Trochoidal milling

maykestag
PERFORMANCE
IN PRECISION

Trochoidal milling

Known earlier as dynamic milling, trochoidal milling has developed tremendously in recent years. With the steady increase in computing power and machine dynamics at the machining centres in combination with modern CAM systems, trochoidal milling has become an indispensable machining strategy.

HIGH FEED RATE – LOW LATERAL INFEED

STC* milling is similar to the process of surface-side finishing milling, i.e. with little lateral infeed but the greatest possible axial feed rate (2xD to 5xD). An above-average feed reduces the tool engagement time, which significantly reduces the thermal load and thus also wearing on the tool. The achievable material removal rate is thus raised to completely new dimensions, the reduction of milling processing is over 50% compared to conventional strategies.

*) **S**peed-**T**rochoidal-**C**utting by Maykestag

WHERE IS THIS STRATEGY USED?

The great potential of this strategy is most clearly visible when machining „difficult" materials, in addition, even on weaker machining centres, where the machining performance can be significantly increased. Due to the sophisticated tool geometries of our STC milling cutters, vibrations are extremely reduced, which also brings an enormous advantage when machining unstable and thin-walled components.

WITH OR WITHOUT COOLING?

In principle, we recommend cooling with emulsion in materials that are difficult to machine, since, despite the already mentioned advantages of the short engagement time, not enough temperature can be dissipated via the chips. As always, the following adage is important:
„if cooling is used, then use it correctly“.

In steels with good machinability, we prefer dry machining or air cooling. The cooling also has a positive effect on pocket machining processes, since short chips produced by the chip breaker can be transported out of the pocket easily.

- Fast machining
- Low thermal load
- Low cutting forces
- Therefore also spindle-friendly
- High process stability
- Low wearing
- High economic efficiency

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WHERE DOES THIS ALMOST UNATTAINABLE MATERIAL REMOVAL RATE COME FROM?

It is a combination of various factors such as:

- Very high cutting data (Vc & fz)
- Very high cutting depths (ap up to 5XD)
- Intelligently calculated milling paths (idle motion optimised)
- Long service life due to reduced tool load
- Therefore, long tool change intervals

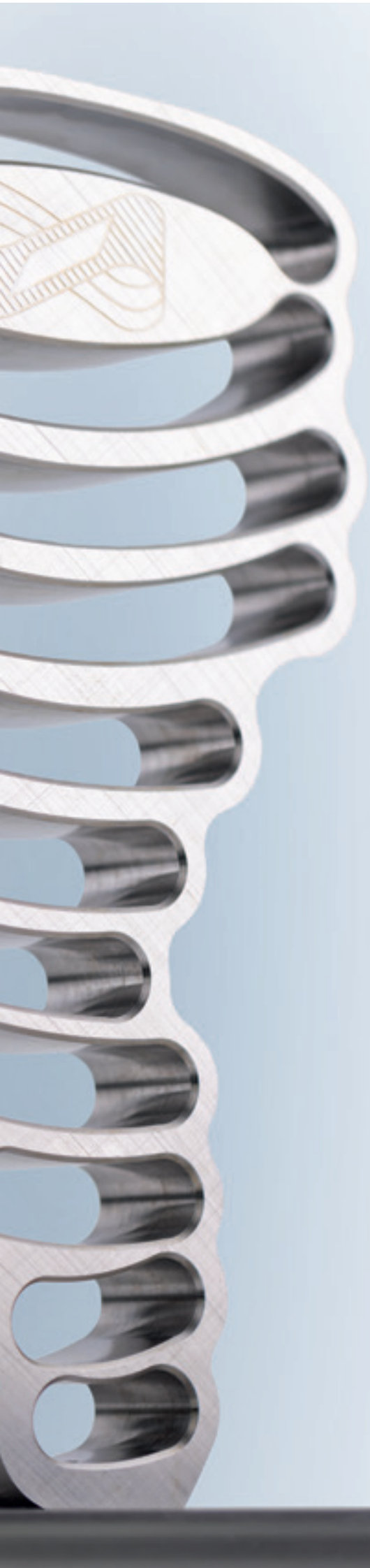
MACHINE AND CONTROL REQUIREMENTS

The machine landscape is very diverse among the machining companies and of course the type and quantities of the parts being machined play a critical part. Prerequisites for the use of this milling strategy are:

- Machining centre with high stiffness and dynamics
- Stable milling spindle with IC
- Chip conveyor equipment
- Suitable control system with appropriate computing power
- Modern CAM programming system

MAYKA'S TIP

- The better the CAM system, the more economical it is possible to work. Specially developed travel paths protect the tool.



IMPORTANT POINTS FOR EFFICIENT STC PROCESSING:

Select suitable milling cutters!

We have decided on a wide range of milling cutters to meet your requirements whatever the case may be.

The tool selection is very important for your success, i.e. the cutting length L2 should be used as completely as possible.

If only 50% or less of the cutting length is used due to the component, a tool change must be considered, otherwise the milling properties may deteriorate.

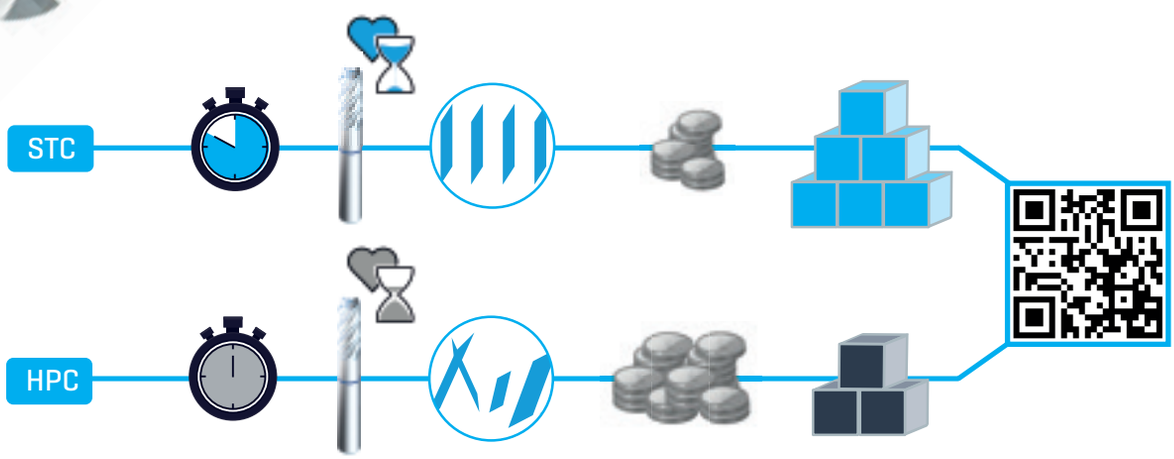
One of the consequences can be the vibration of the tool, which can lead to breakages on the cutting edges and thus result in a reduction in tool life.

Suitable tool holders!

This topic is often given too little attention because the extreme axial forces are underestimated, especially with milling cutters > 3XD.

I.e. holders with a mechanical pull-out protection should be considered as standard here. (e.g. surface chuck with coolant outlets on the collar or through the clamping sleeve).

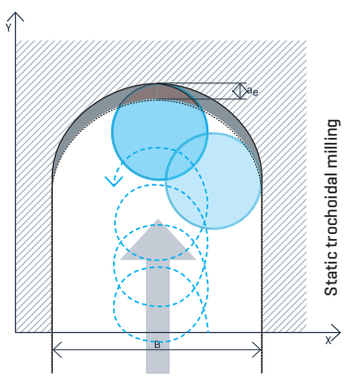
Application and advantages

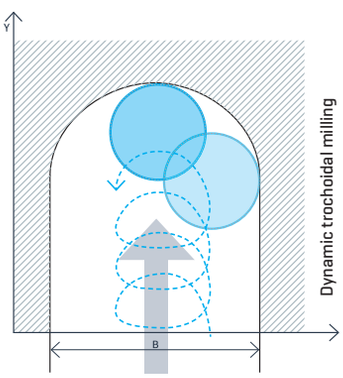


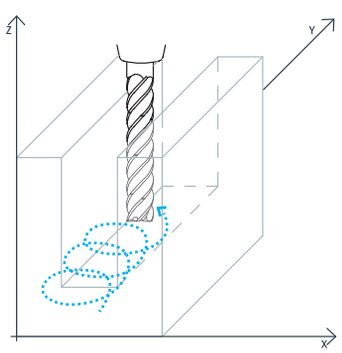
		HPC	STC	
		0841701200100	0800401200100	
Material	*C45E*			
Cutting edge diameter	*D1*	12	12	mm
Number of teeth	*Z*	4	5	
Engagement width	*ae*	3	1	mm
Engagement depth	*ap*	19	48	mm
Cutting speed	*Vc*	230	330	m/mm
Rotational speed	*n*	6101	8754	U/mm
Feed per tooth	*fz*	0,200	0,176	mm
Feed rate	*vf*	4881	7703	mm/min
Time-chip volume	*Q*	278	370	cm³/min
Processing time	*Tb*	18,5	8,5	min

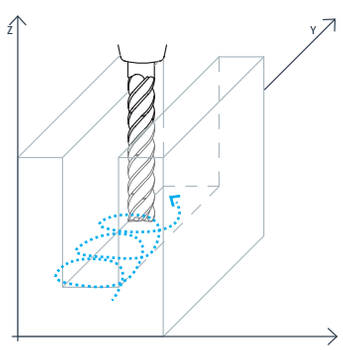
CHIP

A uniform chip is a sign of a constant load, which favours less vibration and less wear. Depending on the strategy, this can be influenced.









MAYKA`S TIPP

- MAYKA'S TIP: To achieve shorter chips, tools with chip breakers are used.

Tool

Turbo Twister

Product overview

Figure	Code	Ø mm	Cutting length	Pictograms	Coating	Z
	8002	3-20	7-42 2xD	45° · DIN 6535-HB · STC ·	SUPRADUR	5
	8003	3-20	10-62 3xD	45° · DIN 6535-HB · STC ·	SUPRADUR	5
	8004	6-20	26-82 4xD	45° · DIN 6535-HB · STC ·	SUPRADUR	5
	8005	6-20	32-102 5xD	45° · DIN 6535-HB · STC ·	SUPRADUR	5

Speedtwister

Product overview

Figure	Code	Ø	Cutting length	Pictograms	Coating	Z
	6107	3-20	10-62 3xD	45° · DIN 6535-HB · STC ·	ULTRADUR	5
	6117	3-20	10-62 3xD	45° · DIN 6535-HB · STC ·	TWINDUR	5
	6137	6-16	32-82 5xD	45° · DIN 6535-HB · STC ·	TWINDUR	5
	6197	6-16	32-82 5xD	45° · DIN 6535-HB · STC ·	ULTRADUR	5
	6198	6-16	32-82 5xD	DIN 6535-HB · STC ·	ULTRADUR	5
	6199	6-16	32-82 5xD	45° · DIN 6535-HA · HSC	ALUNIT-S®	8-10

Speedcut 4.0

Product overview

Figure	Code	Ø	Cutting length	Pictograms	Coating	Z
	8127	3-20	8-40 L	DIN 6535-HA · HPC+ ·	AERODUR	5
	8137	3-20	8-40 L	DIN 6535-HB · HPC+ ·	AERODUR	5
	8147	3-20	8-40 L	DIN 6535-HA · HPC+ ·	AERODUR	5
	8157	3-20	8-40 L	DIN 6535-HB · HPC+ ·	AERODUR	5
	8787	4-20	11-38 L	DIN 6535-HA · HPC+ ·	DUALDUR	5
	8797	4-20	11-38 XL	DIN 6535-HA · HPC+ ·	DUALDUR	5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Toolservice

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