



## FOURWORX®

Four-fold benefits - also with the smallest diameter in high-feed milling



 **pokolm**  
PREMIUMTOOLS. WE KNOW HOW.

# FOUR-FOLD BENEFITS: MORE SPEED, MORE FEED, MORE CUTTING DEPTH AND MORE PERFORMANCE

**FOURWORX®** is THE new high-performance milling system for rough and pre-finishing applications in the field of high-feed milling. With a multitude of revolutionary features, **FOURWORX®** advances into previously unattainable realms of performance. This is possible thanks to a completely redesigned overall geometry of the milling system. The significant outcome is that, for the first time, even the smallest tool diameter  $\varnothing 16$  mm boasts three inserts. With this novelty, cutting depths up to  $a_p$  0.75 mm and feed rates up to  $f_z$  1.2 mm/teeth can be achieved. And despite the small tool diameter, the innovative geometry guarantees maximum stability in use.

Similar attributes apply to the inserts. Despite the compact dimensions, a clearly visible and innovative reinforcing collar around the screw seat, together with a negative insert seat, provides for an enormously extended service life. At the same time, chamfered outer edges protect the inserts against spalling around the circumference. A 3D chip pocket guarantees optimum chip removal paired with maximum cutting performance; the corner radius of 1 mm stands for maximum stability at the outer tool diameter even at

high feedrates. The highly precise inserts possess four cutting edges. In four different grade/coating combinations and with two chip-breaker grooves, they allow the machining of a broad range of materials and are optimally suitable for the machining of steel, cast iron and SAH materials.

Overall, the innovative system design leads to a 50% reduction of the stress in the tool and to significantly enhanced stability.

Even on less powerful machines, **FOURWORX®** offers ultimate performance. Similarly, the new milling system also proves its capabilities with fragile workpieces and in deep cavities, both in wet and dry machining. Four times more performance, which redefines the benchmark for economic efficiency.



Practical video  
**FOURWORX®**  
in 1.2358

## Connection types

All **FOURWORX®** tools are available as

- Plain shank end mill bodies,
- Threaded shank end mill bodies, and with the patented
- **DUOPLUG®** system for ultimate truth of running and maximum rigidity.

All tools possess internal coolant supply for maximum process reliability.



DUOPLUG®



Threaded shank



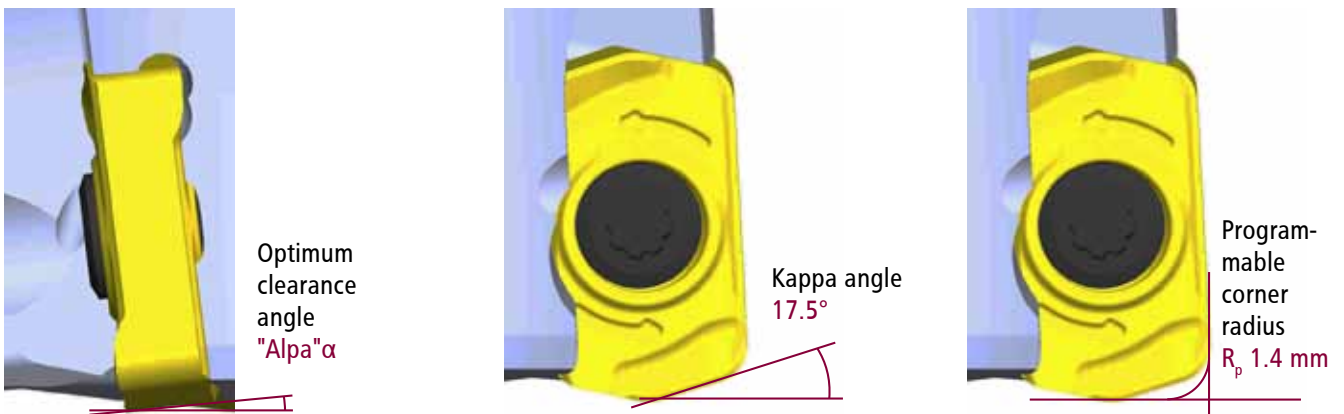
Plain shank

# FOURWORX® S IN DETAIL

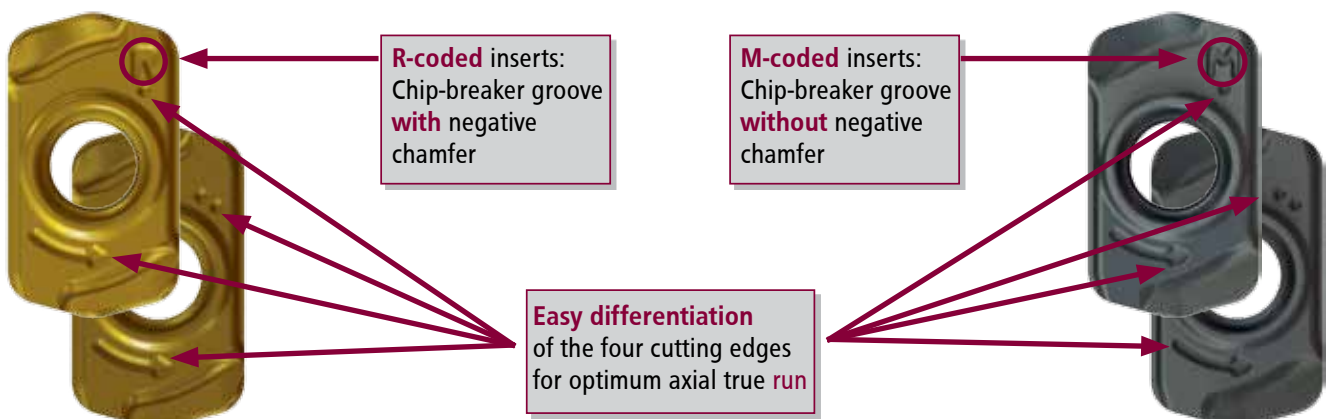
## FOURWORX® - All features at a glance

- ⊕ Four-fold benefits
- ⊕ Completely redesigned overall geometry
- ⊕ Maximum number of teeth on minimum diameter
- ⊕ Available from Ø 16 to 42 mm
- ⊕ Cutting depths up to ap 0.75 mm
- ⊕ Feed rates up to fz 1.2 mm/tooth
- ⊕ Maximum stability
- ⊕ 3D chip pocket for optimum chip removal
- ⊕ Corner radius 1 mm
- ⊕ 4 cutting edges per insert
- ⊕ 4 different inserts, 2 different chip-breaker grooves
- ⊕ Machining of nearly all materials
- ⊕ for ultimate performance even on less powerful machines
- ⊕ Ideal for fragile workpieces and in deep cavities
- ⊕ Wet and dry machining
- ⊕ The new benchmark in terms of efficiency

## Tool and insert geometry - guarantee for ultimate performance and efficiency



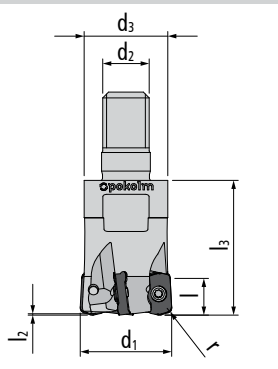
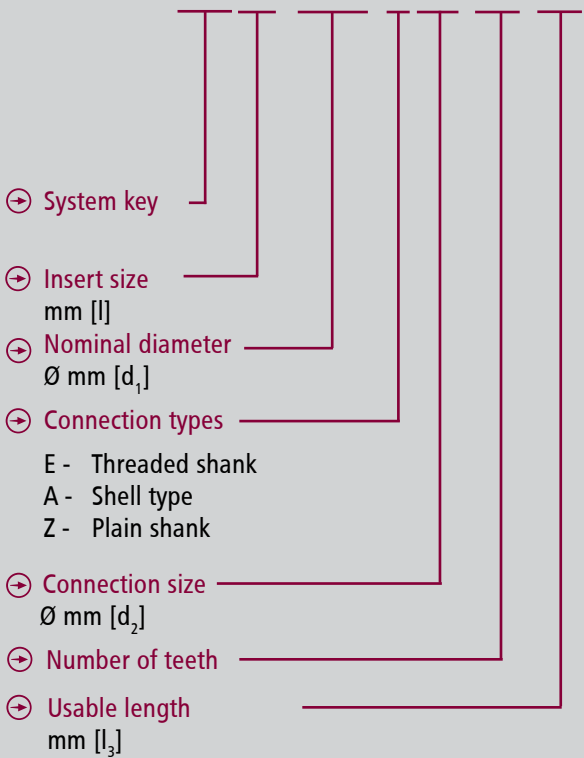
## Inserts - cutting edges and chip-breaker grooves easily differentiated



# FOURWORX® M - BREAKDOWN OF ORDER NUMBER

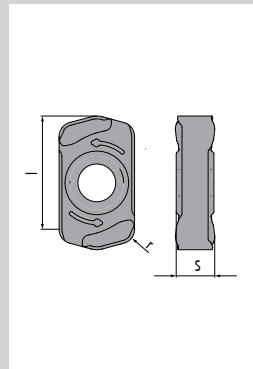
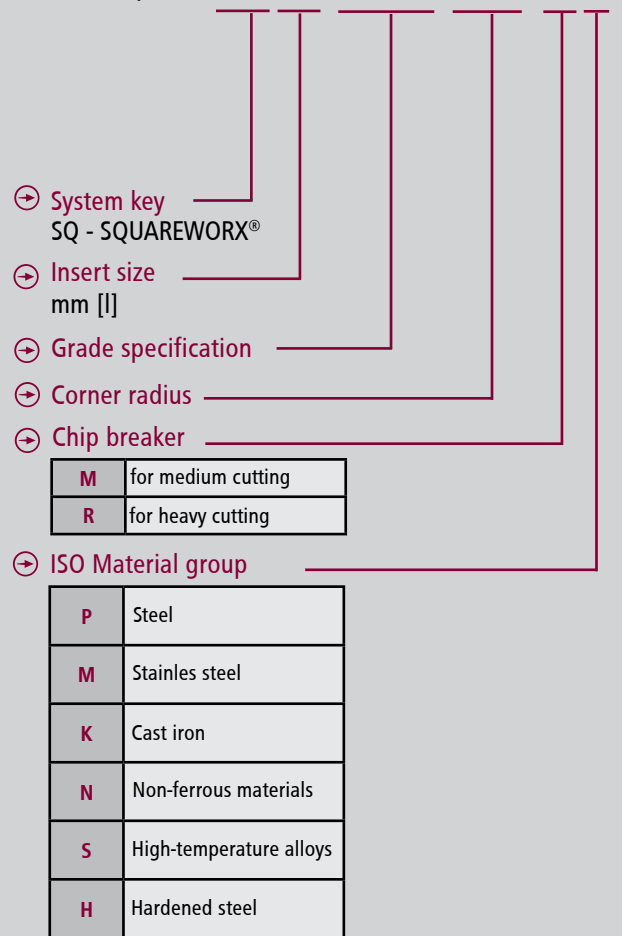
## Breakdown of order number for MILLING CUTTER BODIES

Example: **FR05-016-Z16-03-32**



## Breakdown of order number for INSERTS

Example: **FR05-8042-HF-RP**





# FOURWORX®

Size S - Ø16 ... 42 mm

- Four cutting edges per indexable insert for ultimate efficiency
- Very high material removal rates and extremely easy cutting
- All tools possess internal coolant supply as standard.
- Extremely high feedrates up to fz 1.2 mm/teeth

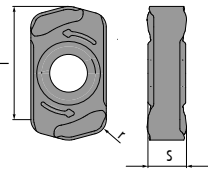
Milling cutter bodies		Catalogue no.										Accessories		Features
		$d_1$	$l$	$r_p^*$	$l_3$	$l_2$	$l_1$	$d_2$	$d_3$	$z$				

DuoPlug®													
	FR05-016-D10-03	16	9	1.4*	35	0.35	-	M 10	15	3	A, B, C, D, E, F		
	FR05-020-D12-04	20	9	1.4*	35	0.4	-	M 12	18.6	4	A, B, C, D, E, F		
	FR05-025-D16-05	25	9	1.4*	40	0.45	-	M 16	23.5	5	A, B, C, D, E, F		

Threaded shank end mill bodies													
	FR05-016-E08-02	16	9	1.4*	29	0.35	-	M 8	13.8	2	A, B, C, D, E, F		
	FR05-016-E08-03	16	9	1.4*	29	0.35	-	M 8	13.8	3	A, B, C, D, E, F		
	FR05-020-E10-04	20	9	1.4*	29	0.4	-	M 10	18	4	A, B, C, D, E, F		
	FR05-025-E12-05	25	9	1.4*	33	0.45	-	M 12	21	5	A, B, C, D, E, F		
	FR05-032-E16-05	32	9	1.4*	42	0.5	-	M 16	29	5	A, B, C, D, E, F		
	FR05-035-E16-06	35	9	1.4*	42	0.5	-	M 16	29	6	A, B, C, D, E, F		
	FR05-042-E16-06	42	9	1.4*	42	0.55	-	M 16	29	6	A, B, C, D, E, F		

Plain shank end mill bodies													
	FR05-016-Z16-03-32	16	9	1.4*	32	0.35	80	diam. 16	13.8	3	A, B, C, D, E, F		
	FR05-020-Z20-04-40	20	9	1.4*	40	0.4	90	diam. 20	18	4	A, B, C, D, E, F		

Accessories						* corner radius to be programmed
<p>22 500 P Torx screw A &gt; Page 7</p>	<p>07 500 P Torx-screwdriver (Torx-Plus) B &gt; Page 7</p>	<p>TV 04-1 Screwdriver torque Vario®-S with window scale, C &gt; Page 7</p>	<p>TV 500 Torque Vario® setter adjusting tool D &gt; Page 7</p>	<p>T7 500 P Torx interchangeable bit for Torque Vario® E &gt; Page 7</p>	<p>T7 502 P, Torx Magic- Spring compatible bit f. Torque Vario® F &gt; Page 7</p>	

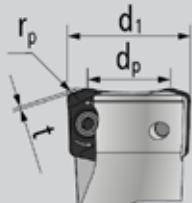
Indexable inserts	Catalogue no.	DIN Specification	Carbide Grade	Coating	l	s	r	M
	FR05-8042-HF-RP	LNKX 0925 ZSR	P40	PCSR	9	2.5	1	M 2.2
	FR05-8048-HF-RP	LNKX 0925 ZSR	P40	PPGO	9	2.5	1	M 2.2
	FR05-8062-HF-RK	LNKX 0925 ZSR	K10	PPTi	9	2.5	1	M 2.2
	FR05-8042-HF-MP	LNKX 0925 ZER	P40	PCSR	9	2.5	1	M 2.2
	FR05-8096-HF-MM	LNKX 0925 ZER	M40	PPST	9	2.5	1	M 2.2

### Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Carbide Grade	Coating						
Feed per tooth   d.o.c.							
Size S   LNKX   M							
P40 PCSR	f <sub>z</sub> (mm) a <sub>p</sub> (mm)	0,25-1 0,05-0,7	-	0,2-0,95 0,05-0,6	-	-	-
M40 PPST	f <sub>z</sub> (mm) a <sub>p</sub> (mm)	0,25-1 0,05-0,6	0,25-1 0,05-0,6	-	-	0,15-0,75 0,05-0,6	-
Size S   LNKX   R							
P40 PCSR	f <sub>z</sub> (mm) a <sub>p</sub> (mm)	0,3-1,2 0,1-0,75	-	0,25-1,1 0,1-0,7	-	-	-
P40 PPGO	f <sub>z</sub> (mm) a <sub>p</sub> (mm)	0,3-1,2 0,1-0,75	-	0,25-1,1 0,1-0,7	-	-	-
K10 PPTi	f <sub>z</sub> (mm) a <sub>p</sub> (mm)	0,3-1,2 0,1-0,75	-	0,3-1,2 0,1-0,75	-	-	0,1-1 0,1-0,6

### Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Carbide Grade	Coating						
Application							
P40 PCSR	roughing pre finishing finishing	▽130 190 250 ▽150 225 300 -	-	▽120 170 220 ▽150 200 250 -	-	-	-
P40 PPGO	roughing pre finishing finishing	▽100 150 200 ▽100 150 200 -	-	▽110 130 150 ▽110 130 150 -	-	-	-
K10 PPTi	roughing pre finishing finishing	▽90 140 190 ▽110 160 210 -	-	▽120 180 240 ▽140 205 270 -	-	-	▽80 120 160 ▽100 140 180 -
M40 PPST	roughing pre finishing finishing	▽80 140 200 ▽100 150 200 -	▽80 130 180 ▽100 155 210 -	-	-	▽30 55 80 ▽40 65 90 -	-



For the **CAD/CAM set-up** please program **1.4 mm** corner radius (r<sub>p</sub>).  
The remainder of the material is theoretically **0.342 mm** (t).  
Please use „d<sub>p</sub>“ for tool length measurement.

## Extended operation data

Plunging	
Cutter diam. d1	X <sub>max</sub>
16	0.35
20	0.4
25	0.45
32-35	0.5
42	0.55

Ramping		
Cutter diam. d1	$\alpha^\circ$	y
16	<2,5	7
20	<1,9	11
25	<1,5	16
32	<1,2	23
35	<1,0	26
42	<0,9	33

Helix		
Cutter diam. d1	D <sub>min</sub>	D <sub>max</sub>
16	23	31
20	31	39
25	41	49
32	55	63
35	61	69
42	75	83

Accessories	Catalogue no.	Description				
<b>Torx@screws   Torx@screws</b>						
	22 500 P	Torx screw M 2.2   L 5.2   T 7 Plus   0.65 Nm	M 2.2	L 5.2	T 7 Plus	0.65 Nm
<b>Spanners / screwdrivers   Torx-screwdriver</b>						
	07 500 P	Torx-screwdriver (Torx-Plus) T 7 Plus	T 7 Plus			
<b>Torque screwdrivers and accessories   Torque screwdrivers</b>						
	TV 04-1	Screwdriver torque Vario@-S with window scale from Nm 0.4   up to 1.0 Nm   with scale, inc setter				
<b>Torque screwdrivers and accessories   Torque Vario@ setter adjusting tool</b>						
	TV 500	Torque Vario@ setter adjusting tool				
<b>Torque screwdrivers and accessories   Torx bits, standard</b>						
	T7 500 P	Torx interchangeable bit for Torque Vario@ T 7 IP   L 175   max. 0.9 Nm	T 7 IP	L 175	max. 0.9 Nm	
<b>Torque screwdrivers and accessories   Torx bits with retaining spring</b>						
	T7 502 P	Torx MagicSpring compatible bit f. Torque Vario@ T 7   L 175   max. 0.9 Nm	T 7	L 175	max. 0.9 Nm	



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