



## FINWORX®

TOOLING SYSTEMS

PROCESS OPTIMIZATION

CONSULTING IN MILLING STRATEGIES



 **pokolm**  
PREMIUMTOOLS. WE KNOW HOW.

# DOUBLE SIDED INSERT WITH FOUR CUTTING EDGES – **DOUBLE EFFICIENT**

**F**INWORX® – is the new economic miracle in the range of Pokolm rhombic square sh. face milling cutter bodies. The reason is that although it has the same number of teeth, it has twice the number of cutting edges and thus quite simply slashes your cutting materials costs by a huge 50 %. In addition, the new tool

system covers a broad range of finishing applications. The carefully thought out **FINWORX®** geometry ensures low cutting forces and excellent chip control. Together with the precision-ground, highly accurate cutter bodies, it is particularly well-suited for vibration-free finishing, even at large depths.



Straight shank



Skrew-on type



DuoPlug®

## Connections

The **FINWORX®**-range is available with straight shanks, threaded shanks and with our stand alone and patented DuoPlug®-system for highest concentricity and maximum rigidity.

All cutters are manufactured with internal coolant supply for best process reliability.

# FINWORX® FEATURES AT A GLANCE

- ⊕ Finishing tool with a wide application range
- ⊕ Suitable in steel, hardened steel, cast iron and RSH
- ⊕ CBN & PKD tipped inserts for machining modern materials
- ⊕ Outside- and Copy-milling
- ⊕ Circular- and incline plunging

## Indexable inserts – Pocket seat – Contact area:

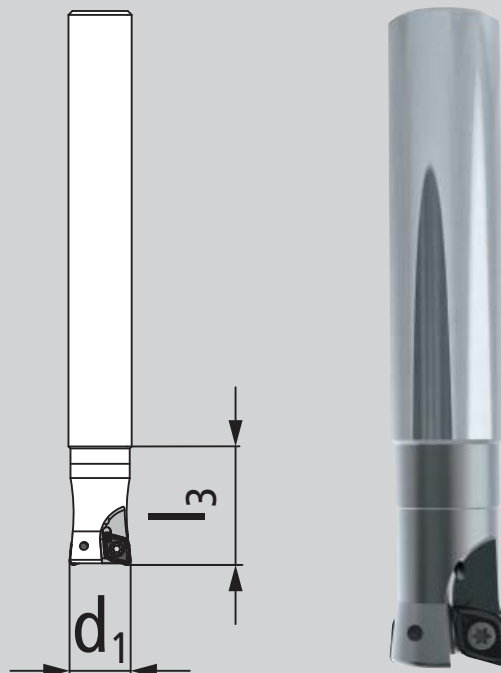
- ⊕ Calotte (circle / triangle) for orientation
- ⊕ Contact flats bigger than cutting edge
- ⊕ Curved cutting edge for optimal chip control and evacuation
- ⊕ Cutting edge has no contact to cutter body
- ⊕ Easy to handle and fixing insert



## Description Tool Order Number Key

Sample: **2 32 16 185 G**

- ⊕ No. of flutes ————
- ⊕ Working depth [ $l_3$ ] ————
- ⊕ Nominal diameter [ $d_1$ ] ————
- ⊕ Connection ————
  - 1 - Straight shank
  - 2 - Screw-on type
  - 3 - shell type
  - 0750 - Monoblock SK40
- ⊕ System key ————
  - 85 - FINWORX® M
- ⊕ Straight shank according to DIN ————
  - G - DIN 1835 A
  - - DIN 1835 B





# FINWORX®

Size „M“

- Universal milling cutters for finishing and profile milling with small radii.
- particularly smooth operating in corners and pockets
- extreme economic due to four effective cutting edges
- low energy consumption

## Milling cutter bodies

Catalogue no.

$d_1$   $l$   $r$   $l_3$   $l_2$   $l_1$   $d_2$   $d_3$   $z$

Accessories

Features

### DuoPlug®

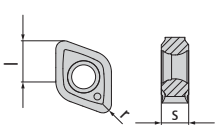
	2 16 285 SG	16	6.5	1	31	0.7	-	M 10	15	2	A, B, C, D, E	
	3 20 285 SG	20	6.5	1	32.5	1.0	-	M 12	18.6	3	A, B, C, D, E	
	4 25 285 SG	25	6.5	1	37.5	1.0	-	M 16	23.5	4	A, B, C, D, E	
	 25 505 A > Page 5	 08 500P B > Page 5	 TV 1-5 C > Page 5	 T8 500P D > Page 5	 T8 502P E > Page 5							

### Screw-on type

	2 16 285	16	6.5	1	28.5	0.7	-	M 8	13.8	2	A, B, C, D, E	
	3 20 285	20	6.5	1	28.5	1.0	-	M 10	18	3	A, B, C, D, E	
	4 25 285	25	6.5	1	32.5	1.0	-	M 12	21	4	A, B, C, D, E	
	4 30 285	30	6.5	1	32.5	1.0	-	M 16	29	4	A, B, C, D, E	
	5 32 285	32	6.5	1	32.5	1.0	-	M 16	21	5	A, B, C, D, E	
	5 35 285	35	6.5	1	42.5	1.0	-	M 16	29	5	A, B, C, D, E	
	6 42 285	42	6.5	1	42.5	1.0	-	M 16	29	6	A, B, C, D, E	
 25 505 A > Page 5	 08 500P B > Page 5	 TV 1-5 C > Page 5	 T8 500P D > Page 5	 T8 502P E > Page 5								



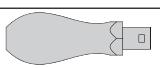


### Straight shank

	2 32 16 185 G	16	6.5	1	30	0.7	165	16	15.5	2	A, B, C, D, E	
	3 40 20 185 G	20	6.5	1	40	1.0	165	20	19.5	3	A, B, C, D, E	
	 25 505 A > Page 5	 08 500P B > Page 5	 TV 1-5 C > Page 5	 T8 500P D > Page 5	 T8 502P E > Page 5							

Indexable insert	Catalogue no.	ISO Standard	Carbide Grade	Coating	Dimensions			
					l	s	r	M
	03 85 835	XNHU 063010 EN	HSC 05	PVTi	6.5	3	1	M 2.5
	03 85 836	XNHU 063010 EN	HSC 05	PVTiH	6.5	3	1	M 2.5
	03 85 835 D	XNHU 063010 EN	HSC 05	PVDiaN	6.5	3	1	M 2.5
	03 85 892*	XNHU 063010 EN	CBN for steel		6.5	3	1	M 2.5
	03 85 894	XNHU 063010 EN	PKD		6.5	3	1	M 2.5

\* 2 cutting edges

## FINWORX® „M“ – Accessories

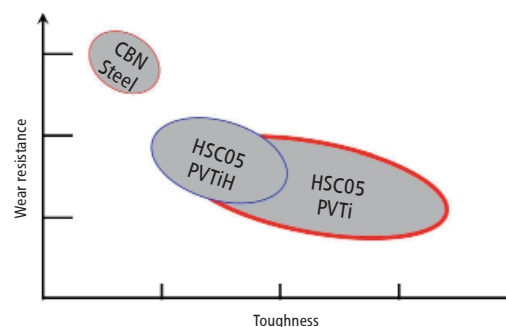
Accessories	Catalogue no.	Description	Dimensions			
	25 505	Torxscrew M 2,5	M 2,5	L 6,36	T 8 plus	
	08 500P	Torx Screwdriver (Torx-Plus)	T 8 IP			
	TV 1-5	Torque Screwdriver Vario® S with scale	from 1.0 Nm	up to 5.0 Nm	with scale	
	T8 500P	Torx interchangeable bit for Torque Vario®	T 8 IP	L 175	max. 1.3 Nm	
	T8 502P	Torx MagicSpring compatible bit for Torque Vario®	T 8 IP	L 175	max. 1.3 Nm	

Starting torque for Torxscrews:  $M_0$  1.28 Nm

## Application field

Carbide Grade   Coating	Description	Application area
HSC 05 PVTi / PVTiH	835 / 836	Dry machining with high feed rates in all conditions
HSC 05 PVDiaN	835 D	Machining of highly abrasive plastics, graphite and non-ferrous materials
CBN	892	Finishing with highest cutting speeds and with a constant oversize

PVTiH coated inserts have best performance in silicon alloyed materials, eg. 1.2714, or dry machining of RSH materials (RSH - stainless, acid and heat resistant materials)



### Cutting speed $V_c$ in m/min

Material	Application	Insert radius	l	Machining rates	HSC05 PVTi	HSC05 PVTiH	HSC05 PVDian	CBN	PKD
Steel		1	6.5	roughing	120 - 200	120 - 200			
				finishing	200 - 350	200 - 350			
Cast irons		1	6.5	roughing	100 - 200	100 - 200			
				finishing	200 - 350	200 - 350			
Hardened steel		1	6.5	roughing	35 - 150	35 - 150			
				finishing	150 - 250	150 - 250		500 - 1000	
Non ferrous materials		1	6.5	roughing			100 - 400		200 - 600
				finishing			180 - 600		400 - 800
Stainless steel		1	6.5	roughing					
				finishing	100 - 200	150 - 250			

Major application roughing  
 Minor application roughing

pre-finishing  
 finishing

### feed per tooth ( $f_z$ ) | d.o.c. ( $a_p$ )

Material	Insert	Insert radius	l	feed per tooth ( $f_z$ ) d.o.c. ( $a_p$ )	HSC05 PVTi	HSC05 PVTiH	HSC05 PVDian	CBN	PKD
Steel		1	6.5	$f_z$ (mm)	0.05 - 0.5	0.05 - 0.5	0.05 - 0.5		
				$a_p$ (mm)	0.1 - 1.0	0.1 - 1.0	0.1 - 1.0		
Cast irons		1	6.5	$f_z$ (mm)	0.05 - 0.5				
				$a_p$ (mm)	0.1 - 1.0				
Hardened steel		1	6.5	$f_z$ (mm)	0.05 - 0.35	0.05 - 0.35		0.05 - 0.2	
				$a_p$ (mm)	0.1 - 0.5	0.1 - 0.5		0.1 - 0.2	
Non ferrous materials		1	6.5	$f_z$ (mm)			0.05 - 0.5		0.05 - 0.2
				$a_p$ (mm)			0.1 - 1.0		0.1 - 1.0
Stainless steel		1	6.5	$f_z$ (mm)	0.05 - 0.3	0.05 - 0.3			
				$a_p$ (mm)	0.1 - 0.25	0.1 - 0.25			

Plunging		Ramping		Helix	
Cutter diam. $d_1$ mm	x max. mm	$\alpha^\circ$	y mm	$D_{min}$ mm	$D_{max}$ mm
16	0,7	< 2,8	14	30	32
20	1	< 3,2	18	38	40
25	1	< 2,5	23	48	50
30	1	< 2	28	58	60
32	1	< 1,9	30	62	64
35	1	< 1,7	33	68	70
42	1	< 1,4	40	82	84

x maximum plunge depth  
 $f_z$  see operation data table, but reduce value to 30%

y minimum travel in [mm]  
 x maximum plunge depth  
 $a_p, f_z$  see operation data table

$D_{min}$  minimum bore diameter depending on cutter diameter in [mm]  
 $D_{max}$  maximum bore diameter depending on cutter diameter in [mm]  
 $a_p, f_z$  see operation data table

# FROM PRACTICE TO PRACTICE

## JOB TITLE:

**F**inishing the cylindrical and conical surfaces of the injection moulding tool. Smooth transitions between individual surfaces keep retouching work to a minimum and speed up polishing. The shortest possible processing cycles, yet the best surface quality and low cutting material costs.

The new **FINWORX®** tool is predestined for such applications. The maximum number of effectively usable cutting edges for the lowest cutting material costs. The highly positive, precision peripheral ground and yet sturdy cutting edge of the indexable inserts provides an excellent processing result.

## MACHINE

Quaser MV154P

## MATERIAL

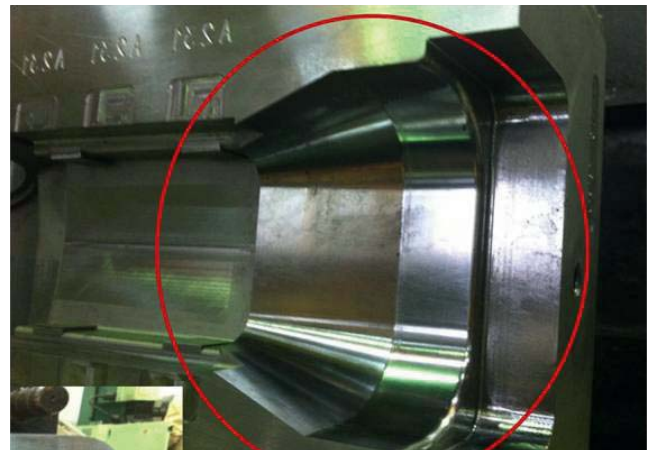
1.2344 52HRC

## PROGRAMMING SYSTEM

Heidenhain

## EXAMPLE FROM PRACTICE:

<b>component:</b>	Injection moulding tool
<b>material:</b>	1.2344 52 HRC
<b>arbor:</b>	40 08 601
<b>cutter body:</b>	FINWORX® 2 16 285
<b>insert:</b>	03 85 835
<b>coating:</b>	PVTi
<b><math>V_c</math> (speed):</b>	226 m/min
<b><math>V_f</math> (feed rate):</b>	2,000 mm/min
<b>S (revolutions):</b>	4,500 1/min
<b>d1 (nominal diameter) :</b>	16 mm
<b><math>f_z</math> (feed per tooth):</b>	0.22 mm
<b><math>a_p</math> (depth of cut):</b>	0.1 mm
<b><math>a_e</math> (width of cut):</b>	0.1 mm
<b>tool life:</b>	> 120 min
<b>life length:</b>	> 240 m

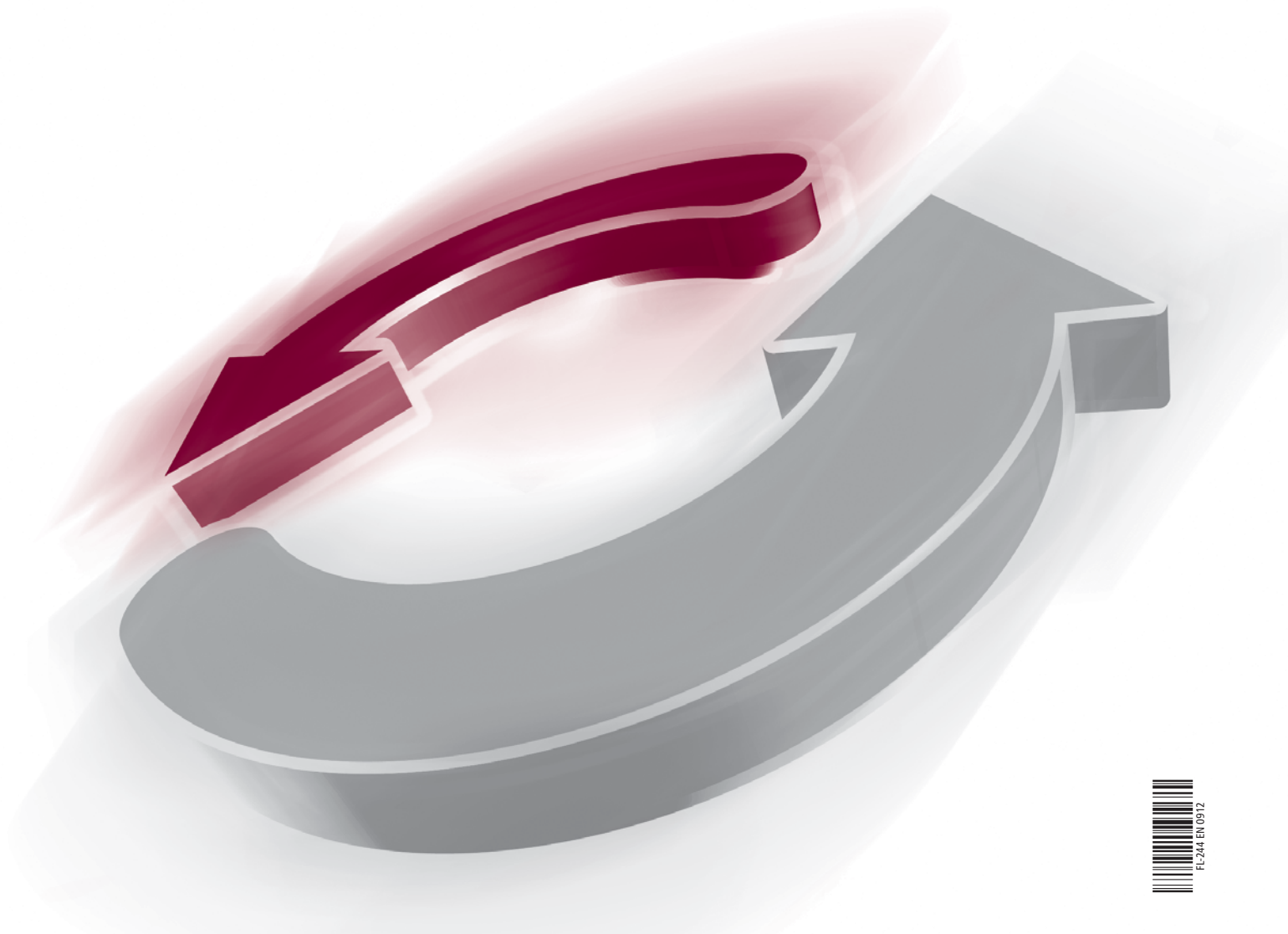


## RESULT:

Excellent surface quality with longer tool life at the same time. The 4 usable cutting edges on each indexable insert deliver great potential with regard to economy.

Obvious reasons for using tooling systems from Pokolm Frästechnik GmbH & Co. KG.

Everything points towards the future with Pokolm premium tools.



**Pokolm  
Frästechnik GmbH & Co. KG**

Adam-Opel-Straße 5  
33428 Harsewinkel  
Germany

Fon: +49 5247 9361-0  
Fax: +49 5247 9361-99

info@pokolm.com  
www.pokolm.com



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