Specialists in Problem Solving:

Modern Tooling Systems.

pokolm voha®

High Quality Cutting Tools for Professionals

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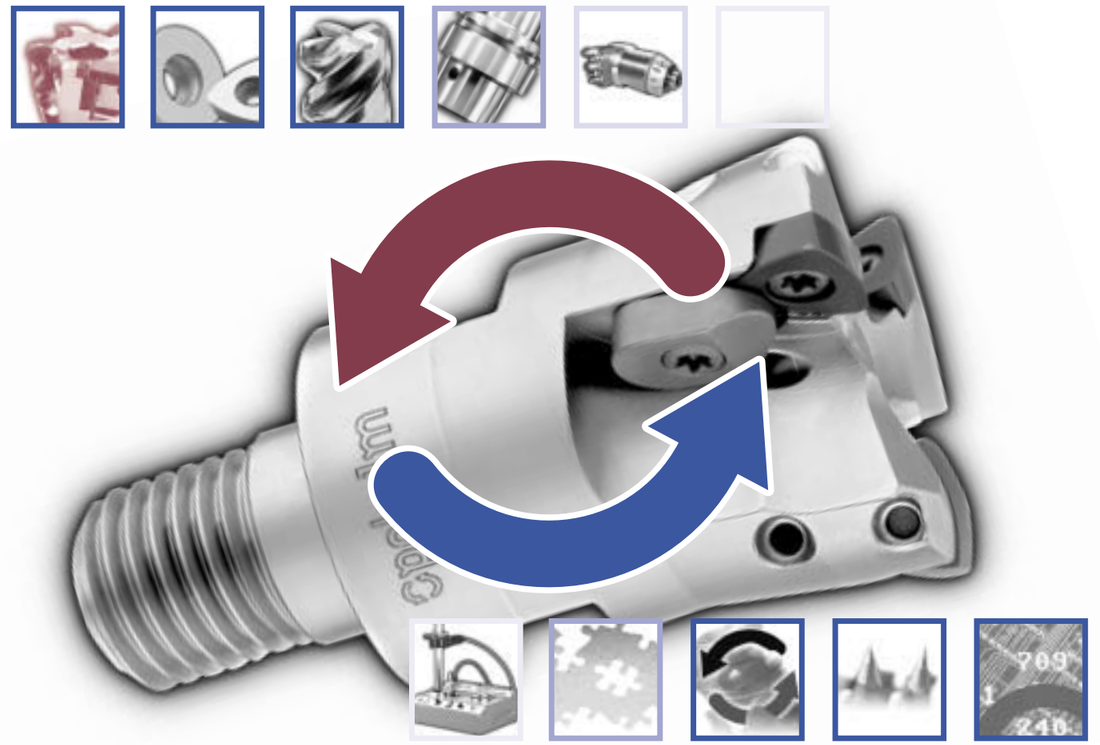
Mould Making | Die Shops | Machine Building | Modell Making | Tool Making

Trigaworx®



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Trigaworx® – milling in gigantic scopes.

Your specialist for highest performance in extreme working depths.

Only in really difficult applications your specialist in problem solving shows his real competence. The development of **Trigaworx**® is the latest result from our extensive experience.

At all times, when high performance milling in deep slots or pockets is required, **Trigaworx**® offers the optimum solution.

Our **Trigaworx**® range of tooling has been established to avoid vibrations when milling with long overhang of tooling.

Specially developed **Trigacut**® Polygon idexable inserts avoid all possible vibrations in your extreme milling operations.

Your profit is:

- **extreme high feed rates up to 3 mm per tooth perform highest milling capability**
- **optimum economic value through 3 cutting edges per insert**
- **very quiet running, also in very deep slots, pockets or contours**
- **careful and gentle treatment of machining centre and tooling**

Trigaworx® – your clearly defined economic advantage for highest cutting performance on difficult applications!

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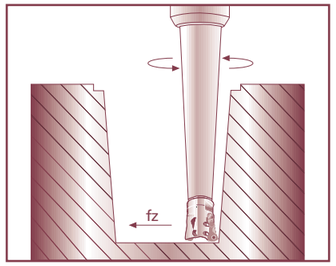
Trigaworx® and DuoPlug® – a perfect team.

Our patent protected incorporated inserts and our specially arranged form of the cutting edges guarantee an optimum load distribution – also when using highest feed rates.



*If roughing milling operations are required, maximum economy of machining centre and tooling is guaranteed in using **Trigaworx**® milling cutter bodies and **Trigacut**® inserts. It results in increasing your profit.*

Milling in gigantic scopes – in roughing and finishing operations!

Our new **Trigaworx**® – Milling Cutter Bodies combined with our **DuoPlug**® Shrinking System secure roughing in extreme working dephts and contours avoiding shattering and vibrating.

Feed rates of up to 3 mm per tooth can be realized with this new tooling generation.

Also for pre-finishing and finishing, the **DuoPlug**® system is the ideal supplement.

DuoPlug® offers:

- **no looseness between adaptor and cutter body**
- **exact concentricity**
- **safe load transmission**
- **extreme rigidity**

Every single detail is an important provision for economic high speed milling, particular for deep contours too!

Trigaworx® and **DuoPlug**® are the best adapted team for economic and process-safe milling operations.

NEW

Trigaworx®

with Trigacut®- Indexable Inserts

- extremely high feed rates up to 3 mm per tooth
- optimum economic value through 3 cutting edges per insert
- very quiet running, also in deep slots, pockets and contours

Milling Cutter Bodies size S

	catalogue-no.	d_1	l	r	l_3	l_2	l_1	d_2	d_3	z	ref. pg. arbors ref. access.	stock item	characteristics		
NEW	2 16 272 SG	16	7	–	38	max. 1	–	M 10	15	2	s. catalogue A, C, E	☑→			
	3 20 272 SG	20	7	–	39	max. 1	–	M 12	18,5	3	s. catalogue A, C, E	☑→			
	4 25 272 SG	25	7	–	41	max. 1	–	M 16	23,5	4	s. catalogue A, C, E	☑→			
NEW	2 16 272	16	7	–	28	max. 1	–	M 8	14	2	s. catalogue A, C, E	☑→			
	3 20 272	20	7	–	28	max. 1	–	M 10	18	3	s. catalogue A, C, E	☑→			
	4 25 272	25	7	–	32	max. 1	–	M 12	21	4	s. catalogue A, C, E	☑→			

Milling Cutter Bodies size M

	catalogue-no.	d_1	l	r	l_3	l_2	l_1	d_2	d_3	z	ref. pg. arbors ref. access.	stock item	characteristics		
NEW	2 25 273	25	10,3	–	32	max. 1,5	–	M 12	22,5	2	s. catalogue B, D, F	☑→			
	3 30 273	30	10,3	–	42	max. 1,5	–	M 16	29	3	s. catalogue B, D, F	☑→			
	3 35 273	35	10,3	–	42	max. 1,5	–	M 16	29	3	s. catalogue B, D, F	☑→			
NEW	4 42 373	42	10,3	–	42	max. 1,5	–	16	35	4	s. catalogue B, D, F	☑→			
	5 52 373	52	10,3	–	52	max. 1,5	–	22	40	5	s. catalogue B, D, F	☑→			

Accessories

	catalogue-no.	description	size		
A	25 500	torx screw	M 2,5	T7	
B	30 500	torx screw	M 3,0	T10	
C	07 500	screw driver		T7	
D	10 500	screw driver		T10	
E	12 510	clamps	M 2,5	T7	
F	13 510	clamps	M 3,0	T10	

characteristics
characteristics description see book-marker

Indexable Inserts size S

catalogue-no.	Steel	High Temp. Alloys	Stainless Steel	Cast Iron	Non-Ferrous Materials	Carbide Grades	carbide grade	coating
02 72 835							HSC 05	PVTi
02 72 840							P40	PVTi

Indexable Inserts size M

catalogue-no.								
03 73 835							HSC 05	PVTi
03 73 840							P40	PVTi

NEW latest items!

left hand cutting

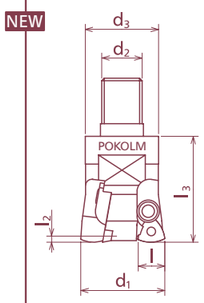
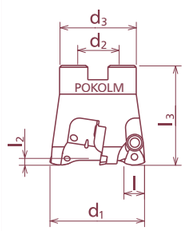
? → on request

☑→ stock item, subject of being unsold

major application ▼ Roughing ▼ Roughing Finishing ▼ Finishing

minor application ▽ Roughing ▽ Roughing Finishing ▽ Finishing

Milling Cutter Bodies size L

	catalogue-no.	d_1	l	r	l_3	l_2	l_1	d_2	d_3	z	ref. pg. arbors ref. access.	stock item	charakteristics		
NEW 	2 32 274	32	14,3	–	42	max. 2	–	M 16	29	2	s. catalogue G, H, I	☑→			
NEW 	4 52 374	52	14,3	–	52	max. 2	–	22	40	4	s. catalogue G, H, I	☑→			
	4 66 374	66	14,3	–	52	max. 2	–	27	48	4	s. catalogue G, H, I	☑→			
	5 80 374	80	14,3	–	52	max. 2	–	27	60	5	s. catalogue G, H, I	☑→			

NEW latest items!

left hand cutting

? → on request

☑ → stock item, subject of being unsold

NEW

Trigaworx®

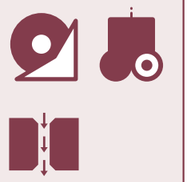
with Trigacut®- Indexable Inserts

- extremely high feed rates up to 3 mm per tooth
- optimum economic value through 3 cutting edges per insert
- very quiet running, also in deep slots, pockets and contours

Accessories

	catalogue-no.	description	size		
G 	10 510	locking washer	ø 11		
H 	20 500	screw driver		T20	
I 	45 500	torx screw	M 4,5		

characteristics
characteristics description see book-marker



	catalogue-no.	Steel	High Temp. Alloys	Stainless Steel	Cast Iron	Non-Ferrous Materials	Carbide Grades	carbide grade	coating
	04 74 840	▼						P40	PVTi

major application ▼ Roughing ▼ Roughing Finishing ▼ Finishing

minor application ▼ Roughing ▼ Roughing Finishing ▼ Finishing

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Indexable Inserts Trigacut®

Indexable Inserts	catalogue-no.	DIN-specification	l	s	r	torx-screw	cutter bodies page	stock item	size
	02 72 835	WDHX 07 02 05	7	2,38	-	M 2,5	4	☑	S
	02 72 840	WDHX 07 02 05	7	2,38	–	M 2,5	4	☑	S
	03 73 835	WDHX 10 03 08	10,3	3,4	–	M 3,0	4	☑	M
	03 73 840	WDHX 10 03 08	10,3	3,4	–	M 3,0	4	☑	M
	04 74 840	WDHX 07 02 05	14,3	4,76	–	M 4,5	6	☑	L

Operation Data for Trigaworx®- Milling Cutter Bodies

Feed per tooth/Depth of Cut; Feed per tooth (fz), Depth of cut (ap)

Cutting Material		fz/ap	P40 PVTi	HSC05 PVTi	
	Steel				
Size of Indexable Insert	7 x 2,38	fz (mm)	0,3 - 1,5	–	
		ap (mm)	0,3 - 0,6	–	
	10,3 x 3,4	fz (mm)	0,5 - 2,0	0,5 - 2,0	
		ap (mm)	0,3 - 1,0	0,3 - 1,0	
	14,3 x 4,76	fz (mm)	0,5 - 3,0	–	
		ap (mm)	0,3 - 1,2	–	

Cutting Speeds

Material	Application	P40 PVTi	HSC05 PVTi	
Steel				
Free Machining Steel/Mild Steel	▼	100 - 250	150 - 250	
normal Tool Steel/Steel Castings	▼	100 - 200	150 - 250	
Tool Steel, difficult to machine/ Steel Castings, difficult to machine	▼	100 - 150	120 - 200	

These speed and feed values are basic and necessitate rigid holding of cutter- and spindle mounting, positive work piece fixture as well as adequate machine horse power in order to achieve optimum and economic cutting conditions. Please ask our office or one of our applications engineers.

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Purchase Order Form

Description	catalogue-no.	quantity	Description	catalogue-no.	quantity
Trigaworx® Milling Cutter Bodies			**Trigacut® Indexable Inserts**		
Milling Cutter Body DuoPlug® for Trigacut® indexable inserts size S	2 16 272 SG		Indexable Inserts size S	02 72 840	
	3 20 272 SG				
	4 25 272 SG				
Threaded Shank End Mill Body for Trigacut® Indexable Inserts size S	2 16 272				
	3 20 272				
	4 25 272				
Threaded Shank End Mill Body for Trigacut® Indexable Inserts size M	2 25 273		Indexable Inserts size M	03 73 835	
	3 30 273			03 73 840	
	3 35 273				
Shell Type Milling Cutter Body for Trigacut® Indexable Inserts size M	4 42 373				
	5 52 373				
Threaded Shank End Mill Body for Trigacut® Indexable Inserts size L	2 32 274		Indexable Inserts size L	04 74 840	
Shell Type Milling Cutter Body for Trigacut® Indexable Inserts size L	4 52 374				
	4 66 374				
	5 80 374				

Accessories					
torx screw	25 500		clamps	13 510	
torx-screw driver	07 500		locking washer	10 510	
clamps	12 510		torx-screw driver	20 500	
torx screw	30 500		torx screw	45 500	
torx-screw driver	10 500				

(please fax this page to:)

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Freecall Fax: +49 [0] 800 / 0 76 56 56

❍ please send us your quotation for above mentioned items

Don't forget your address!

name, first name

postal code and town

company

phone

fax

street and no.

e-mail-adress

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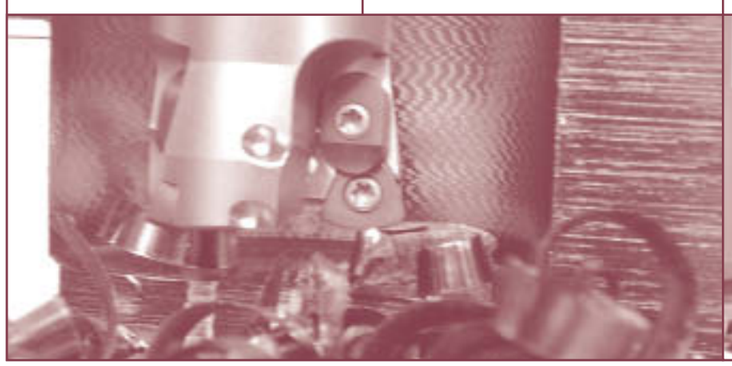
From practice for practice

All theory is every days routine:

Useful know-how results from practice, and has to prove in practice. This is one reason, why we develop new products under real conditions and under the supervision of our customer and his parameters.

Application examples Trigaworx®:

Example 1: from practice…	results with this setup:	results with Trigaworx®
A well-known toolmaker has to machine 9 holes 70 mm dia. with 80 mm depth in solid steel facing several cross holes. **Operation data:** Machine: DMU 100 V SK40 Arbor: 75 16 750 (SK 40, 75 mm overhang) Component: steel 1.2085, 15-17% chromium, 2% nickel 600 x 400 x 100 mm Up to our test, this has been machined with a Threaded Shank End Mill Body 35 200/12 (35 mm dia. r=6, z=3, 12° pos) and an insert 03 12 895K.	**Operation data:** rev.: 2.000 per min. feed: 2.400 mm/min. ap: 1 mm ae: 21mm chip volume: 50 cm^3/min (3.08 cu.in/min) tool life in m: 38-45 m tool life in time: 15-25 min. cooling: air Machining time f. 9 holes was 32 min, but it took only 15-25 min. when turning of inserts was necessary. In order to try improving cutter life and reducing machining time, we have decided to use the following combination: cutter body: 3 35 273 insert: 03 73 835	**Operation data:** rev.: 2.000 per min. feed: 5.000 mm/min ap: 0,75 mm ae: 60 % - 100 % chip volume: 78 cm^3/min (4.08 cu.in/min) tool life in m: 200 - 250 m tool life in time: 40 - 50 min cooling: air **Result:** **chip volume: +56 %** **tool life (time): +900 %** **much safer process** **Trigaworx®** your problem solver for difficult applications in deep cavities.



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Trigaworx® – problem solver for milling in deep cavities

Example 2: from practice…	results with this setup:	results with Trigaworx®
A toolmaker (supplier of automotive industry) has a terrible job to machine deep pockets with almost 90°-walls. Depth of pocket: approx. 200 mm in a piece of steel of 900 mm x 500 mm x 700 mm. **Operation data:** machine: DMU 200 V SK50 Arbor: 100 22 710 (SK 40, 100 mm overhang) 200 22 710 (200 mm overhang) component: steel 1.2311	**Operation data:** rev.: 1.200 per min. feed: 3.000 mm/min ap: 1,5 mm ae: 31 mm chip volume: 140 cm^3/min (8,54 cu. in/min) cooling: air After changing the arbor from 100 mm reach to 200 mm reach, feed had to be reduced due to enormous vibrations.	**Operation data:** rev.: 1.100 per min. feed: 10.000 mm/min ap: 1 mm ae: 31mm chip volume: 312 cm^3/min (19 cu. in/min) cooling: air We didn't have any vibrations, even at the deepest spot of this component. Power consumption of the machine could be reduced from 60 % to 30 %. **For practice:** Using **Trigaworx®** tooling results in phantastic improvements. Smooth running also in extremely deep cavities and pockets. Feed rates up to 10 m/min. double your chip volume !

Up to our test, this has been machined with a Shell Type End Mill Body 52 310 (52 mm dia. r=6, z=5) and inserts 03 12 842K.

After reaching this problematic depth, we have changed the cutter to 5 52 273 (52 mm dia z=5) and inserts 03 73 840.