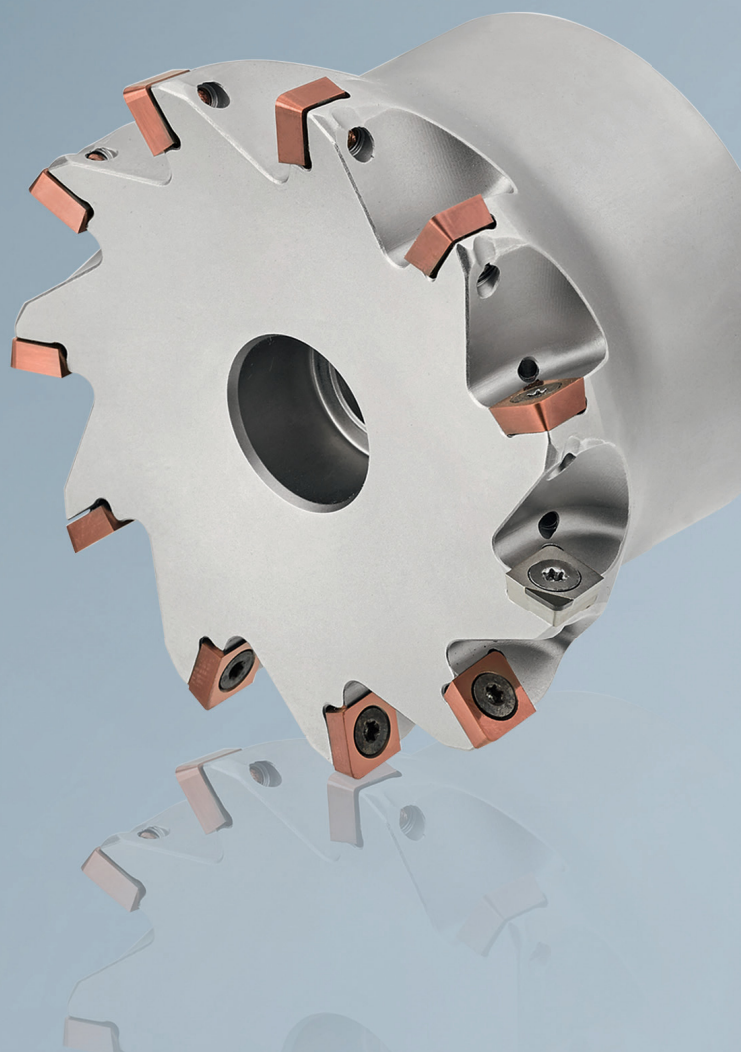


NEW



FinishLine Premium

With new press-to-size insert

FinishLine Premium

One tool – many applications

The FinishLine Premium universal milling program from LMT Kieninger for pre-finishing and finishing is supplemented by a press-to-size indexable insert.

The special topography of the new CPKT cutting insert with chipbreaker is optimized for machining ISO-P and ISO-M material classes. This means that even long-chipping materials such as unalloyed structural steels or rust- and acid-resistant materials can be machined efficiently.

The highly wear-resistant carbide grade with the Nanomold Black coating proven in die and mold making enables universal use in both dry and wet machining.

Infeeds of up to (over) 1 mm are no problem for the new insert.

Advantages:

- Directly pressed insert with chipbreaker for ISO-P and ISO-M
- Infeeds over 1 mm possible
- Wet and dry machining
- Wiper geometry (W_{axial} 1.0 mm / W_{radial} 1.5 mm)
- Good surface quality



The Wiper Effect – Wiper XXL

An innovative indexable insert from LMT Kieninger promises even faster processes thanks to an optimized wiper geometry. Super finishing with the insert delivers surfaces in grinding quality and reduces production times.

The super finishing of flat and vertical surfaces presents a challenge in mold and die making. On one hand, the surface is processed at high speeds, while, on the other hand, it needs to have an especially high quality. Indexable inserts with a wiper geometry have certain advantages in this field of application: Their finishing edge is elongated beyond the corner radius, which improves surface smoothing on the workpiece and enables the use of even higher feeds.

The latest development in our program is the new Wiper XXL insert with a wiper surface of 3 mm. This wiper geometry makes it possible to produce best surface qualities in bigger tool diameters and a max. feed per revolution (f_r) of 3 mm.

FinishLine with mixed cutting grades (carbide/CBN) and vibration-cushioned extension



One cutting edge produces the surface. With this principle, LMT Kieninger developed the new Wiper XXL insert. Having this in mind, only one insert needs to be changed to Wiper XXL on the face milling cutters \varnothing 52 mm to 100 mm. This one insert stands out about 0.02 mm (Fig. 3) and serves as a wiper to reproduce the required surfaces. The remaining insert seats are to be equipped with inserts of either the FG0 or WG0 geometry which perform the semi finishing. This procedure is also to be used for the CBN insert with Wiper XXL.

This mixed configuration of inserts makes higher cutting speeds possible and also increases the tool life with the same surface quality. These advantages become evident for example in the processing of cast iron frame parts.

An additional advantage of the high-precision tool system FinishLine: There is no need for pre-adjustment. The inserts can be changed directly on the machine.



Assembly instructions

When installing the Wiper XXL insert note that the chamfered corner (1) needs to be in the insert seat and the wiper surface (2) with the radius (3) needs to point forward.

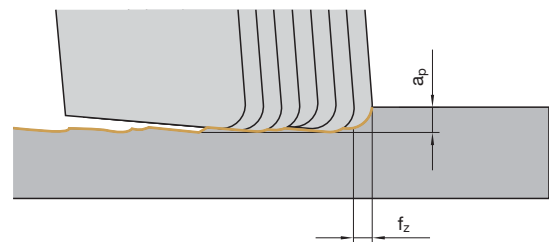


Fig. 1: Without wiper geometry, FG0

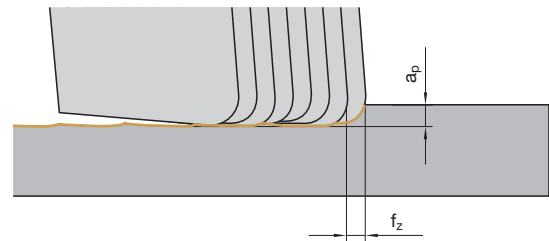


Fig. 2: With wiper geometry, WG0

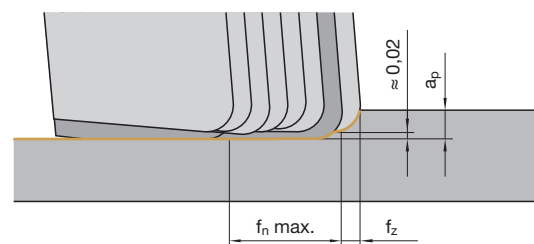
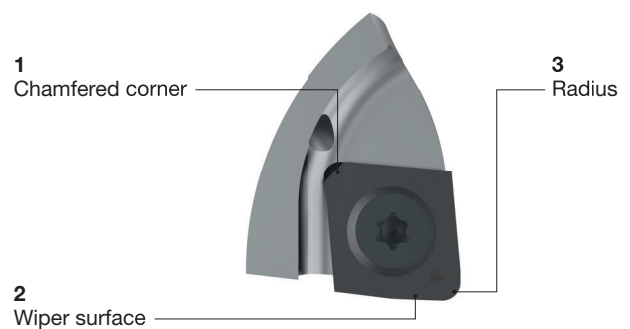
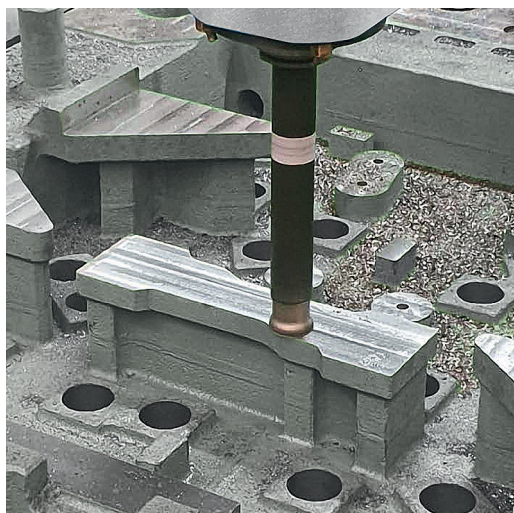


Fig. 3: With wiper XXL geometry





Tool:
FinishLine Premium
Cat.-No. FCG V08.066AN050-09-I, $d_1 = 66 \text{ mm}$, $z = 9$

Insert:
8 x CPHX 080310ER-WG0 | LCPH05M
1 x CPHX 080310ER-WG0-A (Wiper XXL)

Material:
0.6025, EN-GJI-250

Cutting data:
 $v_c = 280 \text{ mm}$ $a_p = 0.20 \text{ mm}$
 $n = 1350 \text{ m/min}$ $a_e = 44 \text{ mm}$
 $f_z = 0.2 \text{ mm}$ $v_f = 2432 \text{ mm}$

Achieved surface quality:
 $R_a = 0.8-1.0$

Maximum feed per tooth (f_z /mm) according to the number of teeth

No. of teeth	Wiper axial			
	CPHX 0803... ER-FG0 $W_{ax} = 0.5 \text{ mm}$	CPHX 0502... ER-FG0 $W_{ax} = 0.8 \text{ mm}$	CPHX 0502... ER-WG0 CPHX 0803... ER-WG0 $W_{ax} = 1.0 \text{ mm}$	Wiper XXL CPHX 0803... ER-WG0-A $W_{ax} = 3.0 \text{ mm}$
2	–	0.400	–	1.500
3	0.160	0.250	0.330	1.000
4	0.125	0.200	0.250	0.750
5	0.100	0.160	0.200	0.600
6	–	–	0.160	0.500
7	–	–	0.140	0.420
9	–	–	0.110	0.330
11	–	–	0.090	0.250
13	–	–	0.075	0.230

F_n = Feed per revolution in mm ($f_n = z \cdot f_z$) $f_n < W_{ax}$ $f_z = W_{ax} z$

Wiper-dimension of FinishLine Premium in mm		
	axial (W_{ax})	radial (W_{ra})
CPKT 0803... PP ER-WS10	1	1.5
CPHX 0502... ER-FG0	0.8	0.8
CPHX 0803... ER-FG0	0.5	0.8
CPHX 0502... ER-WG0	1	1.5
CPHX 0803... ER-WG0	1	1.5
CPHX 0803... ER-WG0 XXL	3	0

Another addition to our existing program is the grade LCPH05M. This new cutting grade is specially developed for the machining of hardened materials up to 65 HRC.

ened parts with best surface quality are required more frequently. The solution in these cases is the high-precision tool FinishLine Premium with the new grade LCPH05M as well.

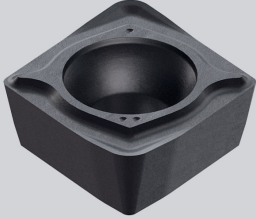


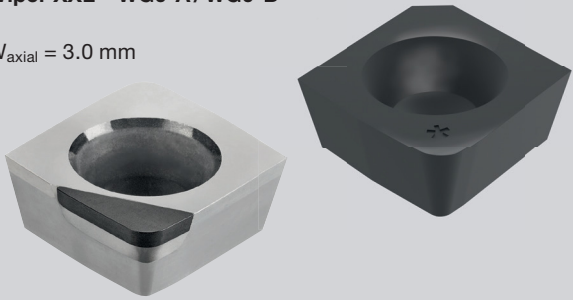
Especially when producing injection molds, mostly hardened materials need to be machined, a perfect surface is first priority. But not only in injection molds. also in general machining hard-

Cutting grade designations

Cutting material grades	Description
LCPH05M	HC-K05/K10 Nanomold Black Highly wear-resistant, coated ultra fine grade, specially for finishing with high cutting speeds and low depth of cuts of hardened steel > 55 HRC. Suitable for dry, wet and MQL machining.
LCKP10M	HC-K10/K20 Nanomold Red Highly wear-resistant, coated milling grade with high cutting edge stability suitable for finishing alloyed and unalloyed tool steels, high-strength materials, cast iron and hardened steel.
LCPK15M	HC-K10/K20 Nanomold Black Highly wear-resistant, coated milling grade with high cutting edge stability and thus particularly suitable for finishing and semifinishing alloyed and unalloyed tool steels, high-strength materials, cast iron and hardened steel up to 56 HRC. Suitable for dry, wet and MQL machining. (The wiper XXL insert is additionally equipped with a magenta colored top layer. This helps to avoid mixups).
LBHK95M	Cubical boron nitride (CBN) Extremely wear-resistant milling grade for machining hardened materials with > 54 HRC and cast iron. <ul style="list-style-type: none"> ■ High cutting speeds ■ Low to medium depths of cut ■ Low to medium chip load

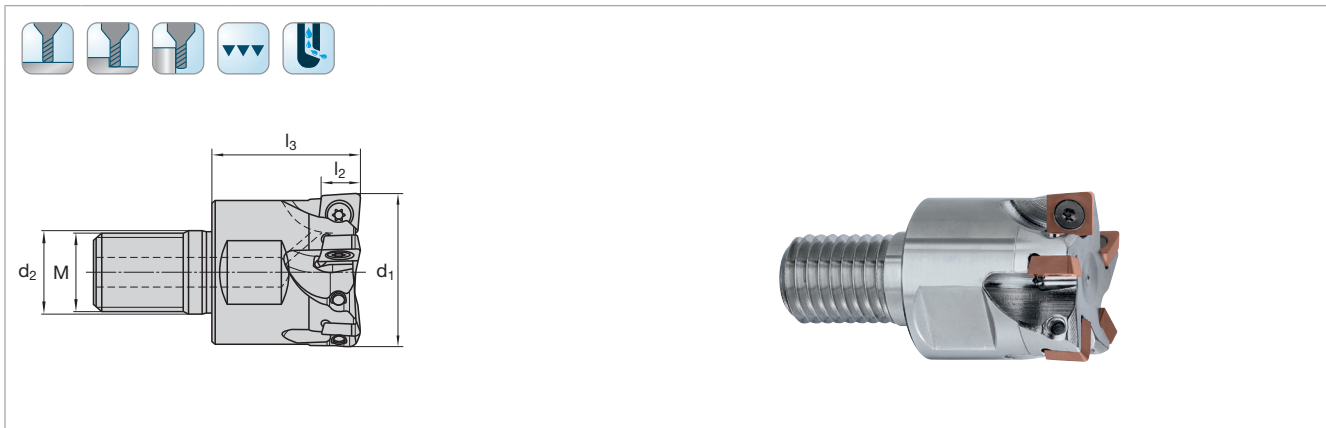
General application recommendations

To achieve the best possible result with the milling system FinishLine Premium, it is mandatory to keep the following application recommendations in focus.

<p>Wiper medium – press-to-size</p> <p>$W_{axial} = 1.0 \text{ mm}$ $W_{radial} = 1.5 \text{ mm}$</p>  <p>Features:</p> <ul style="list-style-type: none"> ■ Suitable for long-chipping materials ISO-P ■ Suitable for stainless materials ISO-M ■ Suitable for wet machining ■ Suitable for copy, shoulder and face milling ■ Infeed depth over 1 mm possible 	<p>Wiper medium – WG0</p> <p>$W_{axial} = 1.0 \text{ mm}$ $W_{radial} = 1.5 \text{ mm}$</p>  <p>Features:</p> <ul style="list-style-type: none"> ■ Suitable for very high surface qualities for example in injection molds (tool steel) ■ Suitable for face milling and 90° shoulder milling ■ Main applications in ISO-P, K and H ■ New grade LCPH05M especially for hard machining up to 65 HRC
<p>Wiper small – FG0</p> <p>$W_{axial} = 0.5 \text{ mm}$ $W_{radial} = 0.8 \text{ mm}$</p>  <p>Features:</p> <ul style="list-style-type: none"> ■ Suitable for copying, shoulder milling and face milling ■ For long extensions and unstable workpiece clamping ■ Nanomold Red suitable for hardness up to 60 HRC ■ Main applications in ISO-P, K and H 	<p>Wiper XXL – WG0-A/WG0-B</p> <p>$W_{axial} = 3.0 \text{ mm}$</p>  <p>Features:</p> <ul style="list-style-type: none"> ■ For face milling operations only ■ Main applications in ISO-P, K (CBN) and H ■ For highest surface qualities for example in sheet metal forming ■ Suitable for bigger tool diameters starting at Ø 52 mm

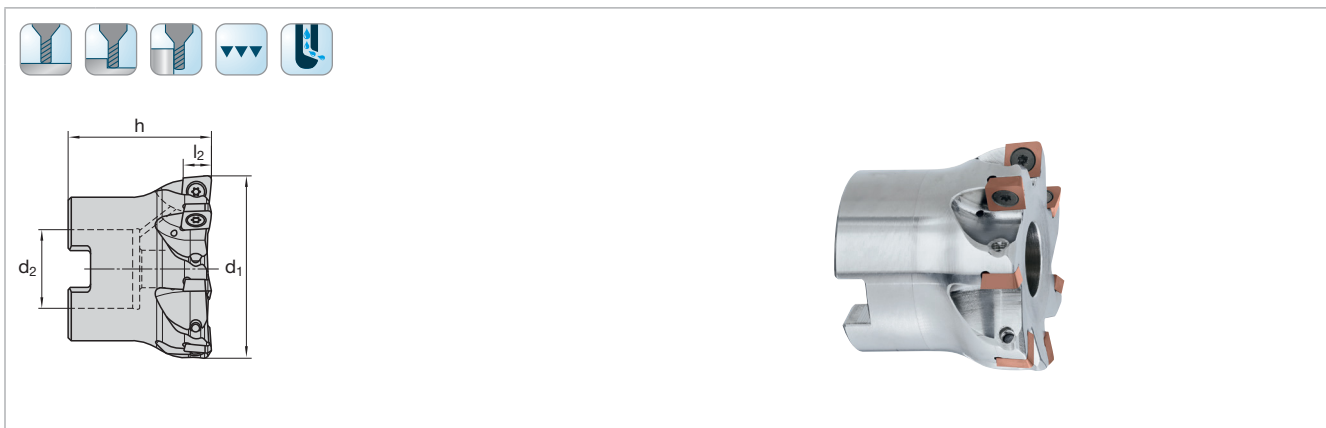
Explanation LMT-Code Inserts

C P H X	08 03 10	E R - W G 0 - A
		1 2 3 4 5 6 7
<p>1 E = Cutting edge type rounded</p> <p>2 R = Direction of cut: right hand</p> <p>3 - = Hyphen</p> <p>4 W = Wiper geometry F = Finishing geometry</p>	<p>5 G = Ground cutting face S = Sintered version</p> <p>6 0 = Rake angle: 0° 10 = Rake angle: 10°</p> <p>7 A = Wiper-XXL Carbide B = Wiper-XXL CBN</p>	

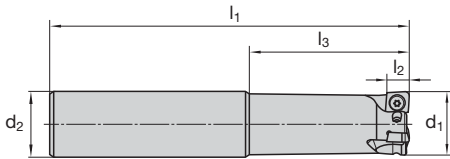


Cat.-No.							ECG			
d ₁	l ₂	l ₃	d ₂	M	z	Ident No.	LMT-Code			
16	5	25	8.5	M8	3	7177787	ECG V05.016TR025-03-I	CPHX 050210	6119610	6119544 T6
20	5	25	10.5	M10	4	7177789	ECG V05.020TS025-04-I			
25	5	25	12.5	M12	5	7177791	ECG V05.025TF025-05-I			
20	8	25	10.5	M10	3	7114274	ECG V08.020TS025-03-I	CPHX 0803... CPKT 080310	6119613	6119528 T8
25	8	25	12.5	M12	4	7114275	ECG V08.025TF025-04-I			
32	8	30	16	M16	5	7114276	ECG V08.032TH030-05-I			
35	8	30	16	M16	5	7114277	ECG V08.035TH030-05-I			
40	8	30	16	M16	6	7114278	ECG V08.040TH030-06-I			

FinishLine Premium
Face milling cutters

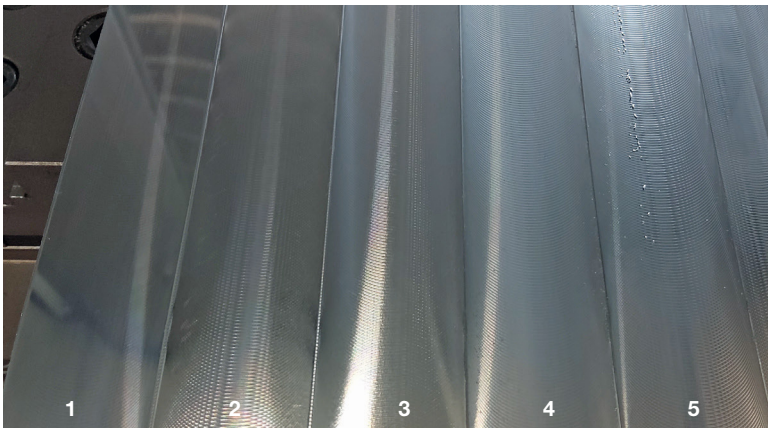


Cat.-No.							FCG			
d ₁	l ₂	h	d ₂	z	Ident No.	LMT-Code				
42	8	40	16	6	7114279	FCG V08.042AN040-06-I	CPHX 0803... CPKT 080310	6119613	6119528 T8	
52	8	40	22	7	7114280	FCG V08.052AN040-07-I				
66	8	50	27	9	7114281	FCG V08.066AN050-09-I				
80	8	50	27	11	7092880	FCG V08.080AN050-11-I				
100	8	55	32	13	7092881	FCG V08.100AN055-13-I				



Cat.-No.							ECG				
d ₁	l ₂	l ₁	l ₃	d ₂	z	Ident No.	LMT-Code				
12	5	77	32	12	2	7092882	ECG V05.012AN032-02-I	CPHX 050210	6119610	6119544 T6	
12	5	95	50	12	2	7092883	ECG V05.012AN050-02-I				
16	5	88	40	16	3	7092884	ECG V05.016AN040-03-I				
16	5	138	90	16	3	7092885	ECG V05.016AN090-03-I				
20	8	110	60	20	3	7092886	ECG V08.020AN060-03-I	CPHX 0803... CPKT 080310	6119613	6119528 T8	
20	8	170	120	20	3	7092887	ECG V08.020AN120-03-I				
25	8	146	90	25	4	7092888	ECG V08.025AN090-04-I				
25	8	216	160	25	4	7092889	ECG V08.025AN160-04-I				
32	8	150	90	32	5	7092890	ECG V08.032AN090-05-I				
32	8	220	160	32	5	7092891	ECG V08.032AN160-05-I				

Application example Comparison surface quality



1. CPHX 080310 ER-WG0 LCPK15M Grinded version	Ra: 0.434/Rz: 2.839
NEW 2. CPKT 080310 PP ER-WS10 LCPK15M Press-to-size	Ra: 0.718/Rz: 3.280
3. Competitor 1	Ra: 0.980/Rz: 4.835
4. Competitor 2	Ra: 1.218/Rz: 5.908
5. Competitor 3	Ra: 2.045/Rz: 9.147

Strategy:
Face milling

Tool LMT:
FinishLine Premium
Cat.-No. ECG V08.025TF025-04-I

Material:
1.2379 X155CrVMo12-1

Cutting data:
 $v_c = 200$ m/min
 $f_z = 0.15$ mm
 $a_p = 0.5$ mm
 $a_e = 20$ mm


Result:
The new sintered insert CPKT generated a significantly improved surface quality compared to all competitors. Only the grinded version CPHX from LMT Tools continues to produce a better surface.





FinishLine Premium Cutting data recommendations

	Material	Material No.	DIN Description Old	R _m /UTS (N/mm ²)	DIN Description New
P	Plain carbon steel + free cutting steel	1.0570	St52-3	-700	S355J2G3
		1.1730	C45	-800	C45U
		1.0715	9SMn28	-700	11SMn30
		1.1191	Ck45	500-950	C45E
		1.7219	26CrMo4		26CrMo4-2
	Heat-treatment steel, medium strength	1.7225	42CrMo4	500-950	42CrMo4
		1.8159	51CrV4		51CrV4
	Cast steel	1.0416	GS40	-950	GS40
	Case hardening steel	1.7131	16MnCr5	-950	16MnCr5
	Stainless steel, ferritic, martensitic	1.4006	X10Cr13	500-950	X12Cr13
		1.4104	X12CrMoS17		X14CrMoS17
		1.4122	X35CrMo17		X39CrMo17-1
	Heat-treatment steel, high strength	1.7225	42CrMo4	950-1400	42CrMo4
		1.6580	30CrNiMo8		30CrNiMo8
	Nitriding steel, heat treated	1.8504	34CrAl6	950-1400	34CrAl6
		1.2344	X40CrMoV5.1	-900	X40CrMoV5-1
	Tool steel	1.2738	45CrMnNiMo8.6.4	950-1150	45CrMnNiMo8-6-4
		1.2379	X155CrVMo12 1	-950	X153CrMoV12-1
		1.2080	X210Cr12	950-1400	X210Cr12
		1.2311	40CrMnMo7	-1100	40CrMnMo7
1.2312		40CrMnNiMoS8.6	-1150	40CrMnNiMoS8-6	
1.2343		X38CrMoV5 1	950-1400	X37CrMoV5-1	
1.2358		60CrMoV18-5	850-1000	60CrMoV18-5	
1.2714		55NiCrMoV7	1100-1350	55NiCrMoV7	
1.2316	X38CrMo16	-1100	X38CrMo16		
M	Stainless steel, austenitic	1.4301	X2CrNiMo17-12-2	500-950	X5CrNiMo18-10
		1.4404	X6CrNiMoTi17-12-2		X2CrNiMo17-12-2
		1.4571	X10CrNiMoTi18		X10CrNiMoTi18
	Stainless steel, martensitic steel	1.2709	X3NiCoMoTi18-9-5	800-1000	X3NiCoMoTi18-9-5
		1.4542	X5CrNiCuNb16-4		X5CrNiCuNb16-4
1.4568	X7CrNiAl17-7		X7CrNiAl17-7		
K	Grey cast iron	0.6025	GG25	100-400 (120-260 HB)	EN-GJL-250
	Alloyed grey cast iron	0.6678	GGL-NiCr35 2	150-250 (160-230 HB)	EN-GJLA-XNiCr35-2
	Nodular cast iron	0.7060	GGG60	400-800	EN-GJS-600-3
		0.7070	GGG70L	(120-310 HB)	EN-GJS-700-2U
	Malleable cast iron	0.8155	GTS55	350-700 (150-280 HB)	EN-GJMB-550-4
H	Chilled cast iron		Ni-hard, Ampco	300-600 HB	Ni-hard, Ampco
	Hardened steel		Sleipner, Toolox	45-52 HRC	Sleipner, Toolox
			Dievar	53-59 HRC	Dievar
			Vandis, Sverker	60-65 HRC	Vandis, Sverker

¹⁾ For very good surface qualities, please note the max. feed per tooth on page 4

The cutting data indicated are starting values and must be adjusted to the prevailing conditions.

 Wet machining, sufficient emulsion volume required

Recommended cutting datas with $a_e = 0.75 \times d_1$ (d_1 = Cutter diameter)													
Face milling						Peripheral milling							
CPKT...			CPHX...			CPKT...			CPHX...				
v_c (m/min)	f_z (mm)	$a_{p \max}$ (mm)	v_c (m/min)	f_z (mm) ⁽¹⁾	a_p (mm)	v_c (m/min)	f_z (mm)	$a_{p \max}$ (mm)	v_c (m/min)	f_z (mm)	-FG0 $a_{p \max}$ (mm)	-WG0	
220-240	0.2	1				360-400	0.15	1.5	360-400	0.15	0.8	1.5	
220-260	0.2	1	240-280	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
200-240	0.2	1	220-260	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
260-280	0.2		280-300	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
160-220	0.2	1	180-240	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
200-240	0.2	1	220-260	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
180-220	0.2	1	200-240	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
180-230	0.2	1	200-250	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
180-230	0.2	1	200-250	0.25	0.2	360-400	0.15	1.5	360-400	0.15	0.8	1.5	
180-230	0.15	1	200-250	0.2	0.2	360-400	0.12	1.5	360-400	0.12	0.8	1.5	
 180-220	0.15	1				 320-380	0.12	1.5					
 180-220	0.15	1				 320-380	0.12	1.5					
220-260	0.2	1	240-280	0.2	0.3	220-260	0.25	1.5	220-260	0.25	0.8	1.5	
200-220	0.2	1	220-240	0.2	0.3	200-220	0.25	1.5	200-220	0.25	0.8	1.5	
200-240	0.2	1	220-260	0.2	0.3	200-240	0.25	1.5	200-240	0.25	0.8	1.5	
200-240	0.2	1	220-260	0.2	0.3	200-240	0.25	1.5	200-240	0.25	0.8	1.5	
			140-180	0.2	0.2				180-200	0.20	0.2		
			180-220	0.15	0.2				220-260	0.20	0.2		
			160-180	0.12	0.2				180-200	0.15	0.2		
			100-120	0.10	0.2				160-180	0.15	0.2		

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