | P4.1 | Stainless steels, ferritic and martensitic | | ✓ | | ✓ | |
| | P5.1 | Cast steel | | | | | |
| | P6.1 | Stainless cast steel, ferritic and martensitic | | | | ✓ | |
| | K | K1.1 | Cast iron with lamellar graphite (grey cast iron), GJL | < 300 | ✓ | ✓ | ✓ |
| | | K2.1 | Cast iron with spheroidal graphite, GJS | < 500 | ✓ | ✓ | ✓ |
| K2.2 | | Cast iron with spheroidal graphite, GJS | ≤ 800 | ✓ | ✓ | ✓ | |
| K2.3 | | Cast iron with spheroidal graphite, GJS | > 800 | ✓ | ✓ | ✓ | |
| K3.1 | | Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM | < 500 | ✓ | ✓ | ✓ | |
| K3.2 | | Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM | > 500 | ✓ | ✓ | ✓ | |

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 | Nitrided, case hardened and heat-treated steels, alloy | < 1400 | ✓ | ✓ | 280 - 380 | 1.0 - 1.6 | 8 - 12 | 0.56 - 0.68 |
|------|--------------------------------------------------------|--------|---|---|-----------|-----------|--------|-------------|

$$1 \quad f_z = \frac{12 \text{ mm}}{100} \cdot 1,2 = 0,144 \text{ mm}$$

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

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

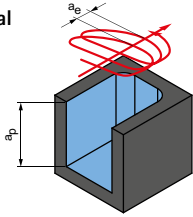
Note:

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.

* 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

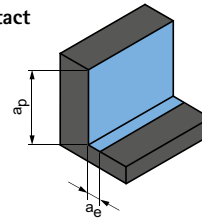
| v_c [m/min] | f_z [mm] in % of D | a_e [mm] in % of D | h_m max. [mm] in % of D | Machining example | |
|------------------|-------------------------|-------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 380 - 520 | 1.4 - 2.0 | 14 - 18 | 0.66 - 0.80 | 16MnCr5 $\varnothing = 12$ mm $v_c = 500$ m/min $f_z = 0.28$ mm $a_e = 1.8$ mm $a_p = 32$ mm | 42CrMo4 $\varnothing = 12$ mm $v_c = 375$ m/min $f_z = 0.17$ mm $a_e = 1.2$ mm $a_p = 32$ mm |
| 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 | | |

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



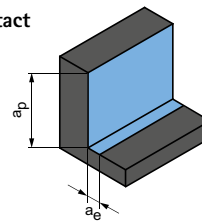
$$a_p = 1.5 \times D$$

$$a_e = 0.25 \times D$$

OptiMill-Alu-HPC-Pocket | SCM850

| MMG* | Workpiece material | Strength/hardness [N/mm ²] [HRC] | Cooling | | | v _c [m/min] | f _z [mm] | | | | | | |
|------|--------------------|----------------------------------------------|---------|-----|---------|------------------------|---------------------------------|-------|-------|-------|-------|-------|-------|
| | | | MQL/Air | Dry | Coolant | | Diameter of milling cutter [mm] | | | | | | |
| | | | | | | | 5.00 | 8.00 | 10.00 | 12.00 | 16.00 | 20.00 | |
| N | N1 | N1.1 Aluminium, non-alloy and alloy < 3 % Si | ✓ | ✓ | ✓ | 945 | 0.080 | 0.120 | 0.145 | 0.169 | 0.210 | 0.243 | |
| | | N1.2 Aluminium, alloy ≤ 7 % Si | ✓ | ✓ | ✓ | 625 | 0.084 | 0.126 | 0.152 | 0.177 | 0.221 | 0.256 | |
| | | N1.3 Aluminium, alloy > 7-12 % Si | ✓ | ✓ | ✓ | 500 | 0.088 | 0.132 | 0.160 | 0.186 | 0.231 | 0.268 | |
| | | N1.4 Aluminium, alloy > 12 % Si | ✓ | ✓ | ✓ | 360 | 0.096 | 0.144 | 0.174 | 0.202 | 0.252 | 0.292 | |
| | N2 | N2.1 Copper, non-alloy and low-alloy | < 300 | ✓ | ✓ | ✓ | 360 | 0.064 | 0.096 | 0.116 | 0.135 | 0.168 | 0.195 |
| | | N2.2 Copper, alloy | > 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, thermosets | | ✓ | ✓ | ✓ | 185 | 0.040 | 0.060 | 0.073 | 0.084 | 0.105 | 0.122 |
| | | N4.3 Plastic, foams | | ✓ | ✓ | | 565 | 0.024 | 0.036 | 0.044 | 0.051 | 0.063 | 0.073 |

Part-contact cutting



$$a_p = 3 \times D$$

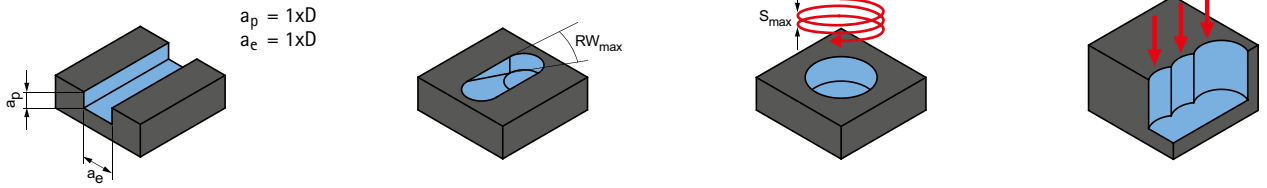
$$a_e = 0.1 \times D$$

OptiMill-Alu-HPC-Pocket | SCM854

| MMG* | Workpiece material | Strength/hardness [N/mm ²] [HRC] | Cooling | | | v _c [m/min] | f _z [mm] | | | | | | | | |
|------|--------------------|----------------------------------------------|---------|-----|---------|------------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | MQL/Air | Dry | Coolant | | 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, non-alloy and alloy < 3 % Si | ✓ | ✓ | ✓ | 915 | 0.061 | 0.091 | 0.110 | 0.126 | 0.141 | 0.154 | 0.166 | 0.176 | |
| | | N1.2 Aluminium, alloy ≤ 7 % Si | ✓ | ✓ | ✓ | 610 | 0.064 | 0.096 | 0.115 | 0.132 | 0.148 | 0.162 | 0.174 | 0.185 | |
| | | N1.3 Aluminium, alloy > 7-12 % Si | ✓ | ✓ | ✓ | 485 | 0.067 | 0.101 | 0.121 | 0.139 | 0.155 | 0.169 | 0.182 | 0.193 | |
| | | N1.4 Aluminium, alloy > 12 % Si | ✓ | ✓ | ✓ | 350 | 0.073 | 0.110 | 0.131 | 0.151 | 0.169 | 0.185 | 0.199 | 0.211 | |
| | N2 | N2.1 Copper, non-alloy and low-alloy | < 300 | ✓ | ✓ | ✓ | 350 | 0.049 | 0.073 | 0.088 | 0.101 | 0.113 | 0.123 | 0.132 | 0.141 |
| | | N2.2 Copper, alloy | > 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, thermosets | | ✓ | ✓ | ✓ | 180 | 0.030 | 0.046 | 0.055 | 0.063 | 0.070 | 0.077 | 0.083 | 0.088 |
| | | N4.3 Plastic, foams | | ✓ | ✓ | | 315 | 0.018 | 0.027 | 0.033 | 0.038 | 0.042 | 0.046 | 0.050 | 0.053 |

* MAPAL machining groups

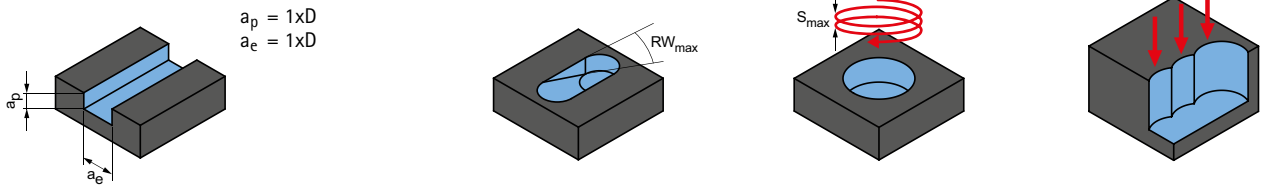
Full cutting



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

| v_c [m/min] | f_z [mm] | | | | | | Ramps | Helix milling | | Drilling | |
|------------------|---------------------------------|-------|-------|-------|-------|-------|------------|---------------|------------|----------|--------------|
| | Diameter of milling cutter [mm] | | | | | | RW_{max} | S_{max} | EW_{max} | | f_z factor |
| | 5.00 | 8.00 | 10.00 | 12.00 | 16.00 | 20.00 | | | G = 1.5 | G = 1.8 | |
| 610 | 0.047 | 0.071 | 0.086 | 0.099 | 0.124 | 0.144 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 405 | 0.049 | 0.074 | 0.090 | 0.104 | 0.130 | 0.151 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 325 | 0.052 | 0.078 | 0.094 | 0.109 | 0.136 | 0.158 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 235 | 0.057 | 0.085 | 0.103 | 0.119 | 0.149 | 0.172 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 235 | 0.038 | 0.057 | 0.068 | 0.080 | 0.099 | 0.115 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 175 | 0.038 | 0.057 | 0.068 | 0.080 | 0.099 | 0.115 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 295 | 0.024 | 0.035 | 0.043 | 0.050 | 0.062 | 0.072 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 80 | 0.024 | 0.035 | 0.043 | 0.050 | 0.062 | 0.072 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 120 | 0.024 | 0.035 | 0.043 | 0.050 | 0.062 | 0.072 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 365 | 0.014 | 0.021 | 0.026 | 0.030 | 0.037 | 0.043 | 45° | 0.75xD | 25° | 16° | 0.8 |

Full cutting



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

| 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 | | | 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° | 16° | 0.8 |
| 330 | 0.047 | 0.071 | 0.085 | 0.098 | 0.109 | 0.120 | 0.129 | 0.137 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 265 | 0.050 | 0.075 | 0.089 | 0.103 | 0.115 | 0.125 | 0.135 | 0.143 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 190 | 0.054 | 0.081 | 0.097 | 0.112 | 0.125 | 0.137 | 0.147 | 0.156 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 190 | 0.036 | 0.054 | 0.065 | 0.075 | 0.083 | 0.091 | 0.098 | 0.104 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 145 | 0.036 | 0.054 | 0.065 | 0.075 | 0.083 | 0.091 | 0.098 | 0.104 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 240 | 0.023 | 0.034 | 0.041 | 0.047 | 0.052 | 0.057 | 0.061 | 0.065 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 65 | 0.023 | 0.034 | 0.041 | 0.047 | 0.052 | 0.057 | 0.061 | 0.065 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 100 | 0.023 | 0.034 | 0.041 | 0.047 | 0.052 | 0.057 | 0.061 | 0.065 | 45° | 0.75xD | 25° | 16° | 0.8 |
| 170 | 0.014 | 0.020 | 0.024 | 0.028 | 0.031 | 0.034 | 0.037 | 0.039 | 45° | 0.75xD | 25° | 16° | 0.8 |

Explanation of terms:

RW_{max} = Maximum angle of the ramp

S_{max} = Maximum slope of the helix

G = Ratio of circular pocket \emptyset when plunging to the tool \emptyset

E.g.: Tool \emptyset 12 mm at G=1.5 results in a pocket \emptyset 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-Alu-HPC-Pocket | SCM854

| MMG* | Workpiece material | Strength/hardness [N/mm ²] [HRC] | Cooling | | | |
|------|--------------------|-------------------------------------------------|---------|-----|---------|---|
| | | | MQL/Air | Dry | Coolant | |
| N | N1 | N1.1 Aluminium, non-alloy and alloy < 3 % Si | ✓ | ✓ | ✓ | |
| | | N1.2 Aluminium, alloy ≤ 7 % Si | ✓ | ✓ | ✓ | |
| | | N1.3 Aluminium, alloy > 7-12 % Si | ✓ | ✓ | ✓ | |
| | | N1.4 Aluminium, alloy > 12 % Si | ✓ | ✓ | ✓ | |
| | N2 | N2.1 Copper, non-alloy and low-alloy | < 300 | ✓ | ✓ | ✓ |
| | | N2.2 Copper, alloy | > 300 | ✓ | ✓ | ✓ |
| | | N2.3 Brass, bronze, gunmetal | < 1,200 | ✓ | ✓ | ✓ |
| | N4 | N4.1 Plastic, thermoplastics | | ✓ | ✓ | ✓ |
| | | N4.2 Plastic, thermosets | | ✓ | ✓ | ✓ |
| | | N4.3 Plastic, foams | | ✓ | ✓ | |

Calculation example for AL99 ø 12 mm:

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

| | | | | | | | |
|------|-----------------------------------------|---|---|---|-----|-----------|------|
| N1.1 | Aluminium, non-alloy and alloy < 3 % Si | ✓ | ✓ | ✓ | 810 | 0.7 - 0.9 | 1.12 |
|------|-----------------------------------------|---|---|---|-----|-----------|------|

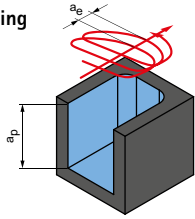
$$1 \quad f_z = \frac{12 \text{ mm}}{100} \cdot 0,8 = 0,069 \text{ mm}$$

$$2 \quad h_m \text{ max.} = \frac{12 \text{ mm}}{100} \cdot 1,12 = 0,134 \text{ mm}$$

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.

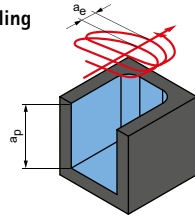
Trochoidal milling



$$a_p = 3 \times D$$

$$a_e = 0.1 \times D$$

Trochoidal milling



$$a_p = 3 \times D$$

$$a_e = 0.2 \times D$$

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

Explanation of terms:

RW_{max} = Maximum angle of the ramp

S_{max} = Maximum slope of the helix

G = Ratio of circular pocket \emptyset when plunging to the tool \emptyset

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

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



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