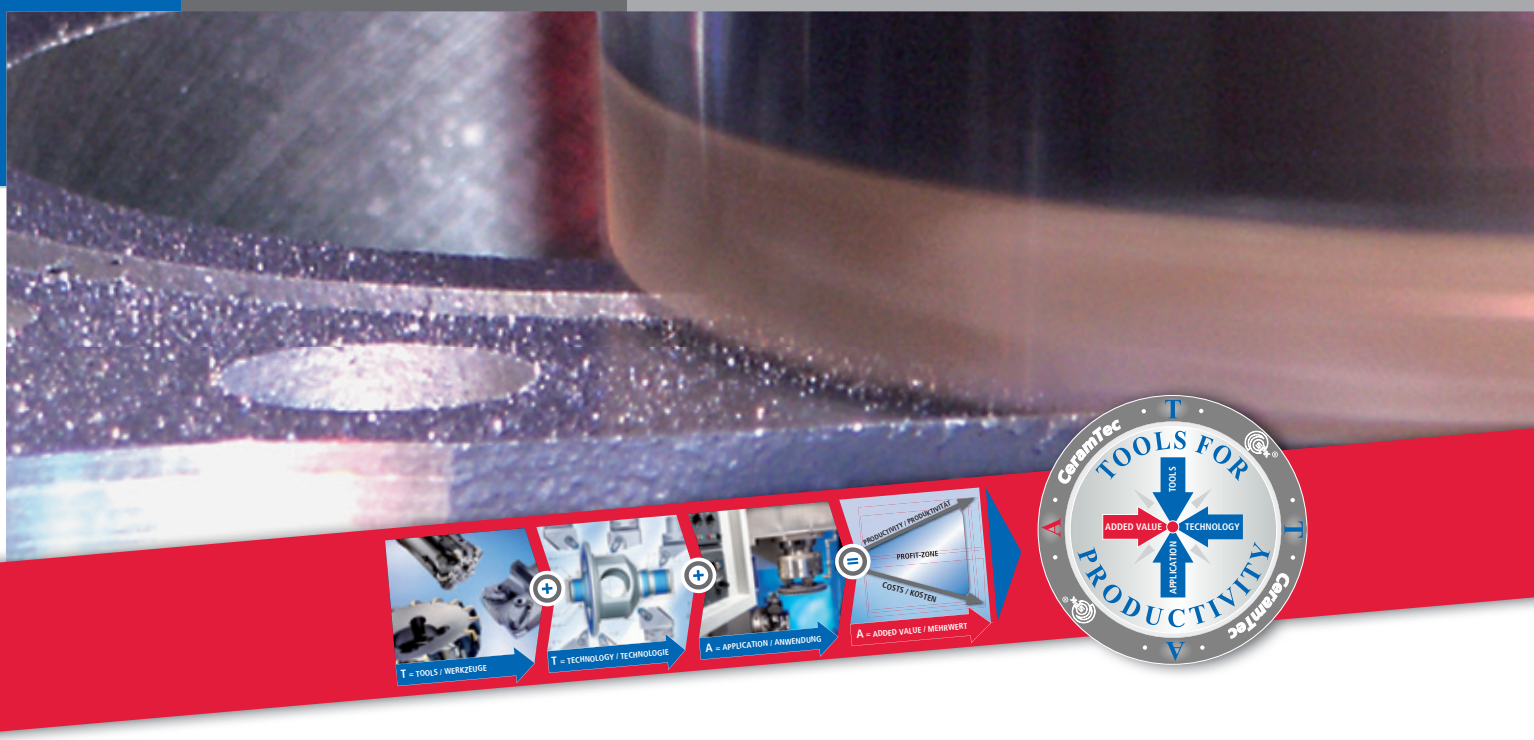
TOOLS | TECHNOLOGY | APPLICATION

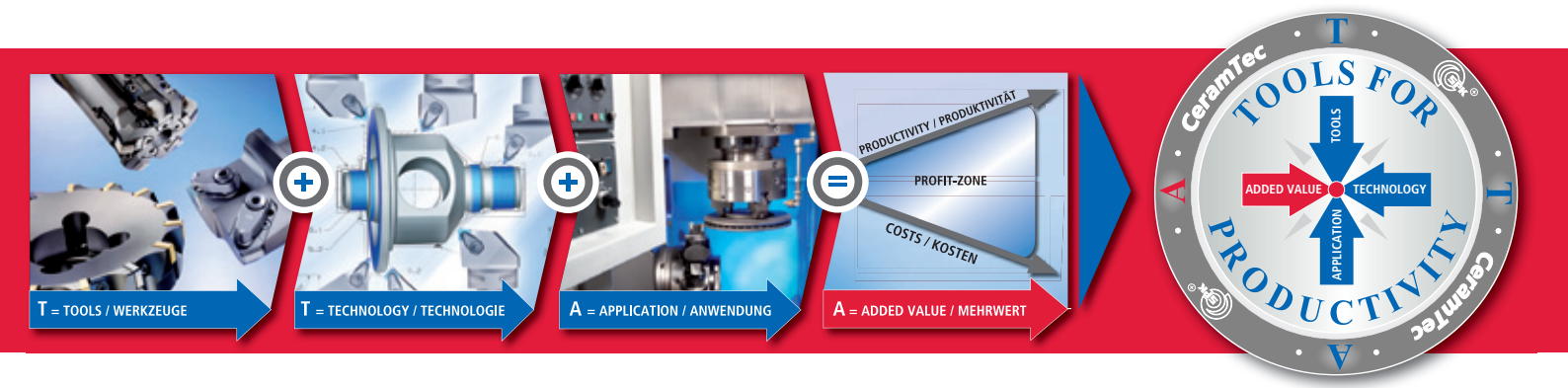


NEW MILLING CUTTER GENERATION

High Speed Roughing and Finishing

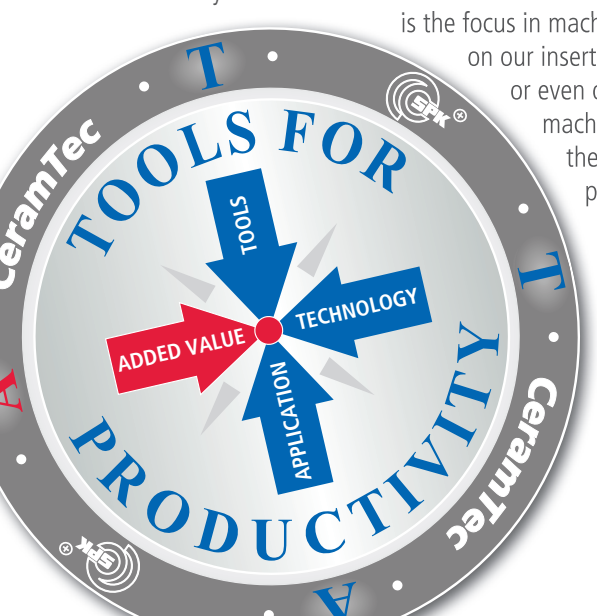
CeramTec
THE CERAMIC EXPERTS

SPK+
THE PRODUCTIVITY EXPERTS



TOOLS FOR PRODUCTIVITY

Achieving the optimal machining of a workpiece is no longer solely dependent on the cutting process. Increasing technological and economical challenges require highly efficient machining processes. To this end, we have developed the programme **"SPK+ - The Productivity Experts"** with the formula: **tool + technology + application = increased productivity with lower costs.** It has already been shown that the formula means a boost in productivity for our customers in many specific applications. In the future, we will draw attention to this by placing a "productivity compass" on our products as a visible sign and seal of quality.The compass stands for our Tools for Productivity. Wherever you find our productivity compass, it will show you that the maximum contribution to productivity is the focus in machining. Whether on our inserts, tool carriers or even on processing machines, whenever the machining process has been optimised by our engineering on location. We work together with our customers from the beginning and provide them with highly specialised experts in the world's most important markets. In this way, we can guarantee that using our **Tools for Productivity – tool + technology + application** – will guide you directly to your goal of perfected machining and maximum productivity. Our high performance cutting materials, precision tooling systems and our extensive range of services are perfectly tailored to meet the demands resulting from higher productivity. Our productivity compass is the productivity seal you can trust. More information can be found at **www.tools-for-productivity.com**



Content

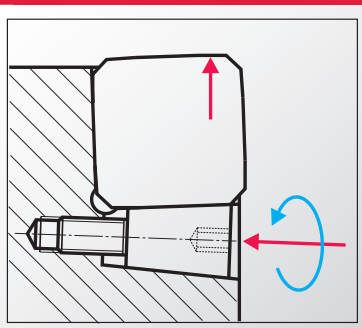
The PMK face milling cutter system is ideally suited for the rough milling and finishing of GJL (grey cast iron) and GJS (ductile cast iron) materials. These milling cutters work with an approach angle of 88°.

FINISHING OPERATIONS USING PMK

In order to attain outstanding surface qualities during finishing, the PMK series has been fitted with insert seatings that can be set in the Z-direction. This setting option allows users to pre-set the specially-developed broad finishing inserts in the µm range. The inserts in the fixed insert seating take over the cutting work, while, thanks to their slightly elevated position, the finishing inserts can generate surface roughness values of up to 0.5 µm.

The mixed assembly of the milling process – the main work is performed with ceramics, the surface quality with PCBN – facilitates highly productive milling and high feed rate speeds, with outstanding tool lives. The mixed assembly also means that the cutting material can be optimally adapted to the material.

Micro setting



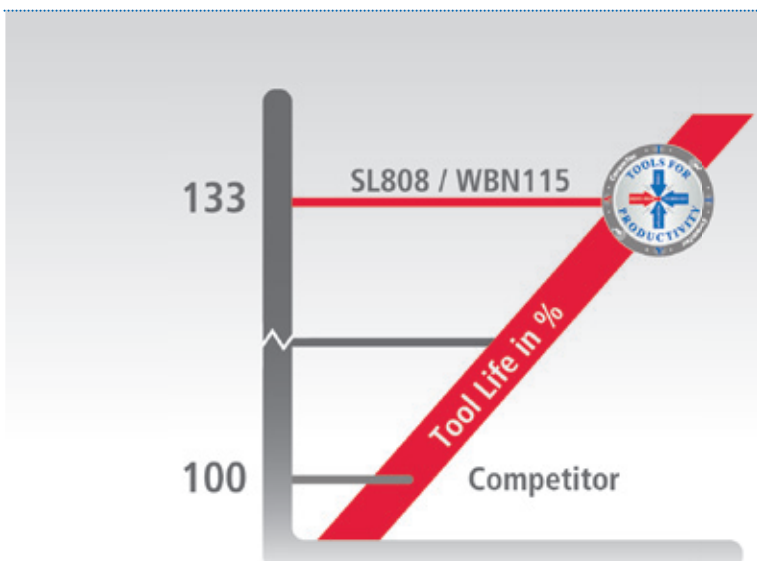
ROUGH MILLING USING PMK

EASY CHANGE TECHNOLOGIE

For high-performance rough milling operations using the PMK milling cutter system, the adjustable insert seatings are equipped with roughing inserts and set to the same height as the inserts in the fixed insert seatings. With the appropriate milling cutter diameters, a cutting depth of up to 5 mm at a feed rate of 0.30 mm per tooth can be reliably achieved during rough milling operations. Thanks to the simple procedure for switching between rough milling and finishing in the milling cutter system, compounded by the high cutting data that can be attained, this high-performance system offers outstanding productivity. It also significantly reduces the production costs for milling.

TOOL LIFE QUANTITY INCREASED UP TO 133%

FOR FINISH MILLING OF A GEAR-BOX



REQUIREMENTS:
- INCREASE TOOL LIFE QUANTITY
- REDUCE MACHINING TIME

CONDITIONS:
- DRY MACHINING

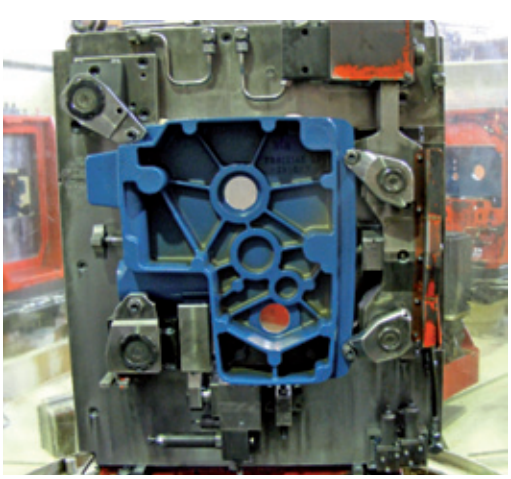
CUTTING MATERIAL MIX SiAlON SL808 AND CBN WBN115

SPK ENGINEERING FOR INCREASING EFFICIENCY THROUGH

- DEFINITION MILLING STRATEGY
- DEFINITION OF CUTTING DATA

Finish Milling of a Gear-Box Made of GJS500

	Competitor	SPK-Cutting Tools
Cutting Material:	Tungsten Carbide	**SL808 / WBN115**
Miling Cutter:	D = 80 mm, z = 8	PMK 080-08SN1288R-AM
Insert:	SNGN 12 04 12	SNGN 12 04 08
Table Feed v_f:	3840 mm/min	4480 mm/min
Cutting Speed v_c:	402 m/min	1005 m/min
Feed per Tooth f_z:	0,30 mm/t	0,14 mm/t
Cutting Depth a_p:	0,20 mm	0,20 mm
Width of Engagement a_e:	40 mm	65 mm
Machinig Time:	**0,78 min**	**0,67 min**
Tool Life:	**100 %**	**133 %**



TOOL LIFE QUANTITY INCREASED UP TO 215%

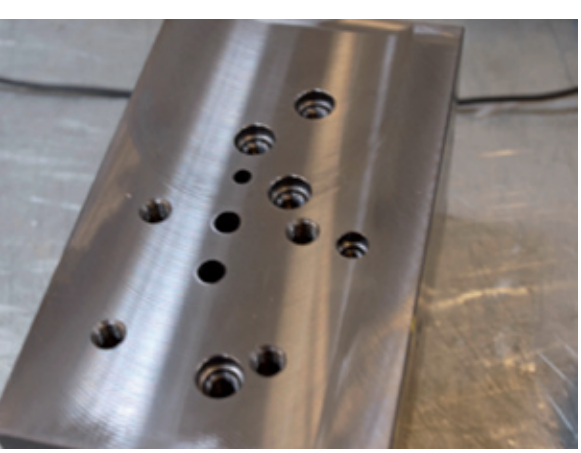
PRE-FINISHING OF A HYDRAULIC BLOCK

REQUIREMENTS:
- INCREASE TOOL LIFE QUANTITY
- REDUCE MACHINING TIME

CONDITIONS:
- SURFACE QUALITY

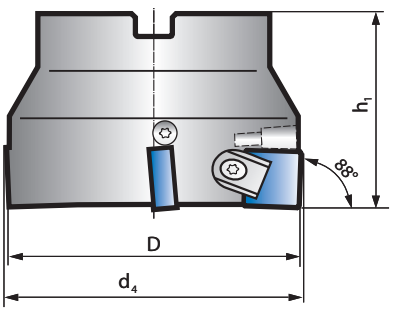
CUTTING MATERIAL MIX SiAlON SL808 AND CBN WBN115

SPK ENGINEERING FOR INCREASING EFFICIENCY THROUGH
- DEFINITION OF MILLING STRATEGY
- DEFINITION OF CUTTING DATA



Pre-Finishing of a Hydraulic Block Made of GJS400

	Competitor	SPK-Cutting Tools
Cutting Material:	Tungsten Carbide	**SL808 / WBN115**
Milling Cutter:	D = 80 mm, z = 8	PMK 080-08SN1288R-AM
Insert:	-	SNGN 12 04 12
Table Feed v_f:	1624 mm/min	3520 mm/min
Cutting Speed v_c:	510 m/min	553 m/min
Feed per Tooth f_z:	0,10 mm/t	0,20 mm/t
Cutting Depth a_p:	0,50 mm	0,50 mm
Width of Engagement a_e:	65 mm	65 mm
Machining Time:	**0,44 min**	**0,20 min**
Tool Life:	**100 %**	**215 %**



Axial rake angle γ_a	-6°
Radial rake angle γ_r depending on Ø	-6° to -9°
Mounting dimenion according to DIN 8030	

Recommended application

GJL (GG) GJS (GGG)

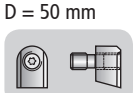
WORKPIECE
thin-walled ✓ unstable ✓ stable ✓

f_z = 0,40 mm/t

6.3 • 3.2 • 0.8

Type	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	$n_{max}(min^{-1})$
PEK-050-05SN1288R-AM	771.00.036.22	50	5	51	40	18000
PEK-063-06SN1288R-AM	771.00.036.32	63	6	64	40	13000
PEK-080-08SN1288R-AM	771.00.036.42	80	8	81	50	10000
PEK-100-10SN1288R-AM	771.00.036.52	100	10	101	50	8000
PEK-125-12SN1288R-AM	771.00.036.62	125	12	126	63	6000

D = 50 mm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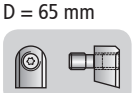
70.91.55.221.0

D = 65 mm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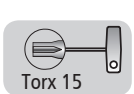

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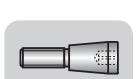
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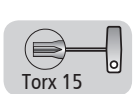

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Recommended application

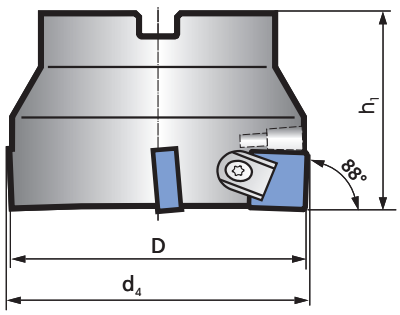
GJL (GG) GJS (GGG)

WORKPIECE
thin-walled ✗ unstable ✗ stable ✓

f_z = 0,16 - 0,3 mm/t

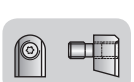
12.5 • 6.3 • 0.5

Axial rake angle γ_a	**-6°**
Radial rake angle γ_r depending on Ø	**-6° to -9°**
Mounting dimenion according to DIN 8030	



Type	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	$n_{max}(min^{-1})$
PMK-063-06SN1288R-AM	771.00.033.32	63	6 (5+1)	64	40	13000
PMK-080-08SN1288R-AM	771.00.033.42	80	8 (7+1)	81	50	10000
PMK-100-10SN1288R-AM	771.00.033.52	100	10 (9+1)	101	50	8000
PMK-125-12SN1288R-AM	771.00.033.62	125	12 (10+2)	126	63	6000
PMK-160-14SN1288R-AM	771.00.033.72	160	14 (12+2)	161	63	6000
PMK-200-16SN1288R-AM	771.00.033.82	200	16 (14+2)	201	63	4000
PMK-250-21SN1288R-AM	771.00.033.92	250	21 (18+3)	251	63	3000
PMK-315-28SN1288R-AM	771.00.033.02	315	28 (24+4)	316	80	2000

t = 6 (5+1): totally 6 teeth, there of one tooth adjustable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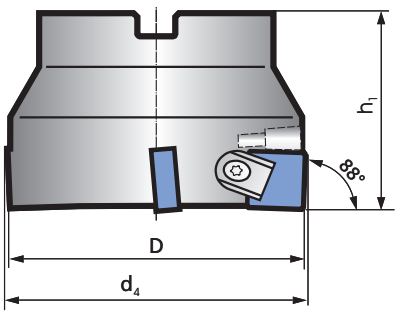
PMKS Face Milling Cutters - Coarse Pitch



Axial rake angle γ_a	**-6°**
Radial rake angle γ_r depending on Ø:	**-6° to -9°**
Mounting dimenion according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

GJL (grey cast iron) ■ GJS (ductile cast iron) ■

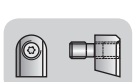
WORKPIECE
thin-walled ✓ unstable ✓ stable ✓

f_z = 0,16 - 0,3 mm/tooth

12.5 ▽ • 6.3 ▽ • 0.5 ▽

Type	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PMK S 063-04SN1288R-AM	778.00.000.32	63	4 (3+1)	64	40	13000
PMK S 080-05SN1288R-AM	778.00.000.42	80	5 (4+1)	81	50	10000
PMK S 100-05SN1288R-AM	778.00.000.52	100	5 (4+1)	101	50	8000
PMK S 125-06SN1288R-AM	778.00.000.62	125	6 (5+1)	126	63	8000
PMK S 160-08SN1288R-AM	778.00.000.72	160	8 (7+1)	161	63	6000

Example:
t = 6 (5+1): totally 6 teeth, there of one tooth adjustable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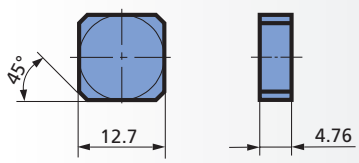
SNCN 12 04 ZN T 	SNCN 12 04 ZN T00520	SL808	17.10.409.03.1
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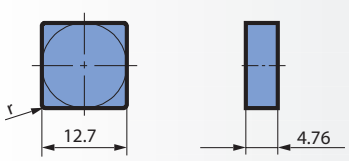
SNGN 12 04 .. T 	SNGN 12 04 08 T01020	SL500	36.10.009.20.0
		SL808	17.10.009.20.1
	SNGN 12 04 12 T01020	SL500	36.10.058.20.0
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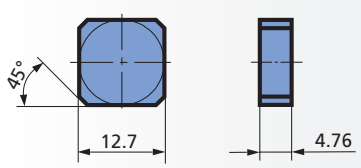
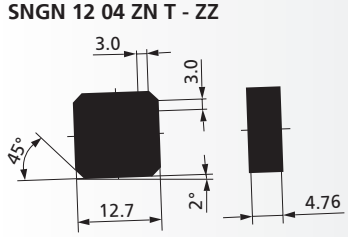
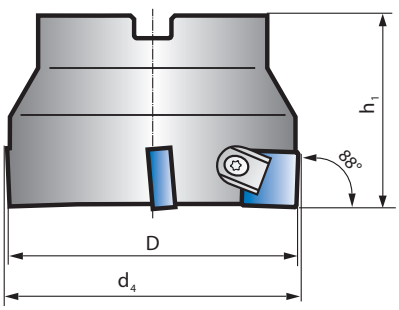
		SL858 C	21.10.058.20.1
SNGN 12 04 ZN T - ZZ 	SNGN 12 04 ZN T 88Z300	SC60	46.10.047.70.6
SNGN 12 04 ZN T - ZZ 	SNGN 12 04 ZN T 01015 - S 88Z300	WBN115	12.12.085.37.0



Axial rake angle γ_a	-6°
Radial rake angle γ_r depending on Ø	-6° to -9°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

GJL (GG) GJS (GGG)

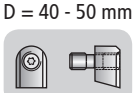
WORKPIECE
thin-walled ✗ unstable ✗ stable ✓

f_z = 0,40 mm/tooth

12.5 • 6.3 • 0.5

Type	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PFK-040-04SN0988R-AM	771.00.030.12	40	4	41	40	23000
PFK-050-05SN1288R-AM	771.00.030.22	50	5	51	40	18000
PFK-063-06SN1288R-AM	771.00.030.32	63	6	64	40	13000
PFK-080-08SN1288R-AM	771.00.030.42	80	8	81	50	10000
PFK-100-10SN1288R-AM	771.00.030.52	100	10	101	50	8000
PFK-125-12SN1288R-AM	771.00.030.62	125	12	126	63	8000
PFK-160-15SN1288R-AM	771.00.030.72	160	15	161	63	6000

D = 40 - 50 mm



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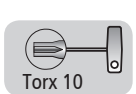

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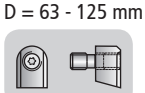
D = 63 - 125 mm



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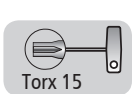

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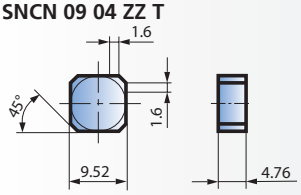
SNCN 09 04 ZZ T 	SNCN 09 04 ZZ T00520	SH2	36.10.351.03.7
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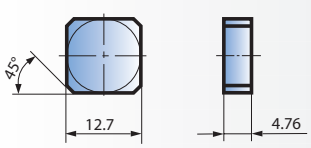
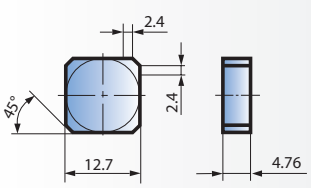
SNCN 12 04 ZN T 	SNCN 12 04 ZN T 00520	SL500	36.10.409.03.0
	SNCN 12 04 ZN T 00520	SL808	17.10.409.03.1
	SNCN 12 04 ZN T 00520	SL854 C	17.10.409.03.9
SNCN 12 04 ZZ T 	SNCN 12 04 ZZ T 00520	SL500	36.10.343.03.0
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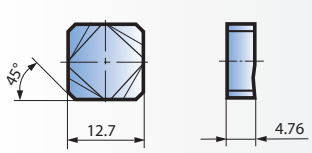
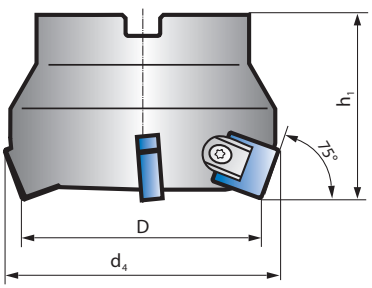
SNER 12 04 ZN E - HC 	SNER 12 04 ZN E - HC	SL808	17.10.405.42.1



Axial rake angle γ_a	-6°
Radial rake angle γ_r depending on Ø	-6° to -9°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

GJL (GG) GJS (GGG)

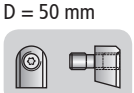
WORKPIECE
thin-walled ✗ unstable ✗ stable ✓

f_z = 0,40 mm/tooth

12.5 • 6.3

Type	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PFK-050-05SN1275R-AM	771.00.031.22	50	5	56	40	18000
PFK-063-06SN1275R-AM	771.00.031.32	63	6	69	40	13000
PFK-080-08SN1275R-AM	771.00.031.42	80	8	86	50	10000
PFK-100-10SN1275R-AM	771.00.031.52	100	10	106	50	8000
PFK-125-12SN1275R-AM	771.00.031.62	125	12	131	63	8000
PFK-160-15SN1275R-AM	771.00.031.72	160	15	166	63	6000

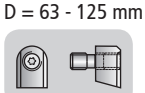
D = 50 mm



70.91.55.583.0

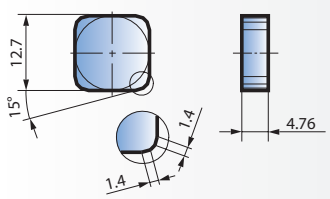
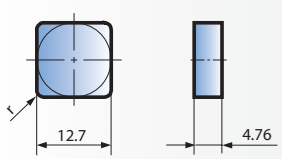
70.91.55.221.0

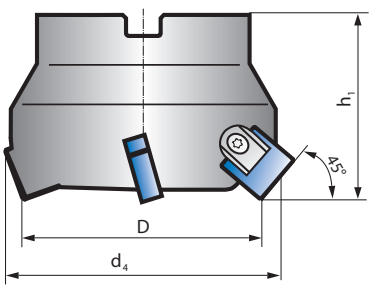
D = 63 - 125 mm



70.91.55.584.0

70.91.55.220.0

INSERT	ISO	GRADE	SPK REF. NO.
SNGN 12 04 EN T 	SNGN 12 04 EN T 01020	SL500	36.10.261.20.0
SNGN 12 04 T 	SNGN 12 04 12 T 01020	SL500	36.10.058.20.0
		SL808	17.10.058.20.1
		SL854 C	17.10.058.20.9



Axial rake angle γ_a	-6°
Radial rake angle γ_r depending on Ø	-6° to -9°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

GJL (GG) GJS (GGG)

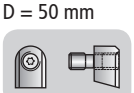
WORKPIECE
thin-walled ✗ unstable ✗ stable ✓

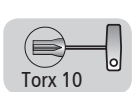
f_z = 0,30 mm/tooth

12.5 • 6.3 • 3.2

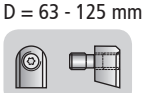
Type	SPK-Ref. No.	Dimensions				
		D	Teeth / t	d_4	h_1	n_{max}(min^{-1})
PFK-050-05SN1245R-AM	771.00.032.22	50	5	65	40	18000
PFK-063-06SN1245R-AM	771.00.032.32	63	6	78	40	13000
PFK-080-08SN1245R-AM	771.00.032.42	80	8	95	50	10000
PFK-100-10SN1245R-AM	771.00.032.52	100	10	115	50	8000
PFK-125-12SN1245R-AM	771.00.032.62	125	12	140	63	8000
PFK-160-12SN1245R-AM	771.00.032.72	160	15	175	63	6000

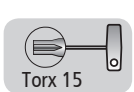
D = 50 mm



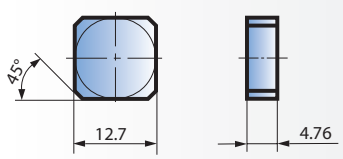
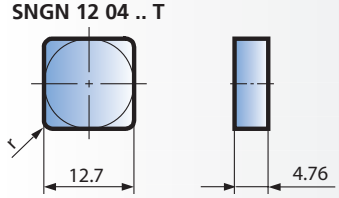
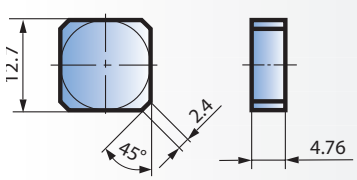


D = 63 - 125 mm

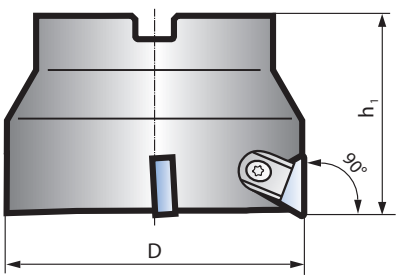




70.91.55.220.0

INSERT	ISO	GRADE	SPK REF. NO.
SNCN 12 04 ZN T 	SNCN 12 04 ZN T 00520	SL500	36.10.409.03.0
		SL854 C	17.10.409.03.9
SNGN 12 04 .. T 	SNGN 12 04 12 T 01020	SL500	36.10.058.20.0
		SL808	17.10.058.20.1
		SL854 C	17.10.058.20.9
SNGN 12 04 AN T 	SNGN 12 04 AN T 01020	SL500	36.10.232.20.0

Square Shoulder Milling Cutter PFK ... 90R-AM



Axial rake angle γ_a	-6°
Radial rake angle γ_r depending on Ø	-6° to -9°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

GJL (GG) GJS (GGG)

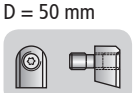
WORKPIECE
thin-walled ✓ unstable ✓ stable ✓

f_z = 0,30 mm/tooth

12.5 • 6.3

Type	SPK-Order-No.	Dimensions				
		D	Teeth t	d_4	h_1	$n_{max}(min^{-1})$
PFK-050-05TN1690R-AM	771.00.042.23	50	5	-	40	18000
PFK-063-06TN1690R-AM	771.00.042.33	63	6	-	40	13000
PFK-080-08TN1690R-AM	771.00.042.43	80	8	-	50	10000
PFK-100-10TN1690R-AM	771.00.042.53	100	10	-	50	8000
PFK-125-12TN1690R-AM	771.00.042.63	125	12	-	63	6000
PFK-160-16TN1690R-AM	771.00.042.73	160	16	-	63	5000

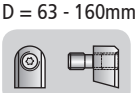
D = 50 mm



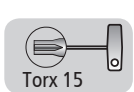
70.91.55.583.0

70.91.55.221.0

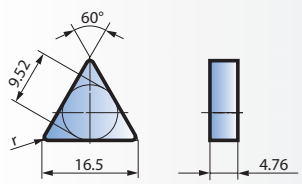
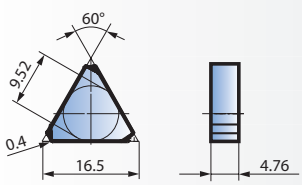
D = 63 - 160mm



70.91.55.584.0



70.91.55.220.0

INSERT	ISO	GRADE	SPK-ORDER-NO.
TNCN 16 04 .. T 	TNCN 16 04 04 T 01020	SL808	17.30.190.20.1
		SL854 C	17.30.190.20.9
	TNCN 16 04 08 T 01020	SL808	17.30.191.20.1
		SL854 C	17.30.191.20.9
	TNCN 16 04 12 T 01020	SL808	17.30.192.20.1
		SI854 C	17.30.192.20.9
TNCN 16 04 PN T 	TNCN 16 04 PN T 01020	SL808	17.30.189.20.1

PFL - New Generation for High Speed Machining with Positive Geometrie

The PFL milling cutter family was especially designed for the highly-productive face milling of components made from GJL (grey cast iron) and GJS (ductile cast iron) with SiALON cutting materials.

The PFL milling cutter family comprises two classic series with a positive geometry:

- PFL-OP: the milling cutter line for rough milling and finishing
- PFL SP: this milling cutter series was designed for finishing and for medium rough milling operations with low axial forces.

PFL-OP

This roughing and finishing specialist is equipped with positive octagon inserts. The design with eight cutting edges nsures a high level of efficiency. With a feed ate of up to 0.35 mm per tooth and a maximum cutting depth of approx. 4 mm, the milling cutters in the PFL-OP series offer extremely productive milling operations at high machining speeds.

PFL-SP

With their positive quadratic cutting, the milling cutters of the PFL-SP series are ideal for machining even the most unstable or thin-walled workpieces under high-performance conditions. PFL-SP milling cutters are available with approach angles of 88°, 75° and 45°. Edge breakage and burr formation can be reduced, while low axial forces can be achieved. The milling cutter allows cutting depths up to 6 mm and a maximum feed rate of up to 0.3 mm per tooth.

With the further expansion of the face milling cutter series with the PFL-OP and PFL-SP series, SPK Cutting Tools is bringing important innovations to the face milling industry. Minimum machining forces are obtainable with the highest cutting values – even under the most abrasive and unfavourable conditions. The positive milling cutter geometries open up a broad scope of applications for the milling cutters, ranging from thin-walled and unstable to stable components. High productivity and a high degree of process reliability were the most important criteria during the series' development.

Recommended application

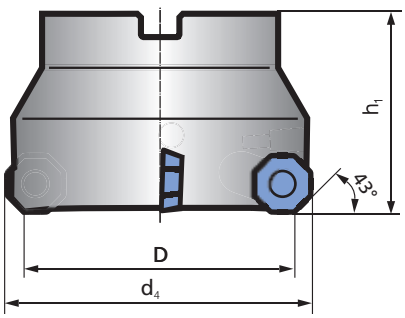
GJL (grey cast iron) ■ GJS (ductile cast iron) ■

WORKPIECE
thin-walled ✗ unstable ✗ stable ✓

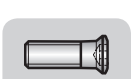
f_z = 0,35 mm/tooth

12.5 • 6.3

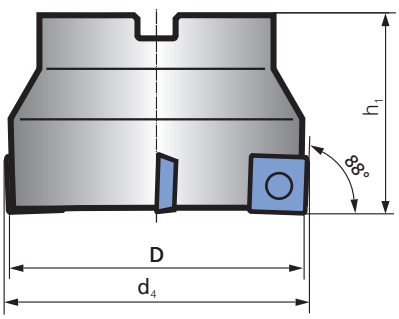
Axial rake angle γ_a	+5°
Radial rake angle: γ_r	-6°
A_p max	4 mm
Mounting dimension according to DIN 8030	



PFL - OP 06	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	$n_{max}(min^{-1})$
PFL-050-05OP0643R-AM	771.00.004.24	50	5	61	40	18000
PFL-063-06OP0643R-AM	771.00.004.34	63	6	74	40	13000
PFL-080-07OP0643R-AM	771.00.004.44	80	7	91	50	10000
PFL-100-09OP0643R-AM	771.00.004.54	100	9	111	50	8000
PFL-125-11OP0643R-AM	771.00.004.64	125	11	136	63	8000
PFL-160-13OP0643R-AM	771.00.004.74	160	13	176	63	6000
PFL-200-15OP0643R-AM	771.00.004.84	200	15	211	63	4000
PFL-250-18OP0643R-AM	771.00.004.94	250	18	261	63	3000


70.91.50.689.0

70.91.55.210.0



Axial rake angle γ_a	**+5**
Radial rake angle: γ_r	**-6°**
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recomended application

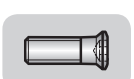
■ GJL (grey cast iron) ■ GJS (ductile cast iron)

WORKPIECE
thin-walled ✓ unstable ✓ stable ✓

f_z = 0,30 mm/tooth

12.5 • 6.3

PFL - SP / 88°	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PFL-063-05SP1388R-AM	771.00.000.32	63	5	64	40	13000
PFL-080-07SP1388R-AM	771.00.000.42	80	7	81	50	10000
PFL-100-09SP1388R-AM	771.00.000.52	100	9	101	50	8000
PFL-125-11SP1388R-AM	771.00.000.62	125	11	126	63	8000
PFL-160-13SP1388R-AM	771.00.000.72	160	13	161	63	6000
PFL-200-17SP1388R-AM	771.00.000.82	200	17	201	63	4000
PFL-250-22SP1388R-AM	771.00.000.92	250	22	251	63	3000


70.91.50.689.0

70.91.55.210.0

Recommended application

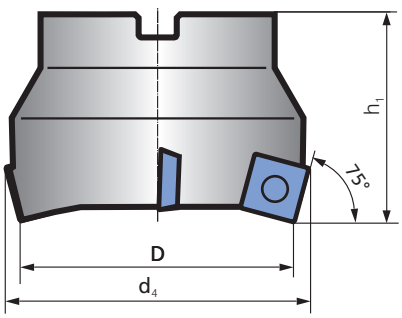
GJL (grey cast iron) ■ GJS (ductile cast iron) ■

WORPIECE
thin-walled ✓ unstable ✓ stable ✓

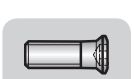
f_z = 0,30 mm/tooth

12.5 • 6.3

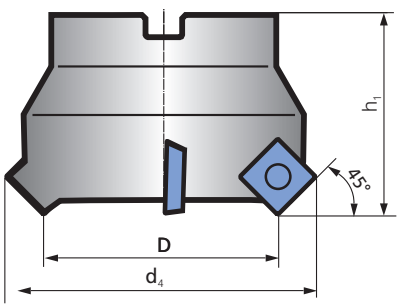
Axial rake angle γ_a	+5
Radial rake abgle: γ_r	-6°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	



PFL - SP / 75°	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	$n_{max}(min^{-1})$
PFL-050-04SP1375R-AM	771.00.001.22	50	4	56,5	40	18000
PFL-063-05SP1375R-AM	771.00.001.32	63	5	69,5	40	13000
PFL-080-07SP1375R-AM	771.00.001.42	80	7	86,5	50	10000
PFL-100-09SP1375R-AM	771.00.001.52	100	9	106,5	50	8000
PFL-125-11SP1375R-AM	771.00.001.62	125	11	131,5	63	8000
PFL-160-13SP1375R-AM	771.00.001.72	160	13	166,5	63	6000
PFL-200-17SP1375R-AM	771.00.001.82	200	17	206,5	63	4000
PFL-250-22SP1375R-AM	771.00.001.92	250	22	256,5	63	3000


70.91.50.689.0

70.91.55.210.0



Axial rake angle γ_a	+5
Radial rake abgle: γ_r	-6°
Mounting dimension according to DIN 8030	
For thin-walled and unstable parts	

Recommended application

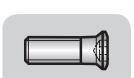
■ GJL (grey cast iron) ■ GJS (ductile cast iron)

WORKPIECE
thin-walled ✓ unstable ✓ stable ✓

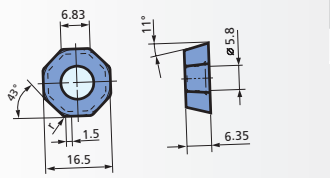
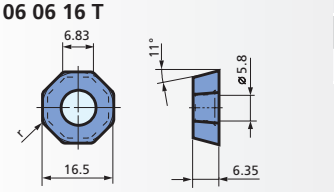
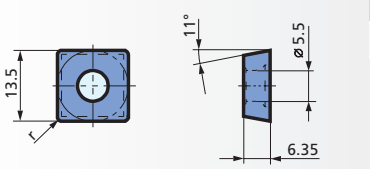
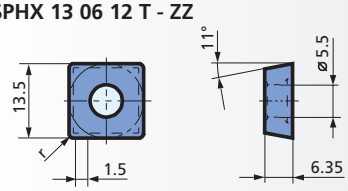
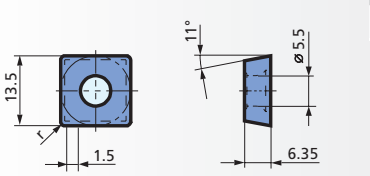
f_z = 0,30 mm/tooth

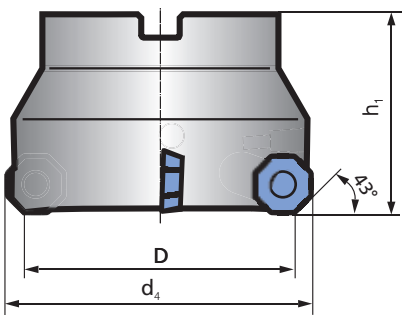
12.5 • 6.3

PFL - SP / 45°	SPK-Ref. No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PFL-050-05SP1345R-AM	771.00.002.22	50	5	67	40	18000
PFL-063-06SP1345R-AM	771.00.002.32	63	6	80	40	13000
PFL-080-07SP1345R-AM	771.00.002.42	80	7	97	50	10000
PFL-100-09SP1345R-AM	771.00.002.52	100	9	117	50	8000
PFL-125-11SP1345R-AM	771.00.002.62	125	11	142	63	8000
PFL-160-13SP1345R-AM	771.00.002.72	160	13	177	63	6000
PFL-200-17SP1345R-AM	771.00.002.82	200	17	217	63	4000
PFL-250-22SP1345R-AM	771.00.002.92	250	22	267	63	3000


70.91.50.689.0

70.91.55.210.0

INSERT	ISO	GRADE	SPK REF. NO.
OPHX 06 06 08 T - ZZ 	OPHX 06 06 08 T 01020 - 43Z150	SL808	17.76.015.20.1
OPHX 06 06 16 T 	OPHX 06 06 16 T 01020	SL808	17.76.014.20.1
SPHX 13 06 12 T 	SPHX 13 06 12 T01020	SL808	17.16.535.20.1
SPHX 13 06 12 T - ZZ 	SPHX 13 06 12 T01020 - 75Z150	SL808	17.16.537.20.1
SPHX 13 06 12 T - ZZ 	SPHX 13 06 12 T01020 - 88Z150	SL808	17.16.536.20.1



Axial rake angle γ_a	**+14°**
Radial rake angle: γ_r	**+2°**
A_p max	**4 mm**
Mounting dimension according to DIN 8030	

Recommended application

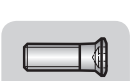
GJL (GG) GJS (GGG)

WORKPIECE
thin-walled ✓ unstable ✓

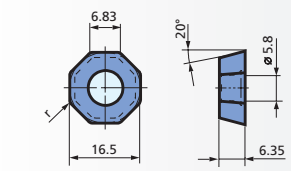
f_z = 0,16 - 0,3 mm/tooth

12.5 • 6.3 •

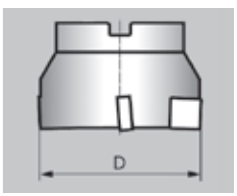
Type	SPK-Order-No.	Dimensions				
		D	Teeth t	d_4	h_1	n_{max}(min^{-1})
PFL-050-04OE0643R-AM	771.00.005.24	50	4	60,2	40	18000
PFL-063-05OE0643R-AM	771.00.005.34	63	5	73,2	40	13000
PFL-080-06OE0643R-AM	771.00.005.44	80	6	90,2	50	10000
PFL-100-07OE0643R-AM	771.00.005.54	100	7	110,2	50	8000
PFL-125-09OE0643R-AM	771.00.005.64	125	9	135,2	63	8000
PFL-160-11OE0643R-AM	771.00.005.74	160	11	170,2	63	6000
PFL-200-13OE0643R-AM	771.00.005.84	200	13	210,2	63	4000
PFL-250-16OE0643R-AM	771.00.005.94	250	16	260,2	63	3000


70.91.50.689.0

70.91.55.210.0

INSERTS	ISO	GRADE	SPK REF. NO.
OEHX 06 06 16 T 	OEHX 06 06 16 T 01020	SL 808	17.76.016.20.1

SPK-Designation System for Milling Cutters



050	50 mm
063	63 mm
080	80 mm
100	100 mm
125	125 mm
...	...
315	315 mm
...	...

Milling cutter diameter

K	Wedge clamping
L	Center hole clamping
X	Special clamping

Insert clamping

P	Face milling cutter
E	Corner milling cutter

Tool type

S	90°	□
O	135°	⬡

Insert style

P	F	L	-	080	-	08	S

F	All insert seats not adjustable
E	All insert seats adjustable
M	Insert seat partial adjustable

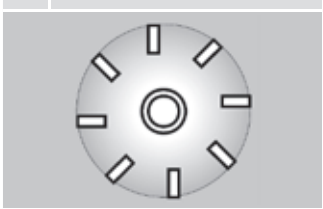
Insert clamping

-	Standard
S	special

Special type

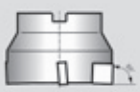
01	1 tooth
02	2 teeth
03	3 teeth
04	4 teeth
...	...
28	28 teeth
...	...

No. of teeth



	α_n
N	0°
C	7°
P	11°
D	15°
E	20°

Clearance angle of insert

88°	
75°	
45°	

Entering angle

AM	Milling cutter - metric
AI	Milling cutter - inch

Mounting

P	13	88	R	-	AM	

Insert size

S		O	
09	9,52	05	13,5
12	12,7	06	16,5
13	13,5		
15	15,88		
16	16,50		
19	19,05		

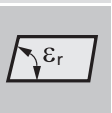
Direction of rotation

L	Left
R	Right

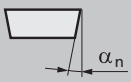
Special version

	none
CL	Internal cooling (each insert seat)
CV	Coolant by distribution disc
AS	Extraction system

Designation System for Inserts According to ISO 1832

V	35°	
D	55°	
E	75°	
C	80°	
M	86°	
K	55°	
B	82°	
A	85°	
R		
S	90°	
T	60°	
W	80°	
L		
P	108°	
H	120°	
O	135°	

Insert style



N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°
G	30°
O	↓

Clearance angle requiring special definition.

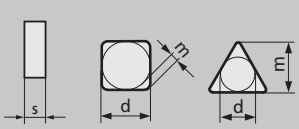
Clearance angle

Inscribet circle d mm	 RC, RN S	O 135°	T 60°	 C 80°	E 75°	D 55°	V 35°	 W 80°	Inscribet circle d mm	 RB (Type MO)
3,97			06						6,0	06
5,56			09						7,0	07
6,35			11	06		07			8,0	08
9,52	09		16	09		11	16	06	9,0	09
10,00						12			10,0	10
12,70	12	05	22	12	13	15	22	08	12,0	12
15,88	15	06	27	16					16,0	16
19,05	19		33						20,0	20
25,40	25		44						25,0	25

Insert size
Note: OPHX 06 ..: IC = 16,5 mm, SPHX 13 ..: IC = 13,5 mm

S	P	H	X	13	06

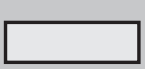
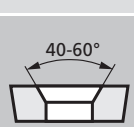
Tolerances



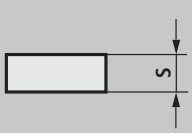
* Allowable deviation for insert shape, depends on insert size.

	S ± mm	d ± mm	m ± mm	Inscribed circle d mm	Tolerance class m ± mm		d ± mm	
					M	U	J, K, L, M	U
A	0,025	0,025	0,005					
C	0,025	0,025	0,013					
E	0,025	0,025	0,025					
F	0,025	0,013	0,005	3,97	0,08	0,13	0,05	0,08
G	0,130	0,025	0,025	5,56				
H	0,025	0,013	0,013	6,35				
J	0,025	0,05-0,13*	0,005	9,52				
K	0,025	0,05-0,13*	0,013	12,70	0,13	0,20	0,08	0,13
L	0,025	0,05-0,13*	0,025	15,88	0,15	0,27	0,10	0,18
M	0,130	0,05-0,13*	0,08-0,18*	19,05				
U	0,130	0,08-0,25*	0,13-0,38*	25,40	0,18	0,38	0,13	0,25

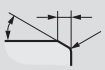
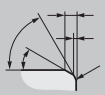
Insert type

N	
A	
W	40-60° 
X	Special type

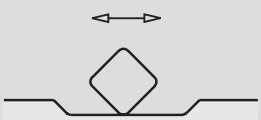
Insert thickness



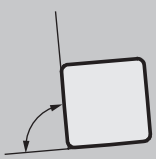
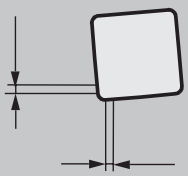
01	1,59
02	2,38
03	3,18
T3	3,97
04	4,76
06	6,35
07	7,94
09	9,52
12	12,7

F Sharp	E  Rounded
T  Chamfered	S  Chamfered and rounded
K  Double chamfered	P  Double chamfered and rounded

Cutting edge type

R 
L 
N 

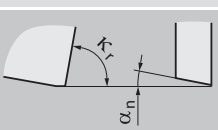
Cutting direction

	
Attack angle	Width of chamfer
eg. 75 = 75°	eg. 150 = 1,50 mm

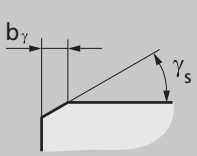
Designation system for Wiper

12	T	N	01020	-	75Z150

Corner radius

Inserts with corner radius		Inserts with wiper edge			
					
00	RN, RC	Plan angle κ_r		Clearance angle α_n	
M0	RB				
02	0,2				
04	0,4				
08	0,8	A	45°	N	0°
12	1,2	D	60°	C	7°
16	1,6	E	75°	P	11°
24	2,4	F	85°	D	15°
32	3,2	P	90°	E	20°
40	4,0			F	25°
ZZ Special type					

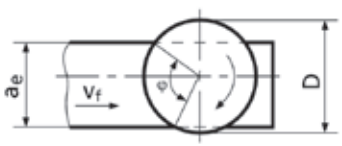
Chamfer type



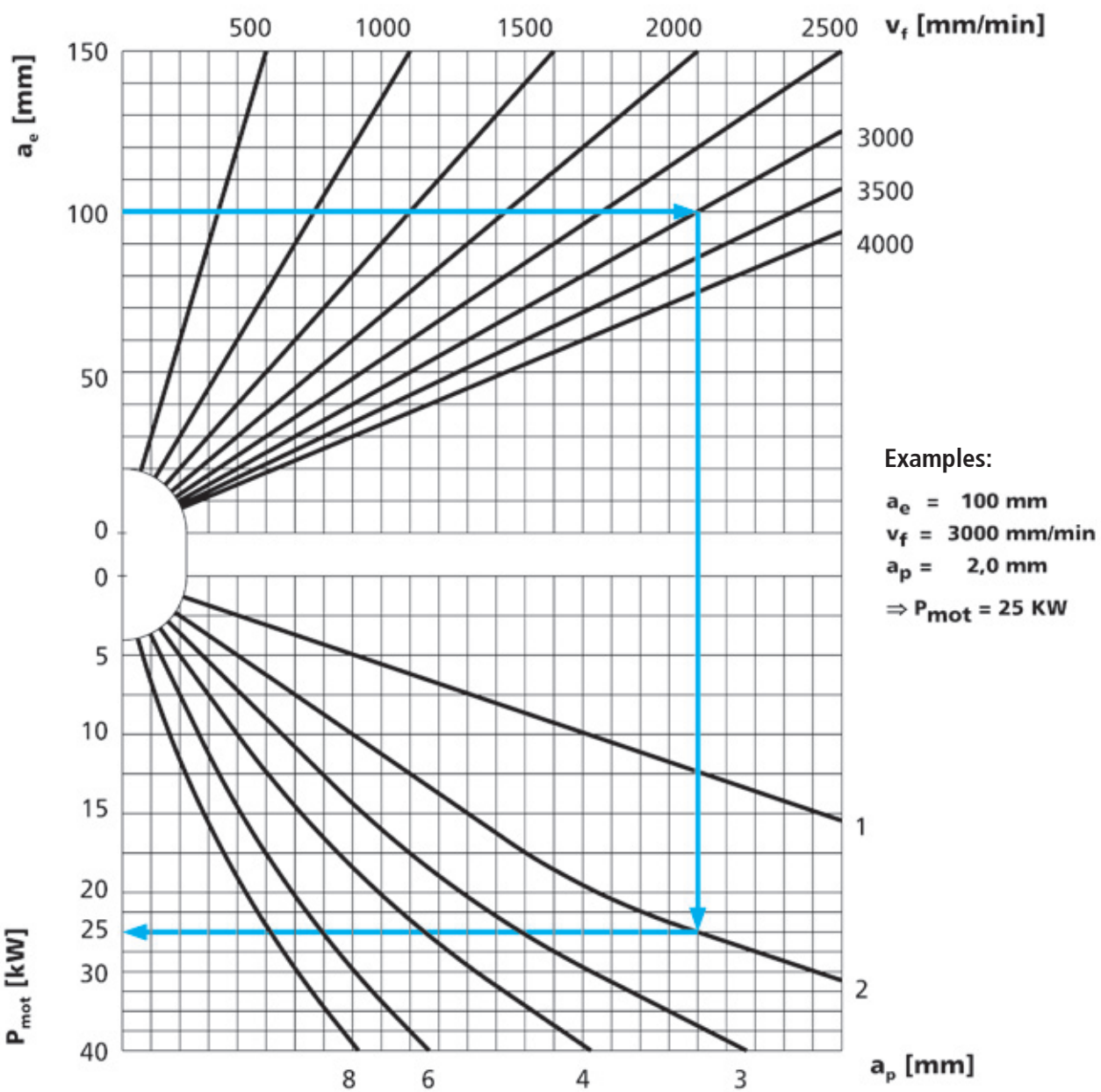
Width of chamfer b_γ in 1/100 mm and angle γ_s without degree symbol

eg.
0,10 x 20° = 01020
0,05 x 20° = 00520

Material cast iron
k_c = 2000 N /mm²
κ_r = 45°
η = 0,8



$$P_{mot} = \frac{a_p \cdot a_e \cdot v_f \cdot k_c}{60 \cdot 10^6 \cdot \eta} \text{ [kW]}$$



Examples:

a_e = 100 mm
v_f = 3000 mm/min
a_p = 2,0 mm
$\Rightarrow P_{mot}$ = 25 KW

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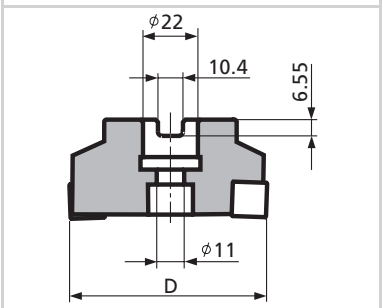
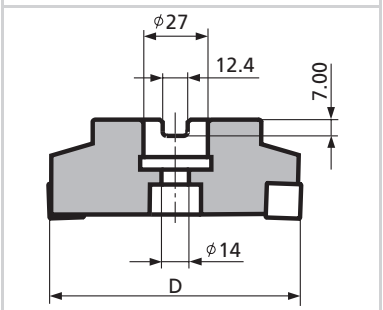
Adaptor style A



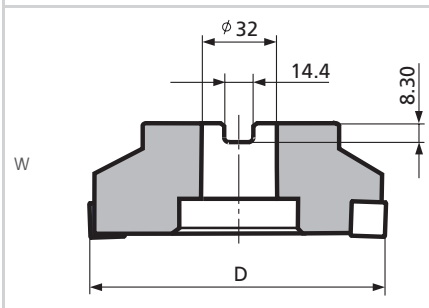
D = 50 mm - 63 mm

Adaptor style A



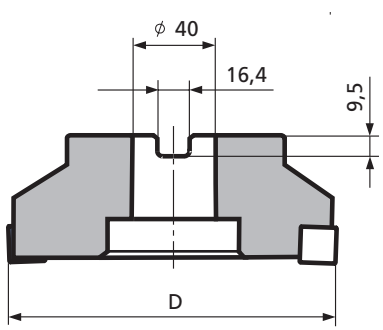
D = 80 mm

Adaptor style B



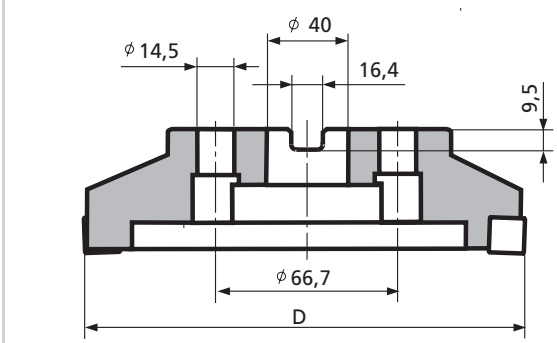
D = 100 mm

Adaptor style B



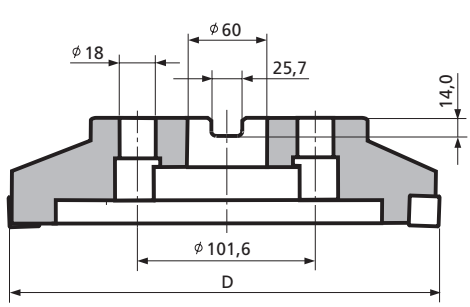
D = 125 mm

Adaptor style C



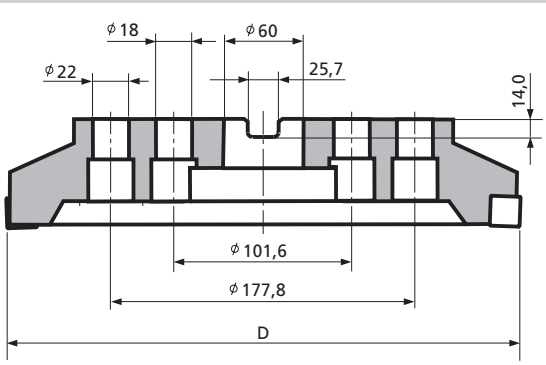
D = 160 mm

Adaptor style C

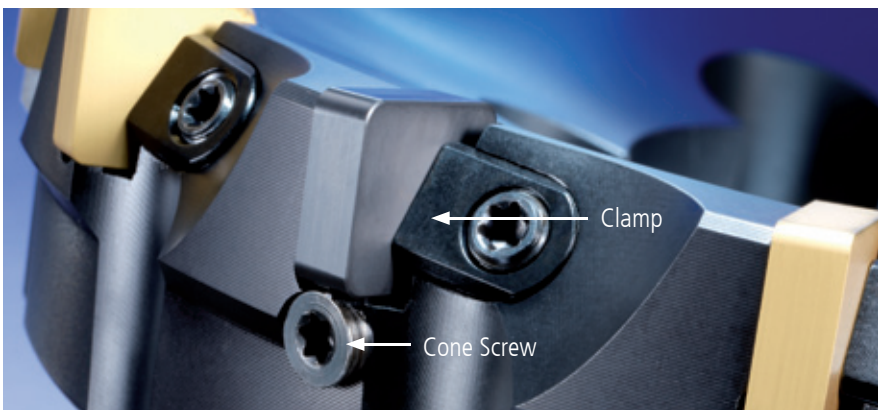


D = 200 - 250 mm

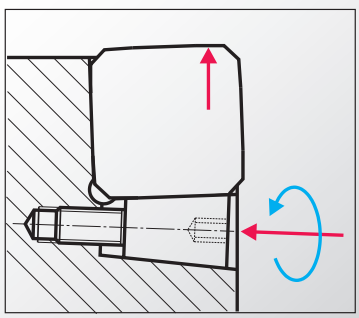
Adaptor style C



D = 315 mm



Fine adjustment



Fine adjustment by tapered screw

1. Set all cone screws flush to the milling cutter outer diameter
2. Put the inserts into the pocket seat and screw the clamp hand tight
3. Turn the tapered screw inside till you feel a light resist
4. Put the milling cutter in a adjustment equipment and adjust each single insert in the order of µm by turning the tapered screw clockwise
5. Tighten the clamp with a torque of 5 Nm

Fastening torque for milling cutter serie PFL-OP and PFL-SP
Fastening torque for the insert mounting screws: 5 Nm

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