



PcBN

Cutting Tools



SBC ■ PBC ■ Sandwich

coated ■ uncoated



Turning ■ Grooving ■ Boring ■ Milling



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Application field

PBC 10S - for high cutting speed and long tool life
in machining of grey cast irons

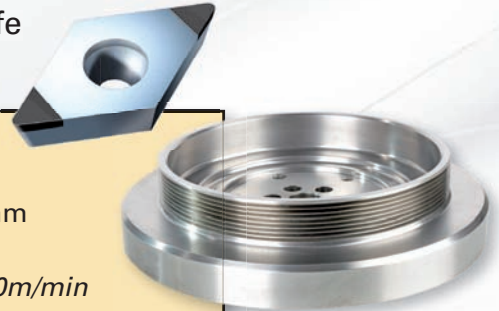
For example: drive wheel, GG 25, diameter 480 mm

Used insert type: DCGW 11T308-D-10S-2MC

Superfinishing: $V_c = 1.430$ m/min, $a_p = 0,3 - 0,5$ mm, $f = 0,20$ mm

Tool life: 280 parts

For comparison only: coated carbide insert: 26 parts, $V_c = 300$ m/min



PBC 15S - for extremely high tool life
in machining of nodular cast irons

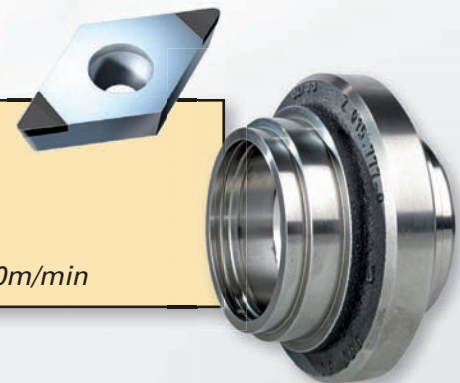
For example: bearing, GGG 60, diameter 200 mm

Used insert type: DCGW 11T308-D-15S-2MC

Superfinishing: $V_c = 900$ m/min, $a_p = 0,3$ mm, $f = 0,28$ mm

Tool life: 120 parts

For comparison only: coated carbide insert: 15 parts, $V_c = 220$ m/min



PBC 25S - favoured in continuous cut,
Hardness: HRc 48 - 62, best surface finish

For example: drive shaft HRc 60, Mat: 1.2332 - 47CrMo4

Used insert Type: CNGA 120408-E-25S-4SC

Superfinishing: $V_c = 180$ m/min, $a_p = 0,25$ mm $f = 0,08$ mm

Surface finish: $R_a 0,18 \mu$

Tool life: turning length = 3.218 m



PBC 40S - favoured in interrupted cut
Hardness: HRc 48 - 65, highest tool life

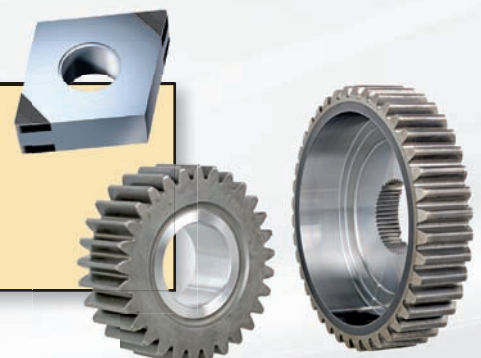
For example: Gear HRc 58, Mat: 1.3523 - 19MnCr5

Used insert type: CNGA 120408-G-40S-4SC

Superfinishing: $V_c = 230$ m/min, $a_p = 0,22$ mm, $f = 0,16$ mm

Surface finish: $R_a 0,40 \mu$

Tool life: turning length = 4.280 m





Content

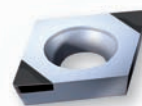
Technology

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Turning

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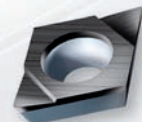
Grooving

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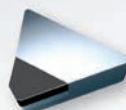
Boring

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Milling

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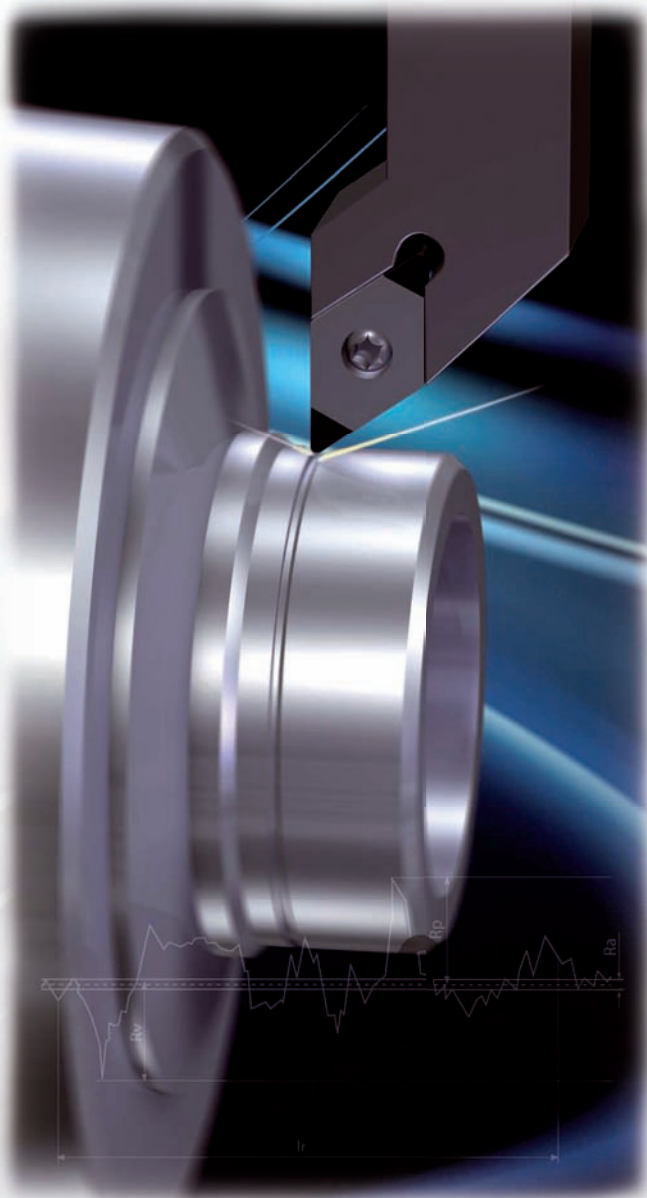


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ultrahard

cutting materials



Dear customers and business partners,

The great challenges of future cutting techniques can only be mastered by ultra-hard cutting materials. For decades we have been pioneering the development and production of efficient cutting tools made of diamond and PcBN. Our tools are practically applied in all industries world-wide, for example in automotive engineering and associated suppliers, aircraft and engine construction, mechanical engineering, precision engineering and medical engineering.

On the following pages we will introduce our broad range of PcBN cutting tools. We have uniformly put the coated and uncoated tools together into one catalogue. This adds up to a comprehensive selection covering practically every application possible.

- 14 different PcBN grades
- Instant delivery ex stock
- Please take note of our regrinding service

In case of suggestions or queries in order to increase performance and improve your product quality, we will gladly be at your service.

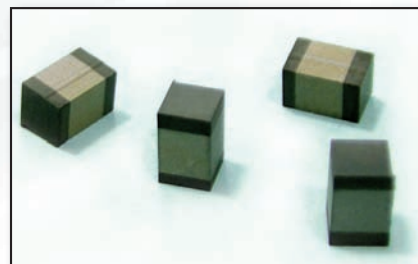
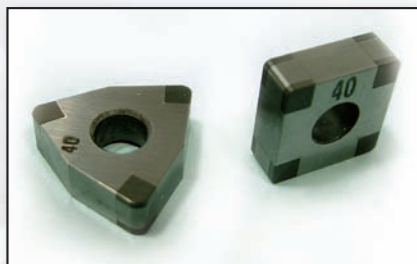
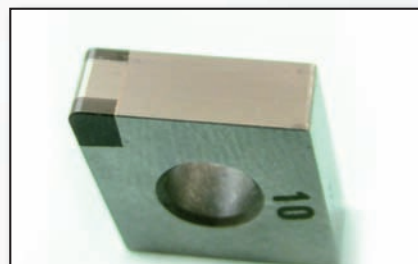
Please take note of our new catalogue on our cutting tools tipped with our 5 different ultrahard diamond cutting materials.

*Sincerely,
Becker Diamantwerkzeuge GmbH*

■ Sandwich – The Cost Killer

Besides the manufacturing of double fullface inserts we cut the new sandwich blanks into rectangular segments and braze them into the correspondingly prepared carbide blanks for negative inserts. Thus we automatically receive 2 cutting edges per brazed

segment each of which has a large volume of PcBN cutting material. This manufacturing process both saves a huge amount of resources and makes a lot of sense economically. We also point out the possibility of regrinding



We manufacture all shapes of negative inserts in multiple corner tipping or double fullface type from these blanks. As the production costs of these sand-

wich blanks are nearly identical to the established, one-sidedly tipped PcBN blanks there is a considerable price advantage per cutting edge or total layer.

The new sandwich blanks are manufactured in 4 different grades:

PBC-10S (BH-C), 95 % content, special grade for machining grey cast iron und super alloys.

PBC-15S (BH-C), 90 % content, special grade for machining nodular cast iron and sintered powdered steel.

PBC-25S (BL-C), 65 % content, special grade for hard turning, favoured in continuous cut.

PBC-40S (BL-C), 55 % content, special grade for hard turning, favoured in interrupted cut.

The development of ultrahard cutting materials is practiced intently on a world-scale and therefore constant progress in the machining is guaranteed. We

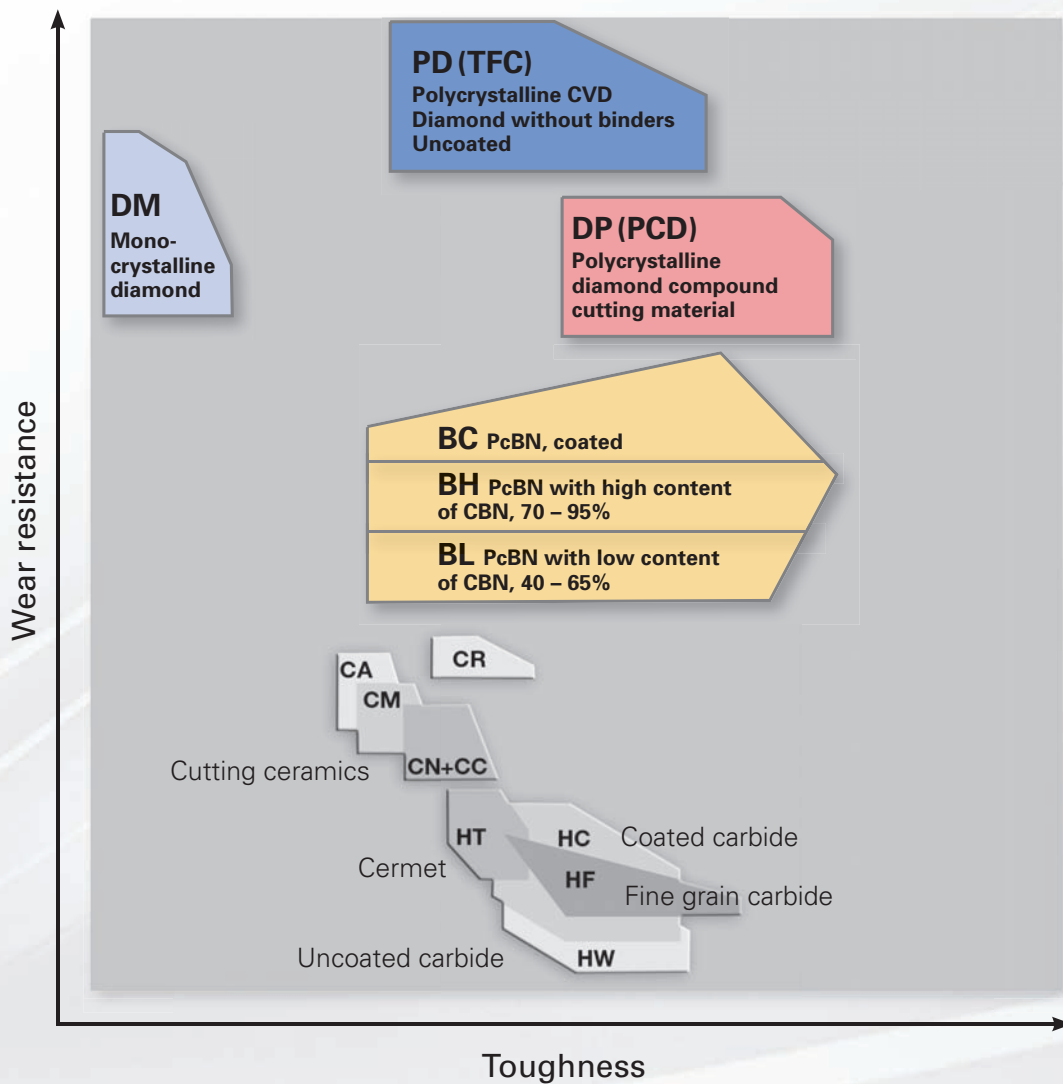
have committed ourselves to these developments to standardly offer to our customers the most suitable ultrahard cutting materials, tools and tool systems.



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Groups of cutting materials (DIN ISO 513)



HW = Uncoated carbide
HF = Fine grained carbide
HT = Cermet, TiC or TiN
HC = Carbide / Cermet as above, but coated

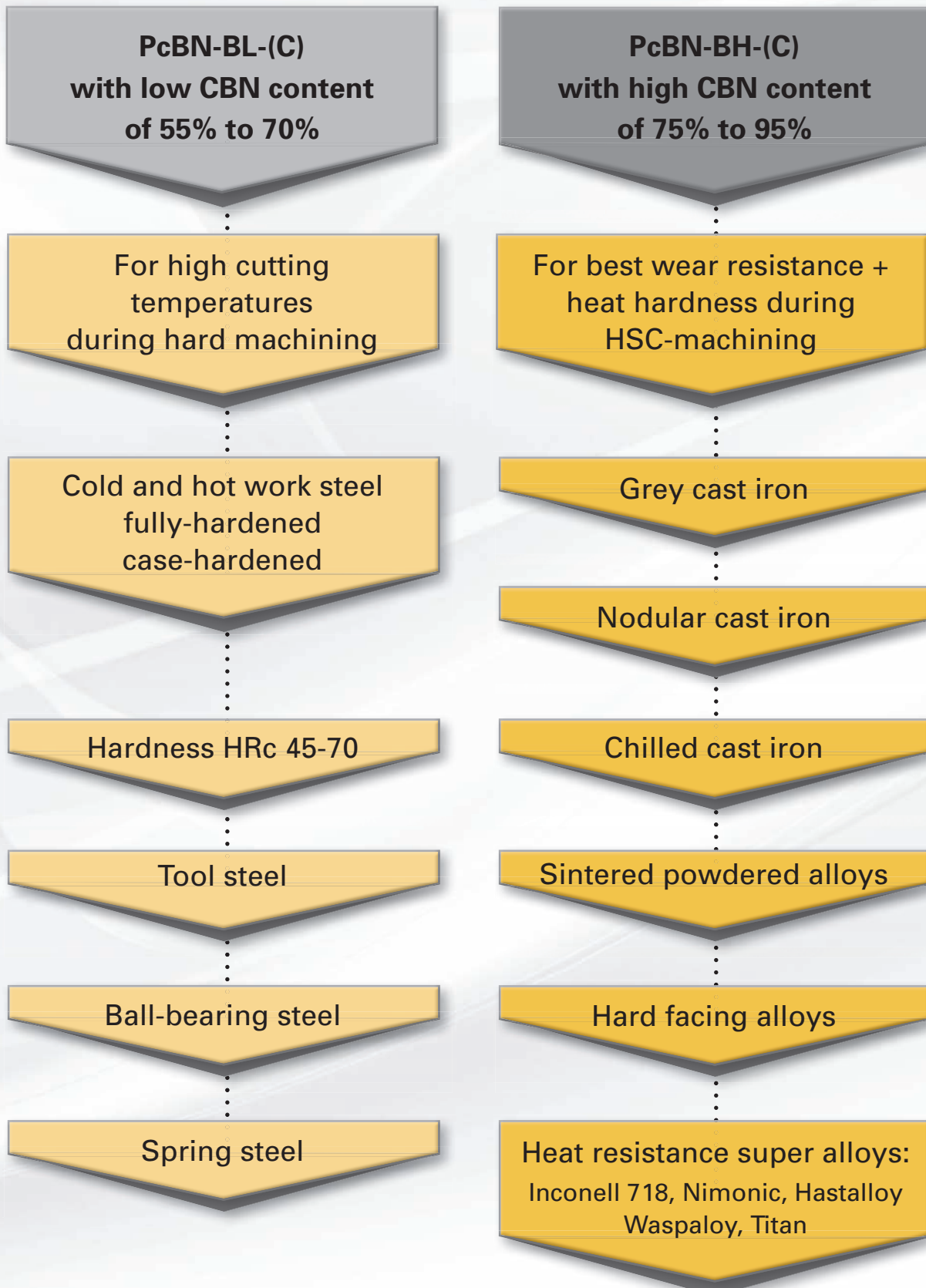
CA = Ceramics, main content Al_2O_3
CM = Mixed ceramics, main content Al_2O_3 , plus components other than oxides
CN = Siliconnitride ceramics, main content Si_3N_4
CR = Ceramics, main content Al_2O_3 reinforced
CC = Ceramics as above, but coated

DM = Monocrystalline diamond
DP = Polycrystalline diamond-compound
PD = CVD - thickfilm diamond

BL = Polycrystalline Cubic Boron Nitride with low content of CBN (40 – 65%)
BH = Polycrystalline Cubic Boron Nitride with high content of CBN (70 – 95%)
BC = Polycrystalline Cubic Boron Nitride as above, but coated



Material grade overview





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■ PcBN-cutting materials - coated

Grades - Application

Becker	ISO	Composition	Application
PBC-10S	BH-C	Coated PcBN-grade with very high CBN-content (95%) in sandwich and standard design, fine grit size (1 – 1.5 μ).	Grey cast iron (GG25) Sintered powdered steel Super alloys $a_p = 0.1 - 0.7$ mm
PBC-15S	BH-C	Coated PcBN-grade with high CBN content (90%) in sandwich and standard design, super fine grit size (0.75 μ).	Nodular cast iron Grey cast iron Sintered powdered steel Super alloys $a_p = 0.05 - 0.7$ mm
PBC-25S	BL-C	Coated PcBN-grade with low CBN content (65%) in sandwich and standard design, fine grit size (1 – 2 μ). Ideal for hard turning in continuous cut.	Hard turning, dry + wet HRc = 48 - 62 $a_p = 0.02 - 0.4$ mm $R_a = 0.2 - 3.2$ μ
PBC-40S	BL-C	Coated PcBN-grade with low CBN content (55%) in sandwich and standard design, super fine grit size (0.75 μ). Grade for slightly- to heavily-interrupted cut.	Hard turning, dry + wet HRc = 48 - 65 $a_p = 0.05 - 0.4$ mm $R_a = 0.1 - 3.2$ μ
SBC-25C	BL-C	Coated solid PcBN-grade with low CBN content (65%), fine grit size (3 μ). Grade for hard turning in continuous cut and higher depth of cut.	Hard turning, dry + wet HRc = 48 - 65 $a_p = 0.04 - 0.8$ mm $R_a = 0.2 - 3.2$ μ
SBC-40C	BL-C	Coated solid PcBN-grade with low CBN content (65%), super fine grit size (1 μ). Grade for hard turning in slightly to heavily interrupted cut and higher depth of cut.	Hard turning, dry + wet HRc = 48 - 65 $a_p = 0.05 - 0.8$ mm $R_a = 0.1 - 3.2$ μ



■ PcBN-cutting materials - uncoated

Grades - Applications

Becker	ISO	Composition	Application
SBC- 1	BH	Uncoated solid PcBN-grade with high CBN-content (90%), coarse grit size (8 – 12 μ). Highest compression strength and thermal stability of all PcBN-grades.	Chilled cast iron Ni-hard Grey cast iron $a_p = 0.5 - 10 \text{ mm}$
SBC-10	BH	Uncoated solid PcBN-grade with high CBN content (80%), fine grit size (3 μ).	Grey cast iron Super alloys Sintered powdered steel $a_p = 0.3 - 8 \text{ mm}$
SBC-25	BL	Uncoated solid PcBN-grade with low CBN content (65%), fine grit size (3 μ). Favoured application in continuous cut.	Hard turning, dry + wet HRc = 56 – 65 $a_p = 0.05 - 6 \text{ mm}$ $R_a = 0.2 - 3.2 \text{ }\mu$
SBC-40	BL	Uncoated solid PcBN-grade with low CBN content (65%), super fine grit size (1 μ). For slightly- to heavily-interrupted cut.	Hard turning, dry + wet HRc = 56 – 65 $a_p = 0.05 - 6 \text{ mm}$ $R_a = 0.2 - 3.2 \text{ }\mu$
PBC-10	BH	Uncoated PcBN-grade with very high CBN content (95%) in standard design. Fine grit size (1 – 1.5 μ).	Grey cast iron Super alloys Sintered powdered steel $a_p = 0.1 - 0.4 \text{ mm}$
PBC-15	BH	Uncoated PcBN-grade with high CBN content (90%) in standard design. Super fine grit size (0.75 μ).	Nodular cast iron Sintered powdered steel Super alloys Grey cast iron $a_p = 0.05 - 0.4 \text{ mm}$
PBC-25	BL	Uncoated PcBN-grade with low CBN content (65%) in standard design. Fine grit size (3 μ), for continuous and very slightly-interrupted cut.	Hard turning, dry + wet HRc = 52 - 65 $a_p = 0.05 - 0.4 \text{ mm}$ $R_a = 0.2 - 3.2 \text{ }\mu$
PBC-40	BL	Uncoated PcBN-grade with low CBN content (65%) in standard design. Super fine grit size (1 μ), for continuous to heavily-interrupted cut.	Hard turning, dry + wet HRc = 54 - 65 $a_p = 0.05 - 0.4 \text{ mm}$ $R_a = 0.2 - 3.2 \text{ }\mu$

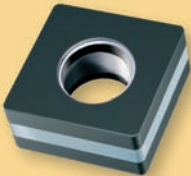
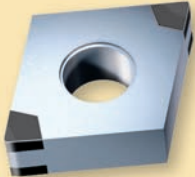
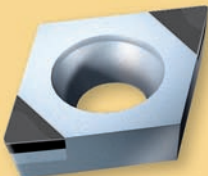
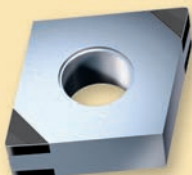


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Tipping modifications

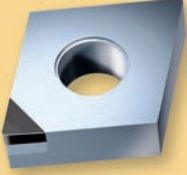
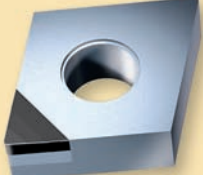
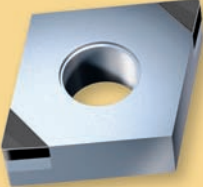
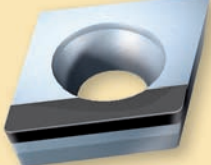
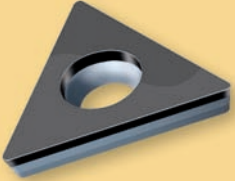
Of all coated grades - ISO-BECKER

ISO	Becker	Design	Grades	Becker	ISO
E	SE		Coated sandwich PcBN grades, double-sided layer thickness approx. 0.7 – 0.8 mm	PBC-10S PBC-15S PBC-25S PBC-40S	BH-C BH-C BL-C BL-C
C	SC		Coated sandwich PcBN grades, layer thickness approx. 0.6 – 0.8 mm	PBC-10S PBC-15S PBC-25S PBC-40S	BH-C BH-C BL-C BL-C
A	MC		Coated standard PcBN grades, layer thickness approx. 0.6 – 0.8 mm	PBC-10S PBC-15S PBC-25S PBC-40S	BH-C BH-C BL-C BL-C
A-S	MC-S		Coated solid PcBN grades, layer thickness approx. 1.2 – 1.3 mm	SBC-25C SBC-40C	BL-C BL-C
A-S	MC-S		Coated solid PcBN grades, layer thickness approx. 1.3 mm	SBC-25C SBC-40C	BL-C BL-C



■ Tipping modifications

Of all uncoated grades with carbide layer – ISO-BECKER

ISO	Becker	Design	Grades	Becker	ISO
A	EW		Uncoated standard PcBN grade, carbide reinforced	PBC-10 PBC-15 PBC-25 PBC-40	BH BH BL BL
A	MW		Uncoated standard PcBN grade, carbide reinforced	PBC-10 PBC-15 PBC-25 PBC-40	BH BH BL BL
A	MC		Uncoated standard PcBN grade, carbide reinforced	PBC-10 PBC-15 PBC-25 PBC-40	BH BH BL BL
	GS		Uncoated standard PcBN grade, carbide reinforced	PBC-10 PBC-15 PBC-25 PBC-40	BH BH BL BL
F	VM		Uncoated standard PcBN grade, carbide reinforced	PBC-10 PBC-15 PBC-25 PBC-40	BH BH BL BL



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Tipping modifications

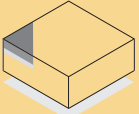
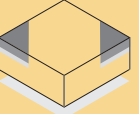
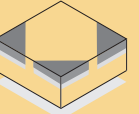
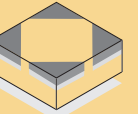
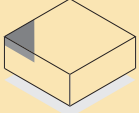
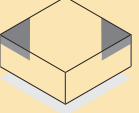
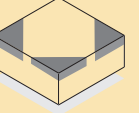
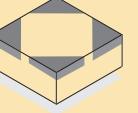
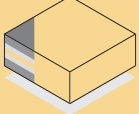
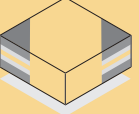
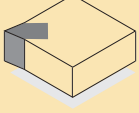
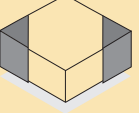
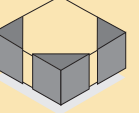
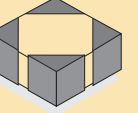
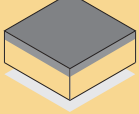
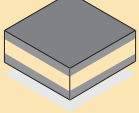
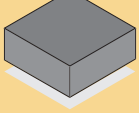
Of all uncoated solid grades without carbide layer ISO-BECKER

ISO	Becker	Design	Grades	Becker	ISO
A-S	EWS		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1 SBC-10 SBC-25 SBC-40	BH BH BL BL
A-S	MC-S		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1 SBC-10 SBC-25 SBC-40	BH BH BL BL
D	PC-S		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1 SBC-10 SBC-25 SBC-40	BH BH BL BL
D	PC-S4		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1	BH BH BL BL
D	PC-M		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1 SBC-10 SBC-25 SBC-40	BH BH BL BL
D	PC-M4		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1	BH BH BL BL
S	SBC		Uncoated solid PcBN grade, without carbide reinforcement	SBC-1 SBC-10 SBC-25 SBC-40	BH BH BL BL



Tipping modifications

Of all our PcBN grades with the recommended maximum depth of cut

ISO	Becker	Design	Number of tipped corners			Recommended max. depth of cut
			2	3	4	
A	EW MW MC	 1 tipped corner, carbide reinforced				EW.....ap = 0,4 mm MW.....ap = 0,7 mm MC.....ap = 0,4 mm
A-S	EWS MC-S	 1 tipped corner, solid grades				EWS.....ap = 0,8 mm MC-S.....ap = 0,8 mm
C	SC	 2 tipped corners, carbide reinforced				SC.....ap = 0,7 mm
D	PC-S PC-S4 PC-M PC-M4	 1 tipped edge, solid grades				PC-S.....ap = 2,0 mm PC-S4....ap = 3,0 mm PC-M.....ap = 2,0 mm PC-M4...ap = 3,0 mm
F	VM	 Fullface				VM.....ap = 0,7 mm
E	SE	 Double- sided fullface				SE.....ap = 0,7 mm
S	SBC	 Solid				SBC.....ap = 10 mm



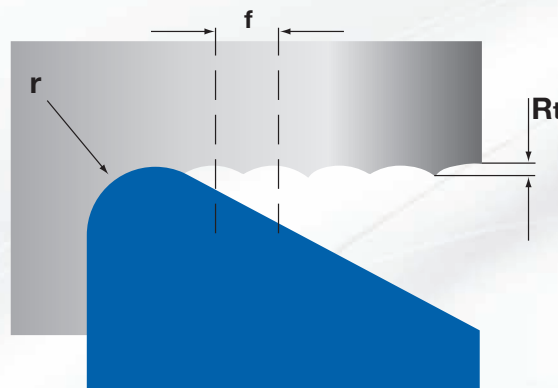
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Wiper Geometry and Surface Finish

The theoretical R_t surface roughness value can be determined with the radius and the feed rates on hand. The required surface finish can be calculated very precisely in advance, provided all relevant peripheral prerequisites are given. As an example instable conditions of machine and/or workpiece, incorrect chucking, faulty or wrong tool system, wrong cutting speed and depth of cut etc. will all impair the results.

The theoretically computed profile height is generally underrun when hardturning with PcBN. A special cutting mechanism with a high cutting pressure is in operation (self-induced hot-cutting process). This smoothes the theoretical profile with a better surface finish.

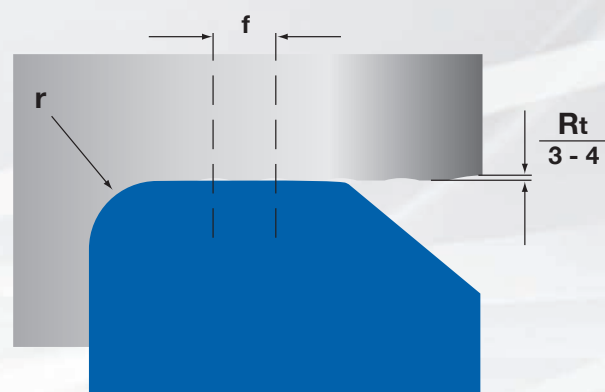


All values converted to μ

$$R_t = \frac{f^2}{8 \times r} \quad r = \frac{f^2}{8 \times R_t} \quad f = \sqrt{8 \times r \times R_t}$$

Theoretical surface roughness	Corner radius Feed rate per revolution ($f = \text{mm / rev}$)					
	R_t	$r = 0,2$	$r = 0,4$	$r = 0,8$	$r = 1,2$	$r = 1,6$
0,6	1,6	$f = 0,05$	$f = 0,07$	$f = 0,10$	$f = 0,12$	$f = 0,14$
1,6	4	$f = 0,08$	$f = 0,11$	$f = 0,15$	$f = 0,19$	$f = 0,23$
3,2	10	$f = 0,12$	$f = 0,17$	$f = 0,24$	$f = 0,29$	$f = 0,36$
6,3	16	$f = 0,16$	$f = 0,22$	$f = 0,30$	$f = 0,37$	$f = 0,45$

A clear improvement of the theoretical surface roughness can be achieved with our WIPER geometry. For the high-performance cutting of all aspects we have developed a number of inserts with WIPER geometry for internal, external and milling processes. This WIPER edge replaces the minor cutting edge reducing its angle to a minimum, whereas it automatically improves the theoretically computed surface roughness by 2 to 4 times.

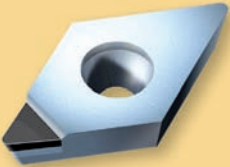
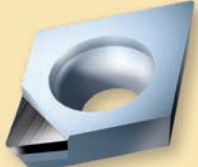
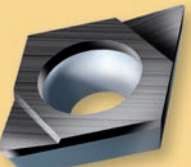
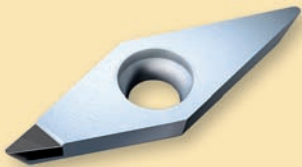


In practise these are the two possibilities for high-performance and high-tech cutting:

- 1) 2-4x higher feed rate = same surface finish
- 2) same feed rate = 2-4x improved surface finish



■ Positive Top Rake Geometries

Top Rake Geometries		PcBN-grades	Applications
	Positive Neutral 1tippedcorner EW-ISO-insert	PBC-10 PBC-15 PBC-25 PBC-40	Low cutting pressure ■ Thin-walled or instable workpieces ■ Internal boring ■ Minor tolerances ■ Lowest depths of cut
	Positive Neutral 1tippedcorner EW-MiniCut-insert	PBC-10 PBC-15 PBC-25 PBC-40	Low cutting pressure ■ Thin-walled or instable workpieces ■ Internal boring ■ Minor tolerances ■ Lowest depths of cut
	Positive Neutral FullFace MiniCut-insert	PBC-10 PBC-15 PBC-25 PBC-40	Low cutting pressure ■ Thin-walled or instable workpieces ■ Internal boring ■ Minor tolerances ■ Lowest depths of cut
	Positive Neutral 1tippedcorner EWS-ISO-insert	SBC-10 SBC-25 SBC-40	Low cutting pressure ■ Thin-walled or instable workpieces ■ Internal boring ■ Minor tolerances ■ Lowest depths of cut

Since their introduction 12 years ago our uncoated PcBN-inserts with positive top rake geometries have captured a considerable potential with our customers. Even though these particular positive top rake geometries are disregarded in any global documentation on cutting technology with PcBN cutting materials, we have been offering those positive insert geometries ex stock with great success.

Those positive geometries are applied for very complex cutting operations both for the machining of cast iron and for hardturning. In particular for very thin-walled and instable workpieces. The possible depths of cut are very low and thus minor tolerances are achieved. As a result of the extremely low cutting pressure, these geometries are preferentially applied for internal turning operations, in parts with unusual projecting lengths.



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Cutting data Application range

Application range for PBC-10S, SBC-1 and SBC-10									
GREY CAST IRON: GG 20 - GG25 - GG30 - GG40									
Vc: m/min	Cutting edge design (T-land + honing)								
	A	B	C	D	E	F	G	H	
↑ Cutting speed									
1750									
1500	Vc	Vc	Vc	Vc	Vc	Vc	Vc	Vc	
1250									
1000									
750									
500									
300									
Feed rate	f: 0,02 - 0,25	f: 0,04 - 0,25	f: 0,05 - 0,25	f: 0,05 - 0,40	f: 0,06 - 0,50	f: 0,08 - 0,35	f: 0,10 - 0,35	f: 0,12 - 0,35	Feed rate
Depth of cut PBC-10S	ap: 0,02 - 0,25	ap: 0,03 - 0,3	ap: 0,06 - 0,4	ap: 0,06 - 0,4	ap: 0,08 - 0,5	ap: 0,08 - 0,4	ap: 0,1 - 0,4	ap: 0,12 - 0,4	Depth of cut PBC-10S
Depth of cut SBC-1								ap: 0,15 - 10	Depth of cut SBC-1
Depth of cut SBC-10	ap: 0,05 - 3						ap: 0,3 - 8		Depth of cut SBC-10
Cutting conditions	Continuous to heavily interrupted cut								Cutting conditions

Application range for PBC-10S and PBC-10									
SUPER ALLOYS: Inconel 718, Nimonic, Hastelloy, Waspaloy									
Vc: m/min	Cutting edge design (T-land + honing)								
	A	B	C	D	E	F	G	H	
↑ Cutting speed									
700									
600	Vc	Vc	Vc	Vc	Vc	Vc	Vc	Vc	
500									
400									
300									
200									
100									
Feed rate	f: 0,02 - 0,25	f: 0,04 - 0,25	f: 0,05 - 0,25	f: 0,05 - 0,40	f: 0,06 - 0,50	f: 0,08 - 0,35	f: 0,10 - 0,35	f: 0,12 - 0,35	Feed rate
Depth of cut PBC-10S	ap: 0,02 - 0,4	ap: 0,03 - 0,4	ap: 0,06 - 0,4	ap: 0,06 - 0,4	ap: 0,08 - 0,5	ap: 0,08 - 0,4	ap: 0,1 - 0,4	ap: 0,12 - 0,4	Depth of cut PBC-10S
Depth of cut PBC-10S	ap: 0,02 - 0,3						ap: 0,05 - 0,4		Depth of cut PBC-10S
Cutting conditions	Continuous to medium interrupted cut								Cutting conditions



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Cutting data Application range

Application range for PBC-25S and PBC-25									
Hardturning, favoured in continuous cut, $a_p = 0,02 - 0,4$ mm, HRc 48 - 62									
Vc: m/min	Cutting edge design (T-land + honing)								Ra (μ)
	A	B	C	D	E	F	G	H	
350									0,1 μ
300									0,2 μ
250	Vc								0,4 μ
200		Vc							0,8 μ
150			Vc	Ra	Vc	Ra	Vc	Ra	1,6 μ
100	Ra								3,2 μ
50									6,4 μ
Feeding rate	f: 0,02 - 0,15	f: 0,03 - 0,15	f: 0,04 - 0,20	f: 0,05 - 0,25	f: 0,06 - 0,25	f: 0,06 - 0,25	f: 0,06 - 0,20	f: 0,06 - 0,20	Feeding rate
Depth of cut PBC-25S	a_p : 0,04 - 0,25	a_p : 0,04 - 0,3	a_p : 0,06 - 0,4	a_p : 0,06 - 0,4	a_p : 0,08 - 0,4	a_p : 0,08 - 0,4	a_p : 0,1 - 0,4	a_p : 0,12 - 0,4	Depth of cut PBC-25S
Depth of cut PBC-25	a_p : 0,02 - 0,25			a_p : 0,05 - 0,4					Depth of cut PBC-25
Cutting conditions	Continuous cut								Cutting conditions

Application range for SBC-25C and SBC-25									
Hardturning, favoured in continuous Cut, $a_p = 0,04 - 6,0$ mm, HRc 48 - 65									
Vc: m/min	Cutting edge design (T-land + honing)								Ra (μ)
	A	B	C	D	E	F	G	H	
350									0,1 μ
300									0,2 μ
250	Vc								0,4 μ
200		Vc							0,8 μ
150			Vc	Ra	Vc	Ra	Vc	Ra	1,6 μ
100	Ra								3,2 μ
50									6,4 μ
Feeding rate	f: 0,02 - 0,20	f: 0,03 - 0,20	f: 0,03 - 0,20	f: 0,05 - 0,20	f: 0,06 - 0,25	f: 0,08 - 0,25	f: 0,08 - 0,25	f: 0,08 - 0,25	Feeding rate
Depth of cut SBC-25C	a_p : 0,04 - 0,5	a_p : 0,05 - 0,5	a_p : 0,05 - 0,8	a_p : 0,08 - 0,8	a_p : 0,08 - 0,8	a_p : 0,12 - 0,8	a_p : 0,15 - 0,8	a_p : 0,2 - 0,8	Depth of cut SBC-25C
Depth of cut SBC-25	a_p : 0,04 - 2,0					a_p : 0,12 - 2,0			Depth of cut SBC-25
Depth of cut SBC-25						a_p : 0,25 - 6,0			Depth of cut SBC-25
Cutting conditions	Continuous cut								Cutting conditions



Cutting data Application range

Application range for PBC-40S and PBC-40											
Hardturning, favoured in interruptet cut, ap: 0,05 - 0,4 mm, HRc 48 - 65											
Vc: m/min		Cutting edge design (T-land + honing)								Ra (μ)	
		A	B	C	D	E	F	G	H		
Cutting speed ↑	350									0,1μ	Surface finish ↑
	300									0,2μ	
	250									0,4μ	
	200	Vc	Vc		Ra	Ra	Ra	Ra	Ra	0,8μ	
	150	Ra	Ra	Vc	Ra	Vc	Vc	Vc	Vc	1,6μ	
	100									3,2μ	
	50									6,4μ	
Feed rate		f: 0,02 - 0,12	f: 0,03 - 0,15	f: 0,05 - 0,20	f: 0,06 - 0,20	f: 0,06 - 0,25	f: 0,06 - 0,25	f: 0,08 - 0,20	f: 0,08 - 0,20	Feed rate	
Depth of cut PBC-40S		ap: 0,05 - 0,25	ap: 0,06 - 0,3	ap: 0,08 - 0,3	ap: 0,08 - 0,3	ap: 0,10 - 0,4	ap: 0,10 - 0,4	ap: 0,15 - 0,4	ap: 0,20 - 0,4	Depth of cut PBC-40S	
Depth of cut PBC-40		ap: 0,04 - 0,25				ap: 0,07 - 0,4				Depth of cut PBC-40	
Cutting conditions		very slightly		slightly		medium		heavily		Cutting conditions	
Interrupted cut											

Application range for SBC-40C and SBC 40											
Hardturning, favoured in interrupted Cut, ap = 0,05 - 6,0 mm, HRc 48 - 65											
Vc: m/min		Cutting edge design (T-land + honing)							Ra (μ)		
		A	B	C	D	E	F	G	H		
Cutting speed ↑	350									0,1μ	Surface finish ↑
	300									0,2μ	
	250	Vc								0,4μ	
	200		Vc							0,8μ	
	150	Ra		Vc		Ra		Ra		1,6μ	
	100		Ra		Vc		Vc		Vc	3,2μ	
	50									6,4μ	
Feed rate		f: 0,02 - 0,20	f: 0,03 - 0,20	f: 0,03 - 0,20	f: 0,05 - 0,25	f: 0,06 - 0,25	f: 0,06 - 0,25	f: 0,06 - 0,25	f: 0,06 - 0,25	Feed rate	
Depth of cut SBC-40C		ap: 0,05 - 0,5	ap: 0,05 - 0,5	ap: 0,05 - 0,8	ap: 0,08 - 0,8	ap: 0,10 - 0,8	ap: 0,12 - 0,8	ap: 0,15 - 0,8	ap: 0,20 - 0,8	Depth of cut SBC-40C	
Depth of cut SBC-40		ap: 0,05 - 2,0						ap: 0,12 - 2,0		Depth of cut SBC-40	
Depth of cut SBC-40								ap: 0,25 - 6,0		Depth of cut SBC-40	
Cutting conditions		very slightly		slightly		medium		heavily		Cutting conditions	
Interrupted cut											



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■ ToolScout

In order for all users to exploit the full potential of our extremely high performance PcBN cutting materials, the following explanations and hints are of importance.

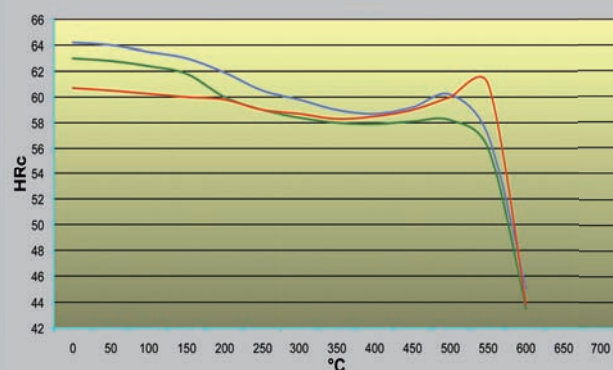
As shown in our previous catalogue supplement we offer our 6 coated PcBN-grades in up to 8 different chamfer geometries per cutting material as well as in various tipping options (see page 8). This large standard range enables us to meet basically all imaginable application profiles ex stock.

Hard machining with PcBN

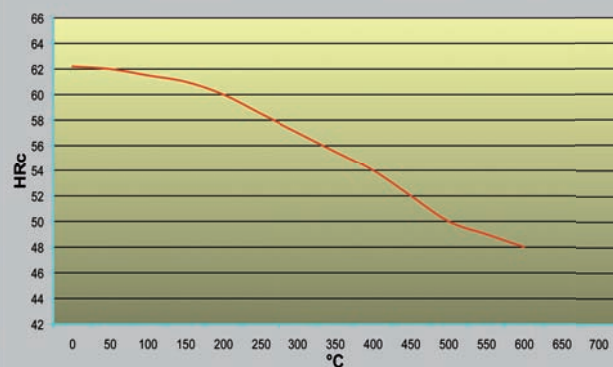
The cutting of hardened steel is generally referred to as hard machining. This cutting mechanism is a self-induced hot cutting process. This requires a defined and high temperature of about 550 to 750°C on the cutting zone. This necessary temperature is being produced by the transformation of existing energies into heat. This energy is released in the form of cutting speed V_c , feed rate f_n , depth of cut a_p as well as the chamfer geometries A-H of the PcBN cutting edges. Cooling is generally not required. Below we have illustrated 3 diagrams of hardness values. You can make out the decreasing hardness with the rising of the temperature. However significant differences are shown.

During the self-induced hot cutting process with our PcBN-grades the ideal hardness in the shear zone is at 40 to 45 HRc. This means that in such a case different cutting temperatures between 550°C up to 750°C are necessary.

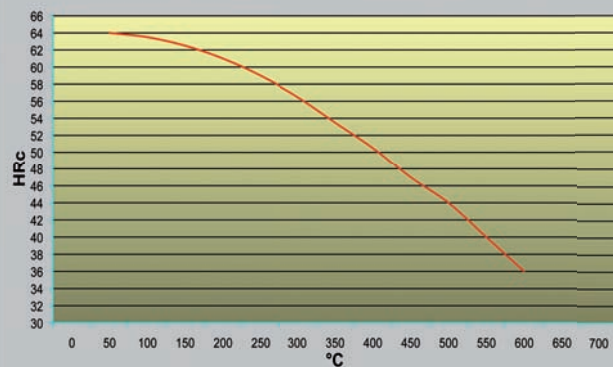
Hardness Values 1.2379 (X155CrVMo 12 - 1)



Hardness Values 1.7131 (16MnCr5)



Hardness Values 1.3505 (100Cr6)



At a temperature of approx. 600°C the steel grade 1.2379 still has a hardness of about 58 HRc, the steel grade 1.7131 about 48 HRc, and the steel grade 1.3505 only achieves about 36 HRc. The original hardness of each steel grade had been about 62 HRc.



In order to produce and maintain the ideal cutting temperature in the shear zone, it is obligatory to strictly stick to three particularities.

- the thermal conductivity of the PcBN-grade used (55% - 65% CBN)
- the applied chamfer geometry A-H, and also the positive top rake geometry (see page 13)
- as well as the hardness diagrams (hardness diagram with rising temperature)

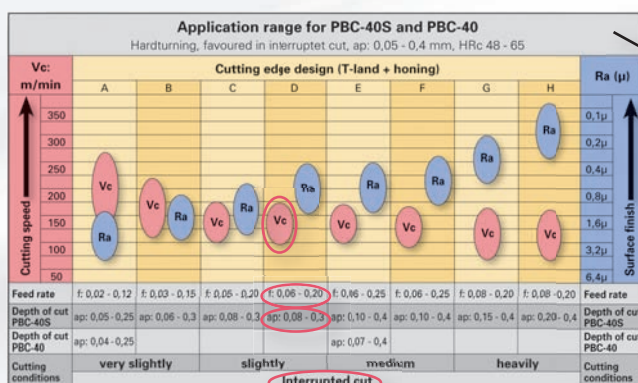
In order to give you professional advice on our standard range for the intended application, the following checklist has to be strictly respected:

- precise specification of the steel grade and its hardness HRc
- the required surface finish Ra has to be determined as well as the depth of cut
- please decide if your cut is continuous to slightly-interrupted or medium to heavily-interrupted

Please select the PcBN grade as described on pages 6 and 7.

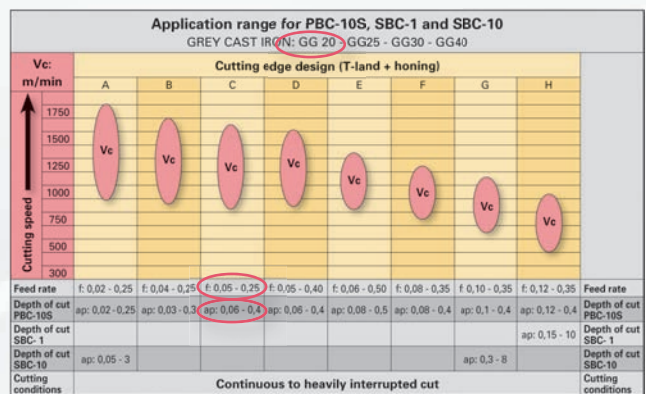
Becker	ISO	Composition	Application
SBC-25	BL	Uncoated solid PcBN-grade with low CBN content (65%), fine grit size (3 μ). Favoured application in continuous cut.	Hard turning, dry + wet HRc = 56 - 65 ap = 0.05 - 6 mm Ra = 0.2 - 3.2 μ
SBC-40	BL	Uncoated solid PcBN-grade with low CBN content (65%), super fine grit size (1 μ). For slightly- to heavily-interrupted cut.	Hard turning, dry + wet HRc = 56 - 65 ap = 0.05 - 6 mm Ra = 0.2 - 3.2 μ

Now please choose the according chamfer geometry for the required surface finish, as shown in our diagrams on pages 16 and 17.



Soft machining with PcBN

Soft machining encompasses the cutting of all materials in their natural hardness without any hardening process or similar applied. Thus the result means not any microstructural transformation has occurred. However it is absolutely necessary to keep materials in mind (super alloys, titanium etc.) that require a very high cutting temperature of 700 to 1,110°C, which can only be generated with the cutting material grade PcBN.



On pages 14 and 15 we have listed different application examples each explained by a simple diagram. On the left-hand side we have indicated the recommended cutting speed, and on the lower lines the according feed rate and depth of cut.

Example:

100Cr6 – HRc 62
ap = 0.25, fn = 0,1 mm
interrupted cut
required Ra = 0.6

PcBN grade = PBC-40S
chamfer "D" at Vc 160 m/min
insert: CNGA 120408-D-40S-4SC

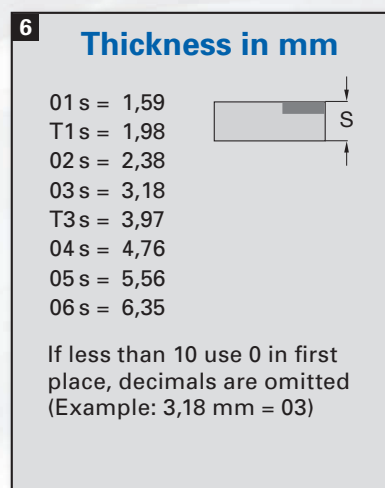
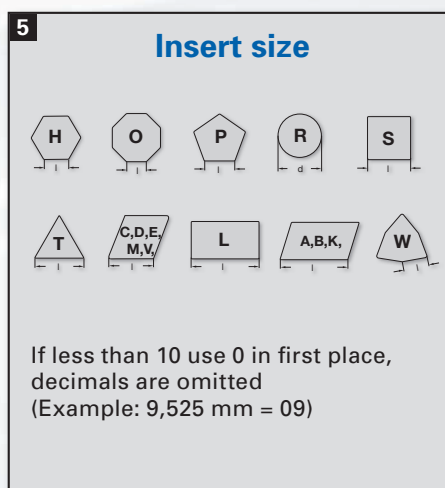
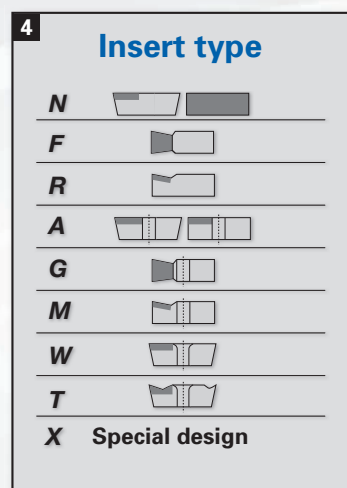
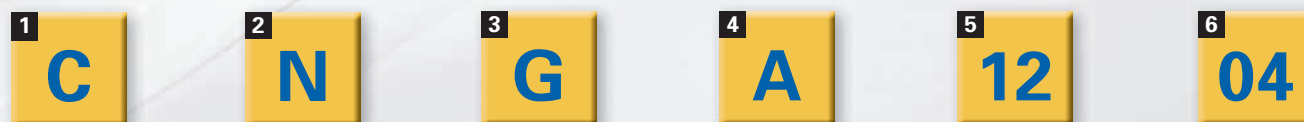
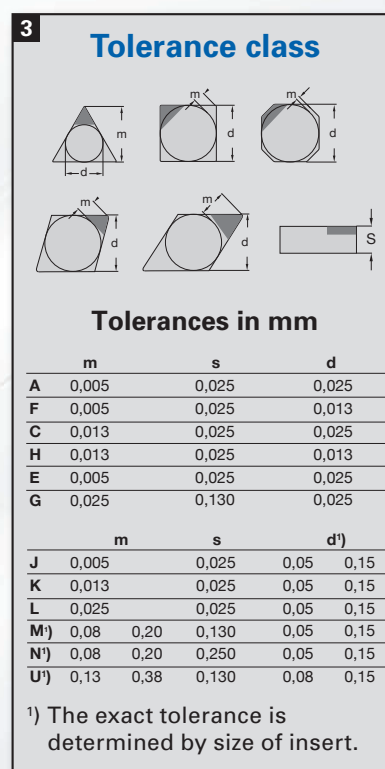
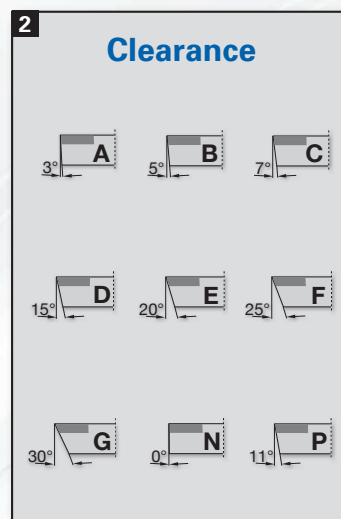
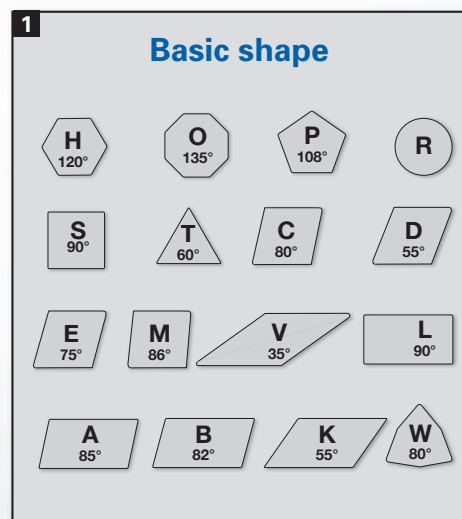


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ISO-Insert Nomenclature

Order designation



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TECHNOLOGY

TURNING

GROOVING

BORING

MILLING

7 Corner configuration

Radius
 02 = 0,2 mm
 04 = 0,4 mm
 08 = 0,8 mm
 12 = 1,2 mm
 16 = 1,6 mm
 00 = round insert (inch)
 M0 = round insert (metr.)

10 Solid-PcBN grades

SBC-1	} Cast iron, sintered powered steel
SBC-10	
SBC-25C	} Hardtuning
SBC-25	
SBC-40C	
SBC-40	

11 Cutting edges

Number of cutting edges:
2-8

12 Tipping variations

Solid PcBN grades

EWS		PC-M	
MC-S		PC-M4	
PC-S		SBC	
PC-S4			

08

W

D

15S

4

SC

8 Wiper edge

W = Wiper-edge, right + left hand

WR = Wiper-edge, right hand

WL = Wiper-edge, left hand

9 Cutting edge design

Cutting edge design
T-land + honing

Conditions
A - H
see pages 14-17

10 Carbide Reinforced PcBN grades

PBC-10S	} Cast iron, sintered powered steel
PBC-10	
PBC-15S	
PBC-15	
PBC-25S	} Hardtuning
PBC-25	
PBC-40S	
PBC-40	

12 Tipping variations

Carbide reinforced PcBN grades

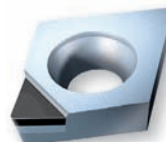
EW		MW		SE	
MC		GS			
SC		VM			



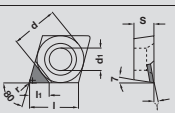
TURNING | ISO

■ CCGT

Standard tipped corners (positive)

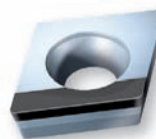


EW

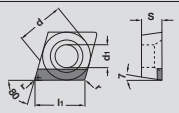
insert size	uncoated				coated																dimensions																		
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																		
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁	
060202-EW	●				●		●																															0,2	3,4
060204-EW	●				●		●																															0,4	3,1
060208-EW	●				●		●																															0,8	2,8
09T302-EW	●				●		●																															0,2	3,4
09T304-EW	●				●		●																															0,4	3,1
09T308-EW	●				●		●																															0,8	2,8

■ CCGW

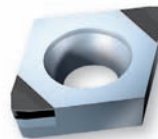
Standard tipped corners



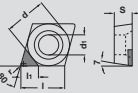
GS

insert size	uncoated				coated																dimensions																
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	r	l ₁
060204R/L-GS	●	●	●	●	●	●	●																													0,4	6,45
060208R/L-GS	●	●	●	●	●	●	●																												0,8		
09T304R/L-GS	●	●	●	●	●	●	●																													0,4	9,70
09T308R/L-GS	●	●	●	●	●	●	●																												0,8		

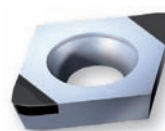
Standard tipped corners



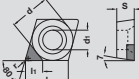
W-2MC

insert size	uncoated				coated																dimensions																				
	PBC-10		PBC-15	PBC-25	PBC-40	PBC-10S				PBC-15S				PBC-25S				PBC-40S																							
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁			
060202-EW	●	●	●	●	●	●	●	●																															0,2	3,4	
060204-EW	●	●	●	●	●	●	●	●																															0,4	3,1	
060208-EW	●	●	●	●	●	●	●	●																															0,8	2,8	
060202-2MC										●		●	●				●			●	●		●	●			●		●	●	●								0,2	3,4	
060204-2MC									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	●	●							0,4	3,1
060208-2MC										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							0,8	2,8
060202-W-2MC										●	●	●	●	●	●		●	●	●	●						●	●	●	●											0,2	3,4
060204-W-2MC									●	●		●	●	●	●	●		●	●	●	●	●					●	●	●	●	●									0,4	3,1
09T302-EW	●	●	●	●	●	●	●	●																															0,2	3,4	
09T304-EW	●	●	●	●	●	●	●	●																															0,4	2,8	
09T308-EW	●	●	●	●	●	●	●	●																															0,8	2,5	
09T312-EW	●	●	●	●		●	●	●																															1,2	2,5	
09T302-2MC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								0,2	3,4	
09T304-2MC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									0,4	3,1
09T308-2MC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								0,8	2,8
09T304-W-2MC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●			●	●	●	●											0,4	3,1
09T208-W-2MC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									0,8	2,8
120404-EW	●	●	●	●		●	●	●																															0,4	3,1	
120408-EW	●	●	●	●		●	●	●																															0,8	2,8	

Solid tipped corners



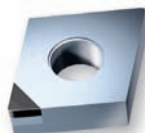
W-2MC/S

insert size	uncoated							coated																dimensions								
	SBC-1		SBC-10		SBC-25		SBC-40		SBC-25C								SBC-40C															
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁				
060202-EWS	●	●	●	●	●	●	●																6,35	2,8	2,38	6,45	0,2	3,4				
060204-EWS	●	●	●	●	●	●	●																								0,4	3,1
060208-EWS	●	●	●	●	●	●	●																								0,8	2,8
060202-W-EWS	●	●	●	●	●	●	●																								0,2	3,4
060204-W-EWS	●	●	●	●	●	●	●																								0,2	3,1
060202-2MC/S								●	●	●	●		●		●		●	●				●					●				0,2	3,4
060204-2MC/S								●	●	●		●	●		●	●	●	●	●	●		●					●				0,4	3,1
060208-2MC/S									●		●		●	●		●		●			●	●									0,8	2,8
060202-W-2MC/S								●		●		●	●	●	●	●	●	●	●	●	●	●									0,2	3,1
060204-W-2MC/S								●	●		●	●		●	●	●	●	●		●	●	●	●				0,4	3,1				
09T302-EWS	●	●	●	●	●	●	●																9,52	4,4	3,97	9,70	0,2	3,4				
09T304-EWS	●	●	●	●	●	●	●																								0,4	3,1
09T308-EWS	●	●	●	●	●	●	●																								0,8	2,8
09T312-EWS	●	●	●	●	●	●	●																								1,2	2,5
09T302-W-EWS	●	●	●	●	●	●	●																								0,2	3,4
09T304-W-EWS	●	●	●	●	●	●	●																								0,4	3,1
09T308-W-EWS	●	●	●	●	●	●	●																								0,8	2,8
09T302-2MC/S								●	●		●		●		●		●	●		●		●									0,2	3,4
09T304-2MC/S								●	●	●	●	●	●			●		●	●	●	●	●					●				0,4	3,1
09T308-2MC/S								●	●			●		●	●		●		●	●	●	●					●				0,8	2,8
09T304-W-2MC/S								●	●		●	●	●		●	●		●	●	●	●	●									0,4	3,1
09T308-W-2MC/S										●	●	●	●	●				●	●	●	●	●					●				0,8	2,8

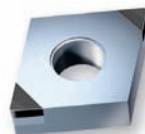


CNGA

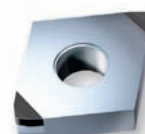
Standard tipped corners



EW



2MC

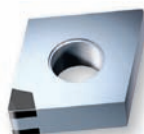


W-2MC

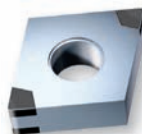
[illegible]

CNGA

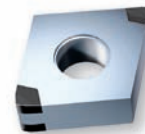
Sandwich tipped corners



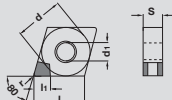
2 SC



4 SC



W-4 SC

insert size	uncoated				coated																dimensions																	
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁
120404-2SC								●					●	●	●			●	●	●	●	●			●		●	●	●	●	●		12,70	5,13	4,76	12,90	0,4	2,8
120408-2SC								●			●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,8					2,5	
120412-2SC								●			●	●	●	●			●	●	●	●	●			●		●	●	●	●	●		1,2					2,2	
120404W-2SC								●			●	●	●	●			●	●	●	●	●			●		●	●	●	●	●		0,4					2,8	
120408W-2SC								●	●		●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,8					2,5	
120404-4SC								●			●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,4					2,8	
120408-4SC								●	●	●	●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,8					2,5	
120412-4SC								●	●	●	●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		1,2					2,2	
120404W-4SC								●			●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,4					2,8	
120408W-4SC								●	●	●	●	●	●	●		●		●	●	●	●			●		●	●	●	●	●		0,8					2,5	

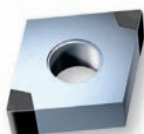
Double fullface



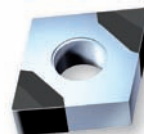
SE

insert size	uncoated				coated																dimensions																
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r
120408-SE									●		●						●		●	●						●		●	●	●	●	12,70	5,13	4,76	12,90	0,8	
120412-SE									●		●						●		●	●						●		●	●	●	●	12,70	5,13	4,76	12,90	1,2	

Solid tipped corners



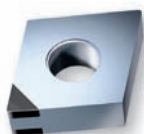
PC-M



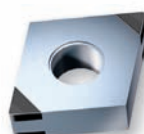
PC-M/4

[illegible]

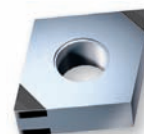
Solid tipped corners



2 MC/S



4 MC/S



W-4MC/S

[illegible]

CPGW

Standard tipped corners

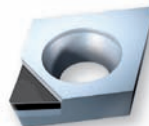


GS

[illegible]

CPGT

Standard tipped corners (positive)

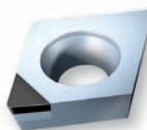


EW

[illegible]

CPGW

Standard tipped corners

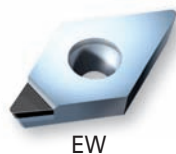


EW

[illegible]

DCGT

Standard tipped corners (positive)

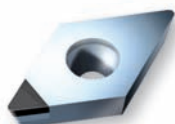


EW

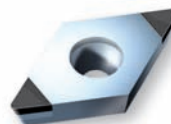
insert size	uncoated				coated																																dimensions					
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S													

DCGW

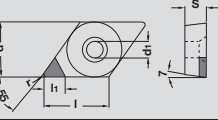
Standard tipped corners



EW

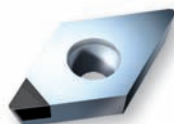


2MC

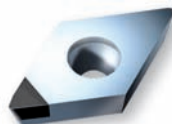
insert size	uncoated				coated																																dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
					A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
070202-EW	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

DCGW

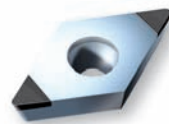
Solid tipped corners



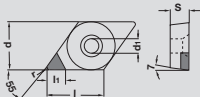
EWS



W-EWS

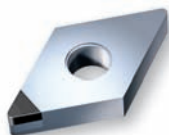


2MC/S

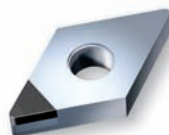
insert size	uncoated							coated																dimensions										
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C																	
	H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁					
070202-EWS		●	●	●	●	●	●																	6,35	2,80	2,38	7,75	0,2	3,9					
070204-EWS		●	●	●	●	●	●																										0,4	3,5
070208-EWS		●	●	●	●	●	●																										0,8	3,0
070201R/L-W-EWS		●	●	●	●	●	●																										0,1	3,0
070202R/L-W-EWS		●	●	●	●	●	●																										0,2	3,0
070204R/L-W-EWS		●	●	●	●	●	●																										0,4	3,0
070202-2MC/S								●	●		●	●		●	●	●		●			●		●						0,2	3,4				
070204-2MC/S								●	●		●	●		●	●	●		●			●	●	●						0,4	3,0				
070208-2MC/S								●			●	●	●		●		●	●		●		●	●						0,8	2,6				
11T301R/L-W-EWS		●	●	●	●	●	●																	9,52	4,40	3,97	11,60	0,1	3,0					
11T302R/L-W-EWS		●	●	●	●	●	●																										0,2	3,0
11T304R/L-W-EWS		●	●	●	●	●	●																										0,4	3,0
11T308R/L-W-EWS		●	●	●	●	●	●																										0,8	3,0
11T302-2MC/S								●	●	●		●	●		●	●	●	●		●		●	●										0,2	3,4
11T304-2MC/S									●		●	●	●	●	●	●		●		●	●	●	●										0,4	3,0
11T308-2MC/S								●		●	●	●	●	●		●	●	●		●	●	●	●						0,8	2,6				

■ DNGA

Standard tipped corners
Sandwich tipped corners



EW



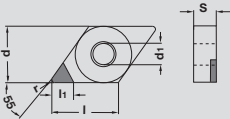
MW



2SC



4SC

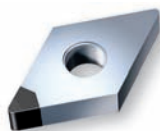
insert size	uncoated				coated																																dimensions																		
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S																						
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁									
110402-EW	●	●		●	●	●	●																																									0,2	3,9						
110404-EW	●	●	●	●	●	●	●																																									9,52	3,81	4,76	11,60	0,4	3,5		
110408-EW	●	●			●	●	●	●																																										0,8	3,0				
150402-EW	●	●			●	●	●	●																																										0,2	3,9				
150404-EW	●	●	●	●	●	●	●	●																																										0,4	3,5				
150408-EW	●	●			●	●	●	●																																										0,8	3,0				
150408-MW		●		●		●		●																																									0,8	5,0					
150412-MW		●		●		●		●																																										12,70	5,13	4,76	15,50	1,2	4,5
150404-2SC								●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,4	2,8			
150408-2SC								●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,6				
150404-4SC								●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,4	2,8					
150408-4SC								●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,6						
150604-EW	●	●	●	●	●	●	●	●																																										0,4	3,5				
150608-EW	●	●	●	●	●	●	●	●																																										0,8	3,0				
150604-MW	●	●			●	●	●	●																																										0,4	5,5				
150608-MW	●	●			●	●	●	●																																										0,8	5,0				
150612-MW	●	●			●	●	●	●																																										12,70	5,13	6,35	15,50	1,2	4,5
150604-2SC								●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,4	2,8					
150608-2SC								●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,6						
150604-4SC								●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,4	2,8						
150608-4SC								●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,6							



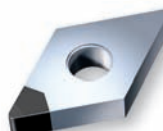
TURNING | ISO

■ DNGA

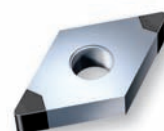
Solid tipped corners



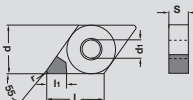
PC-S



PC-S/4

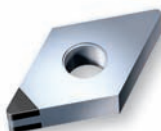


PC-M

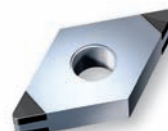
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
150404-PC-S	●	●	●	●	●	●	●																12,70	5,13	4,76	15,50	0,4	2,8		
150408-PC-S	●	●	●	●	●	●	●															0,8					2,6			
150412-PC-S	●	●	●	●	●	●	●															1,2					2,4			
150404-PC-M	●		●		●		●															0,4					2,8			
150408-PC-M	●		●		●		●															0,8					2,6			
150412-PC-M	●		●		●		●															1,2					2,4			
150604-PC-S	●	●	●	●	●	●	●															12,70	5,13	6,35	15,50	0,4	2,8			
150608-PC-S	●	●	●	●	●	●	●																			0,8	2,6			
150612-PC-S	●	●	●	●	●	●	●																			1,2	2,4			
150604-PC-S/4	●																									0,4	4,0			
150608-PC-S/4	●																									0,8	3,6			
150612-PC-S/4	●																									1,2	3,2			
150604-PC-M	●		●		●		●																				0,4	2,8		
150608-PC-M	●		●		●		●																				0,8	2,6		
150612-PC-M	●		●		●		●																					1,2	2,4	

■ DNGA

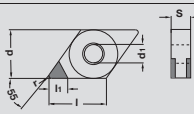
Solid tipped corners



2MC/S



4MC/S

insert size	uncoated								coated																dimensions					
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d1	s	l	r	l1		
150604-2MC/S									●		●	●	●	●	●			●	●	●	●	●	●	12,70	5,13	6,35	15,50	0,4	2,8	
150608-2MC/S									●		●	●	●	●	●			●	●	●	●	●	●					0,8	2,5	
150612-2MC/S									●		●	●	●	●	●			●	●	●	●	●	●					1,2	2,2	
150604-4MC/S									●		●	●	●	●	●			●	●	●	●	●	●					0,4	2,8	
150608-4MC/S									●		●	●	●	●	●			●	●	●	●	●	●					0,8	2,5	
150612-4MC/S									●		●	●	●	●	●			●	●	●	●	●	●					1,2	2,2	



TURNING | ISO

RNGN

Fullface
Double fullface



VM



SE

insert size	uncoated				coated																dimensions																					
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																					
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁				
090300-VM	●	●			●	●	●	●																										9,52		3,18						
090300-SE									●	●		●	●		●	●		●	●		●	●		●	●		●	●		●	●											
120300-SE									●	●		●	●		●	●		●	●		●	●		●	●		●	●		●	●											
120400-VM	●	●			●	●	●	●																																		
120400-SE									●	●		●	●		●	●		●	●		●	●		●	●		●	●		●	●											

RNGN

Solid

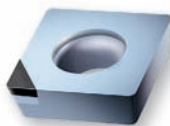


SBC

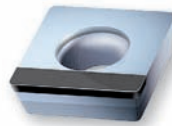
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d1	s	l	r	l1		
090300-SBC	●		●		●		●																9,52		3,18					
120300-SBC	●		●		●		●																12,70		3,18					
120400-SBC	●																						12,70		4,76					

SCGW

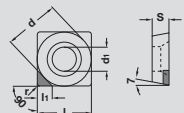
Standard tipped corners



EW

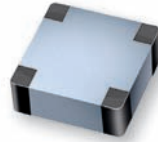


GS

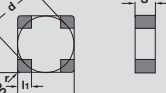
insert size	uncoated				coated																dimensions																		
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																		
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁	
09T304-EW	●	●	●	●	●	●	●	●																														0,4	3,5
09T308-EW	●	●	●	●	●	●	●	●																														0,8	3,4
09T304-GS	●	●	●	●	●	●	●	●																														0,4	9,5
09T308-GS	●	●	●	●	●	●	●	●																														0,8	9,5
120404-EW	●	●			●	●	●	●																														0,4	3,5
120408-EW	●	●			●	●	●	●																														0,8	3,4
120412-EW	●	●			●	●	●	●																														1,2	3,2

SNGN

Solid tipped corners



PC-M

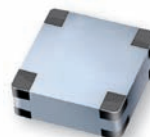
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
090304-PC-M	●				●		●																	9,52		3,18	9,52	0,4	3,0	
090308-PC-M	●				●	●	●	●																			0,8	2,8		
090312-PC-M	●				●	●	●																				1,2	2,6		
120404-PC-M	●	●	●				●																				0,4	3,0		
120408-PC-M	●	●	●		●	●	●	●																12,70		4,76	12,70	0,8	2,8	
120412-PC-M	●	●	●			●																					1,2	2,6		

SNGN

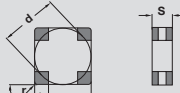
Sandwich tipped corners
Double fullface



SE



8 SC

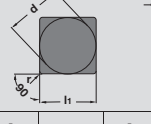
insert size	uncoated				coated																								dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	PBC-10		PBC-15		PBC-25		PBC-40		PC-10S								PBC-15S								PBC-25S								PBC-40S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
090308-SE									●	●	●						●	●	●	●						●	●	●	●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

SNGN

Solid



SBC

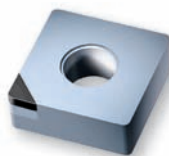
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
	H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁	
090304-SBC	●		●		●		●																	9,52		3,18		0,4	9,5	
090308-SBC	●		●		●		●																				0,8	9,5		
090312-SBC	●		●		●		●																				1,2	9,5		



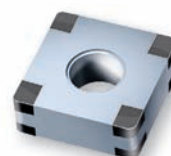
TURNING | ISO

■ SNGA

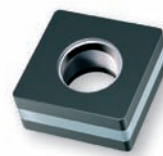
Standard/Sandwich tipped corners
Double fullface



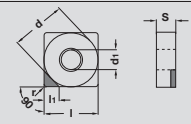
EW



8-SC

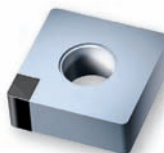


SE

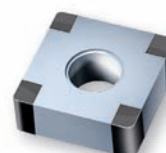
insert size	uncoated				coated																dimensions																			
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																			
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
120404-EW	●	●	●	●	●	●	●	●																														0,4	3,5	
120408-EW	●	●	●	●	●	●	●	●																														0,8	3,4	
120412-EW	●	●	●	●	●	●	●	●																														1,2	3,2	
120408-8SC									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,8
120412-8SC									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1,2	2,6
120408-SE									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	
120412-SE									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1,2	

■ SNGA

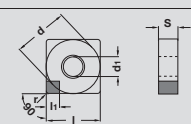
Solid tipped corners



PC-S



PC-M

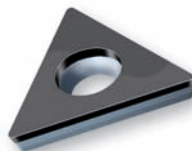
insert size	uncoated							coated																dimensions															
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C																						
									A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁									
120404-PC-S	●	●	●	●	●	●	●																															0,4	3,0
120408-PC-S	●	●	●	●	●	●	●																															0,8	2,8
120412-PC-S	●	●	●	●	●	●	●																															1,2	2,6
120404-PC-M	●		●		●		●																															0,4	3,0
120408-PC-M	●		●		●		●																															0,8	2,8
120412-PC-M	●		●		●		●																															1,2	2,6



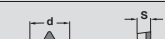
TURNING | ISO

TBGW

Fullface

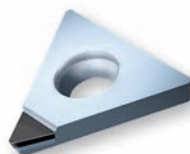


VM

insert size	uncoated				coated																												dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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TCGT

Standard tipped corners (positive)

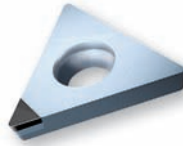


EW

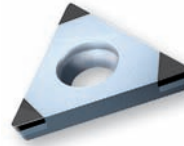
insert size	uncoated				coated																																dimensions										
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																		
A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
090202-EW	●	●	●	●																																											
090204-EW	●	●	●	●																																											
110202-EW	●	●	●	●																																											
110204-EW	●	●	●	●																																											

TCGW

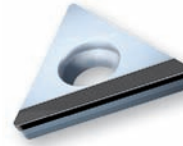
Standard tipped corners



EW

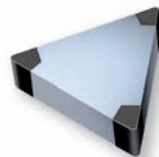


3 MC



GS

insert size	uncoated				coated																																dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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PC-M

TNGN

Solid tipped corners

insert size	uncoated								coated																dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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TURNING | ISO

TNGN

Solid



SBC

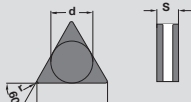
insert size	uncoated							coated																dimensions							
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C														
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁			
110304-SBC	●		●		●		●																	6,35		3,18	11,00	0,4			
110308-SBC	●		●		●		●																							0,8	
110312-SBC	●		●		●		●																								1,2

TNGN

Double fullface



SE

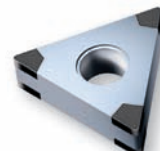
insert size	uncoated				coated																dimensions																		
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																		
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁	
110304-SE									●	●	●						●	●	●	●					●	●	●	●					6,35		3,18	11,00	0,4		
110308-SE									●	●	●						●	●	●	●					●	●	●	●								0,8			
160404-SE									●	●	●						●	●	●	●					●	●	●	●								0,4			
160408-SE									●	●	●						●	●	●	●					●	●	●	●						9,52		4,76	16,50	0,8	
160412-SE									●	●	●						●	●	●	●					●	●	●	●									1,2		

TNGA

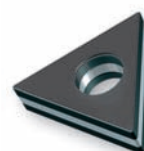
Standard- / Sandwich tipped corners
Double fullface



EW



6 SC

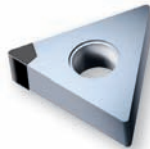


SE

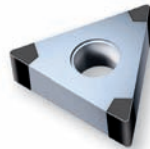
insert size	uncoated				coated																dimensions																			
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																			
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
110304-EW	●	●		●	●	●	●	●																														0,4	2,8	
110308-EW	●	●		●	●	●	●	●																														0,8	2,5	
110304-SE									●		●			●			●		●		●					●		●		●	●							0,4		
110308-SE									●		●			●			●		●		●					●		●		●	●							0,8		
160404-EW	●	●			●	●	●	●																														0,4	3,5	
160408-EW	●	●		●	●	●	●	●																														0,8	3,0	
160412-EW	●	●			●	●	●	●																														1,2	2,6	
160404-6SC									●				●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●						0,4	2,8	
160408-6SC									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●					0,8	2,5
160412-6SC									●				●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●					1,2	2,2	
160404-SE									●		●			●		●	●	●	●							●		●		●	●	●						0,4		
160408-SE									●		●			●		●	●	●	●							●		●		●	●	●						0,8		
160412-SE									●		●			●		●	●	●	●							●		●		●	●	●						1,2		

TNGA

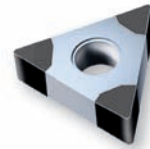
Solid tipped corners



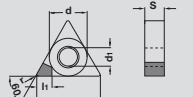
PC-S



PC-M

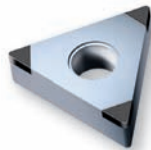


PC-M/4

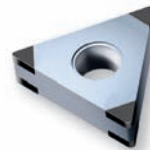
insert size	uncoated							coated																dimensions									
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C																
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁					
160404-PC-S	●	●	●	●	●	●	●																	9,52	3,81	4,76	16,50	0,4	3,0				
160408-PC-S	●	●	●	●	●	●	●																									0,8	2,6
160412-PC-S	●	●	●		●		●																									1,2	2,4
160404-PC-M	●		●		●		●																									0,4	3,0
160408-PC-M	●		●		●		●																									0,8	2,6
160412-PC-M	●		●		●		●																									1,2	2,4
160404-PC-M/4	●																															0,4	4,5
160408-PC-M/4	●																															0,8	4,2
160412-PC-M/4	●																															1,2	4,0

TNGA

Solid tipped corners



3MC/S

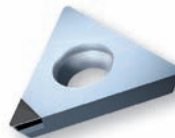


6MC/S

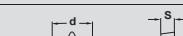
insert size	uncoated								coated																dimensions					
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
160404-3MC/S								●	●		●	●	●				●	●	●	●	●	●	●	9,52	3,81	4,76	16,50	0,4	3,0	
160408-3MC/S								●	●	●	●	●	●				●	●	●	●	●	●	●					0,8	2,6	
160412-3MC/S								●	●		●	●	●	●				●	●	●	●	●	●					1,2	2,4	
160404-6MC/S								●	●		●	●	●				●	●	●	●	●	●	●					0,4	3,0	
160408-6MC/S								●	●	●	●	●	●	●		●	●	●	●	●	●	●	●					0,8	2,6	
160412-6MC/S								●	●		●	●	●	●			●	●	●	●	●	●	●					1,2	2,4	

TPGA

Standard tipped corners



EW

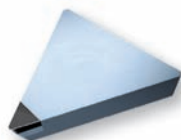
insert size	uncoated				coated																dimensions																			
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																			
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
110302-EW		●				●		●																														0,2	3,8	
110304-EW	●	●	●	●	●	●	●																															0,4	3,5	
110308-EW		●				●		●																															0,8	3,0



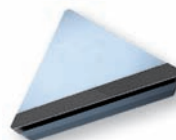
TURNING | ISO

TPGN

Standard tipped corners



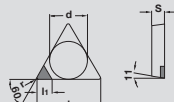
EW



GS

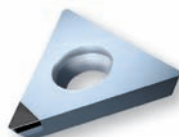


VM

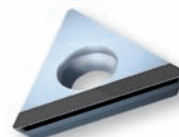
insert size	uncoated				coated																dimensions																	
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁
110302-EW	●	●			●	●	●	●																													0,2	3,8
110304-EW	●	●	●	●	●	●	●	●																													0,4	3,5
110308-EW	●	●			●	●	●	●																													0,8	3,0
110304-GS		●		●		●		●																													0,4	11,0
110308-GS		●		●		●		●																													0,8	11,0
110304-VM		●		●		●		●																													0,4	11,0
110308-VM		●		●		●		●																													0,8	11,0
160304-EW	●	●		●	●	●	●	●																													0,4	3,5
160308-EW	●	●		●	●	●	●	●																													0,8	3,0
160304-GS		●		●		●		●																													0,8	16,5
160308-GS		●		●		●		●																													0,8	16,5

TPGW

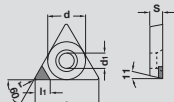
Standard tipped corners



EW

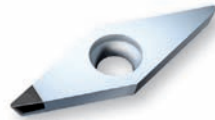


GS

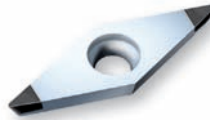
insert size	uncoated				coated																dimensions																	
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁
090202-EW		●			●	●	●																														0,2	3,8
090204-EW	●	●		●	●	●	●																														0,4	3,5
090204-GS		●		●	●	●	●																														0,4	9,6
110202-EW		●			●	●	●																														0,2	3,8
110204-EW		●			●	●	●																														0,4	3,5
110208-GS		●			●	●	●																														0,8	11,0
110302-EW	●	●			●	●	●																														0,2	3,8
110304-EW	●	●		●	●	●	●																														0,4	3,5
110308-EW	●	●			●	●	●																														0,8	3,0
110304-GS	●	●	●	●	●	●	●																														0,4	11,0
110308-GS	●	●			●	●	●																														0,8	11,0
160304-EW	●	●		●	●	●	●																														0,4	3,5
160308-EW	●	●			●	●	●																														0,8	3,0
160308-GS		●			●	●	●																														0,8	16,5

VBGW

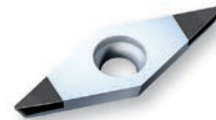
Solid tipped corners



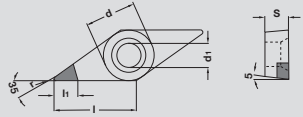
EWS



2MC-S

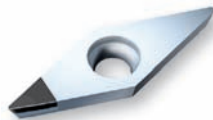


2MC-S/4

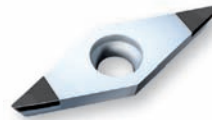
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
110202-EWS		●	●	●	●	●	●																	6,50	2,90	2,38	11,10	0,2	3,5	
110204-EWS		●	●	●	●	●	●																					0,4	3,1	
160402-EWS		●	●	●	●	●	●																					0,2	3,5	
160404-EWS		●	●	●	●	●	●																					0,4	3,1	
160408-EWS		●	●	●	●	●	●																					0,8	2,8	
160402-2MC-S		●	●	●	●	●	●																					0,2	3,5	
160404-2MC-S		●	●	●	●	●	●																					0,4	3,1	
160408-2MC-S		●	●	●	●	●	●																					0,8	2,8	
160404-2MC-S/4	●																											0,4	4,4	
160408-2MC-S/4	●																											0,8	4,2	
160412-2MC-S/4	●																											1,2	4,0	

VBGW

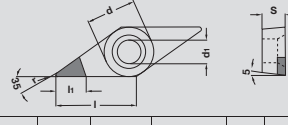
Standard tipped corners



MW



2MC

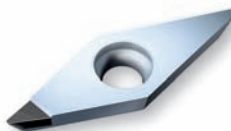
insert size	uncoated				coated																																dimensions											
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S															
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
110202-MW	●	●	●	●	●	●	●																																							0,2	4,7	
110204-MW	●	●	●	●	●	●	●																																							0,4	4,5	
110208-MW	●	●			●	●	●	●																																							0,8	4,2
160402-MW	●	●			●	●	●	●																																							0,2	5,3
160404-MW	●	●	●	●	●	●	●	●																																							0,4	5,0
160408-MW	●	●			●	●	●	●																																							0,8	4,4
160412-MW	●	●			●	●	●	●																																							1,2	3,9
160416-MW		●				●	●	●																																						1,6	3,5	
160404-2MC							●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,4	3,1	
160408-2MC								●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0,8	2,5	



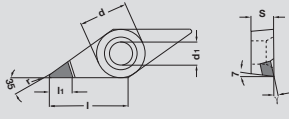
TURNING | ISO

■ VCGT

Solid tipped corners (positive)

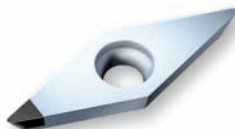


EWS

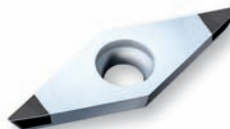
insert size	uncoated								coated																dimensions					
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
070202-EWS		●		●		●																		3,97	2,20	2,38	6,90	0,2	3,5	
070204-EWS		●		●		●																					0,4	3,2		
110202-EWS		●		●		●																		6,35	2,90	3,18	11,10	0,2	3,5	
110204-EWS		●		●		●																					0,4	3,2		
130302-EWS		●		●		●																		7,94	3,40	3,18	13,30	0,2	3,5	
130304-EWS		●		●		●																					0,4	3,2		
160402-EWS		●		●		●																						0,2	3,5	
160404-EWS		●		●		●																		9,52	4,40	4,76	16,60	0,4	3,2	
160408-EWS		●		●		●																						0,8	2,8	

■ VCGW

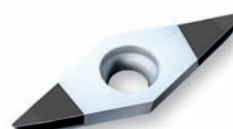
Solid tipped corners



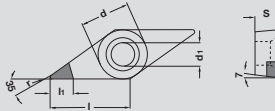
EWS



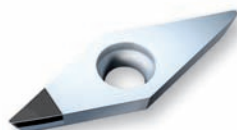
2MC-S



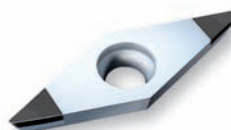
2MC-S/4

insert size	uncoated							coated																dimensions						
	SBC1	SBC10		SBC25		SBC40		SBC-25C								SBC-40C														
		H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁
070202-EWS		●	●	●	●	●																			3,97	2,20	2,38	6,90	0,2	3,5
070204-EWS		●	●	●	●	●																						0,4	3,2	
110302-MC-S		●	●	●	●	●																			6,35	2,90	3,18	11,10	0,2	3,5
110304-MC-S		●	●	●	●	●																						0,4	3,2	
130302-EWS		●	●	●	●	●																			7,94	3,40	3,18	13,30	0,2	3,5
130304-EWS		●	●	●	●	●																						0,4	3,2	
160402-EWS		●	●	●	●	●																							0,2	3,5
160404-EWS		●	●	●	●	●																							0,4	3,2
160408-EWS		●	●	●	●	●																							0,8	2,8
160402-2MC-S		●	●	●	●	●																							0,2	3,5
160404-2MC-S		●	●	●	●	●																			9,52	4,40	4,76	16,60	0,4	3,2
160408-2MC-S		●	●	●	●	●																							0,8	2,8
160404-2MC-S/4	●																												0,4	4,4
160408-2MC-S/4	●																												0,8	4,2
160412-2MC-S/4	●																												1,2	4,0

Standard tipped corners



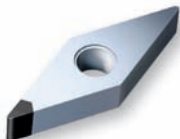
MW



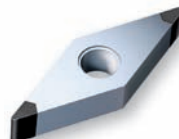
2MC

[illegible]

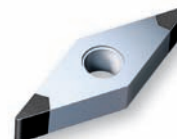
Solid tipped corners



PC-S



PC-M



PC-M/4

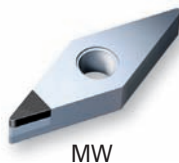
[illegible]



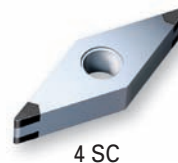
TURNING | ISO

VNGA

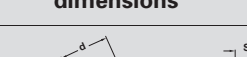
Standard tipped corners
Sandwich tipped corners



MW

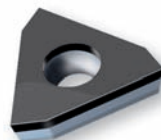


4 SC

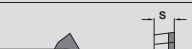
insert size	uncoated				coated																																dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
160404-MW	●	●	●	●	●	●	●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

WBGW

Fullface

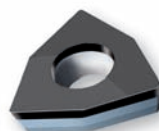


VM

insert size	uncoated				coated																																dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
					A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H							A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
020102L-VM	●	●	●		●	●	●	●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</

WCGW

Fullface

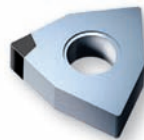


VM

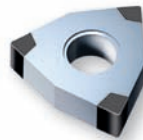
insert size	uncoated				coated																																dimensions											
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S															
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
020102-VM	●	●	●		●	●	●	●																																							0,2	2,7
020104-VM	●	●		●	●	●	●	●																																							0,4	2,7

WNGA

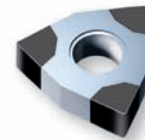
Solid tipped corners



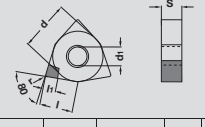
PC-S



PC-M

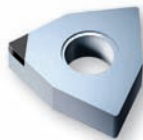


PC-M/4

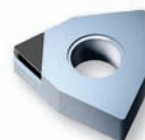
insert size	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
080404-PC-S	●	●	●	●	●	●	●																12,70	5,13	4,76	8,50	0,4	2,8		
080408-PC-S	●	●	●	●	●	●	●															0,8					2,6			
080412-PC-S	●	●	●	●	●	●	●															1,2					2,4			
080404-PC-M	●		●		●		●															0,4					2,8			
080408-PC-M	●		●		●		●															0,8					2,6			
080412-PC-M	●		●		●		●															1,2					2,4			
080404-PC-M/4	●																					0,4					4,5			
080408-PC-M/4	●																					0,8					4,2			
080412-PC-M/4	●																					1,2					4,0			

WNGA

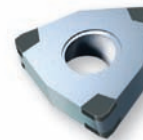
Standard tipped corners
Sandwich tipped corners



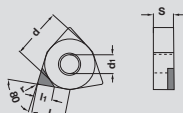
EW



MW



6 SC

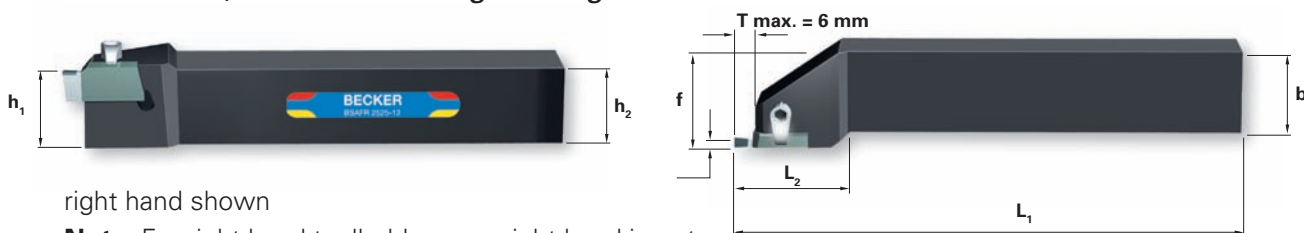
insert size	uncoated				coated																dimensions																		
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S				PBC-15S				PBC-25S				PBC-40S																		
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁	
080404-EW	●	●	●	●	●	●	●																														0,4	3,1	
080408-EW	●	●	●	●	●	●	●																														0,8	2,8	
080412-EW	●	●		●	●	●	●																														1,2	2,5	
080404-MW	●	●	●	●	●	●	●																														0,4	5,3	
080408-MW	●	●	●	●	●	●	●																														0,8	5,0	
080412-MW	●	●		●	●	●	●																														1,2	4,7	
080404-6SC							●				●	●	●	●		●	●	●	●	●						●	●	●	●	●							0,4	2,8	
080408-6SC							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	●						0,8	2,5
080412-6SC							●			●	●	●	●	●	●		●	●	●	●	●					●	●	●	●	●	●							1,2	2,2
080404W-6SC							●			●	●	●	●	●		●	●	●	●	●						●	●	●	●	●								0,4	2,8
080408W-6SC							●	●	●	●	●	●	●	●	●		●	●	●	●	●	●				●	●	●	●	●								0,8	2,5



GROOVING FormCut

BSAFR/L

Toolholder, external radial grooving



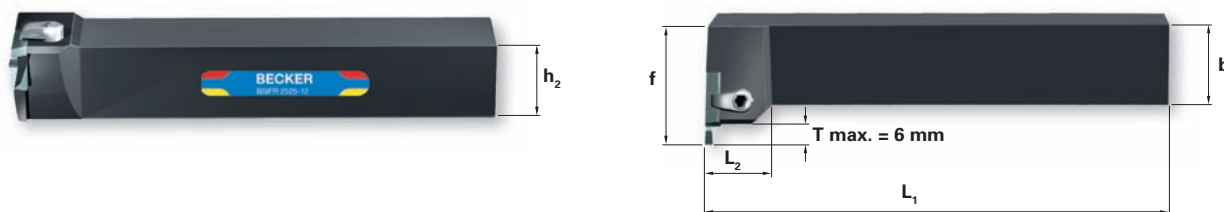
right hand shown

Note: For right-hand toolholders use right-hand inserts,
for left-hand toolholders use left-hand inserts only.

designation		dimensions					
right-hand	left-hand	h_1	h_2	b	f	L_1	L_2
BSAFR 1616 - 12	BSAFL 1616 - 12	16	16	16	20	106	31
BSAFR 2020 - 12	BSAFL 2020 - 12	20	20	20	24	131	31
BSAFR 2525 - 12	BSAFL 2525 - 12	25	25	25	30	156	31
BSAFR 3225 - 12	BSAFL 3225 - 12	32	32	25	30	176	31

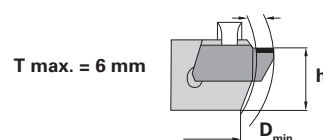
BSIFR/L

Toolholder, internal radial grooving



right hand shown

Note: For right-hand toolholders use left-hand inserts,
for left-hand toolholders use right-hand inserts only.



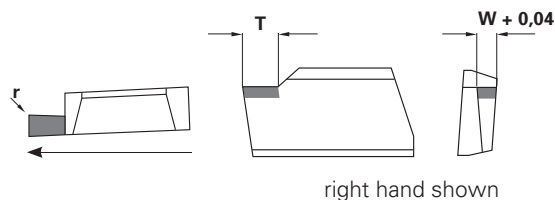
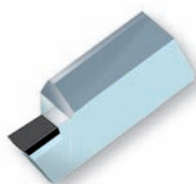
designation		dimensions						
right-hand	left-hand	h_1	h_2	b	f	L_1	L_2	$D_{min.}$
BSIFR 1616 - 12	BSIFL 1616 - 12	16	16	16	28	100	18	50
BSIFR 2020 - 12	BSIFL 2020 - 12	20	20	20	32	125	18	72
BSIFR 2525 - 12	BSIFL 2525 - 12	25	25	25	37	150	18	110
BSIFR 3225 - 12	BSIFL 3225 - 12	32	32	25	37	170	18	110

Spare parts

CLA 3103	SCR 1303	KEY 2104	VAR 5101

BFSN

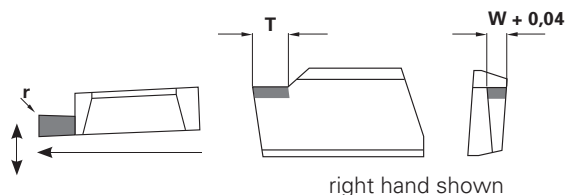
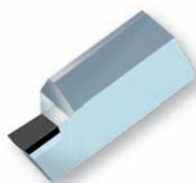
External grooving



insert size	uncoated				coated																																dimensions											
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																			
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r				
BFSN-2,5-R/L		●				●																																						2,5	4	0,2		
BFSN-3,0-R/L		●				●																																							3,0	6	0,2	
BFSN-3,5-R/L		●				●																																							3,5	6	0,2	
BFSN-4,0-R/L		●				●																																							4,0	6	0,2	0,40
BFSN-4,5-R/L		●				●																																							4,5	6	0,2	
BFSN-5,0-R/L		●				●																																							5,0	6	0,2	0,40

BFSV

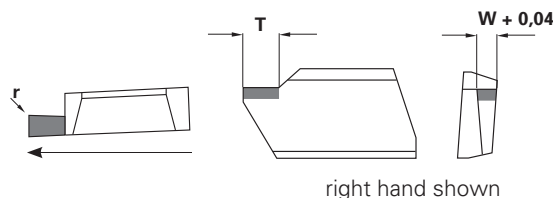
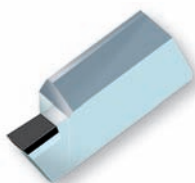
External grooving and turning



insert size	uncoated				coated																																dimensions										
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																		
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r			
BFSV-3,0-R/L		●				●																																						2,5	4	0,2	
BFSV-3,5-R/L		●				●																																						3,0	6	0,2	
BFSV-4,0-R/L		●				●																																						3,5	6	0,2	
BFSV-4,5-R/L		●				●																																						4,0	6	0,2	
BFSV-5,0-R/L		●				●																																						4,5	6	0,2	

BFIN

Internal grooving



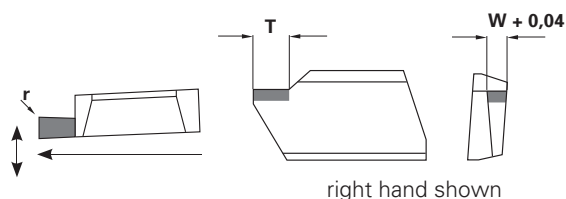
insert size	uncoated				coated																																dimensions									
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r		
BFIN-2,5-R/L					●	●																																					2,5	3	0,2	
BFIN-3,0-R/L		●				●	●																																				3,0	6	0,2	
BFIN-3,5-R/L		●					●	●																																			3,5	6	0,2	
BFIN-4,0-R/L							●	●																																			4,0	6	0,2	0,4
BFIN-4,5-R/L							●	●																																			4,5	6	0,2	



GROOVING | FormCut

BFIV

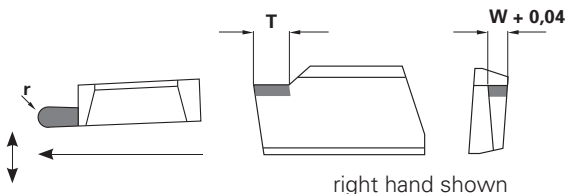
Internal grooving
and turning



insert size	uncoated				coated																																dimensions									
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S													
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r		
BFIV-3,0-R/L					●	●																																					3,0	6	0,2	0,4
BFIV-3,5-R/L	●				●	●																																					3,5	6	0,2	0,4
BFIV-4,0-R/L	●				●	●																																					4,0	6	0,2	0,5
BFIV-4,5-R/L					●	●																																					4,5	6	0,2	0,5
BFIV-5,0-R/L					●	●																																					5,0	6	0,2	0,6

BFRV

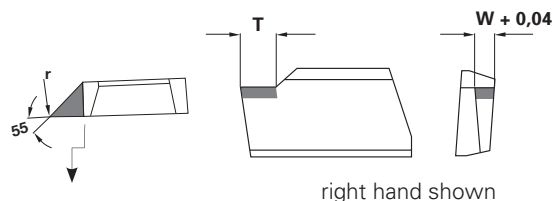
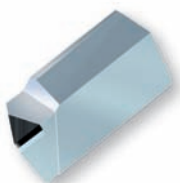
External copying



insert size	uncoated				coated																																dimensions									
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r		
BFRV-3,0-R/L	●				●	●																																					3,0	6	1,50	
BFRV-3,5-R/L	●				●	●																																					3,5	6	1,75	
BFRV-4,0-R/L	●				●	●																																					4,0	6	2,00	
BFRV-4,5-R/L	●				●	●																																					4,5	6	2,25	
BFRV-5,0-R/L	●				●	●																																					5,0	6	2,50	

BFDV

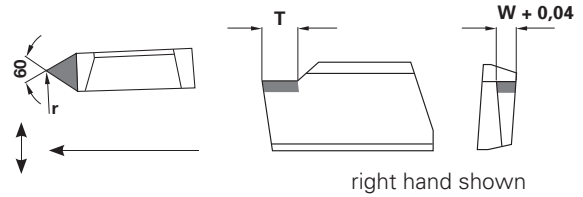
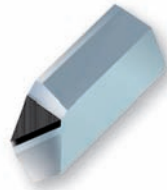
External profiling



insert size	uncoated				coated																																dimensions								
	PBC-10	PBC-15	PBC-25	PBC-40	PBC-10S								PBC-15S								PBC-25S								PBC-40S																
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r	
BFDV-0,2-R/L		●				●																																				5	5	0,2	
BFDV-0,4-R/L		●				●																																				5	5	0,4	
BFDV-0,8-R/L		●				●																																				5	5	0,8	
BFDV-1.2-R/L		●				●																																				5	5	1.2	

BFTV

External threading
(partial profile)



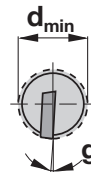
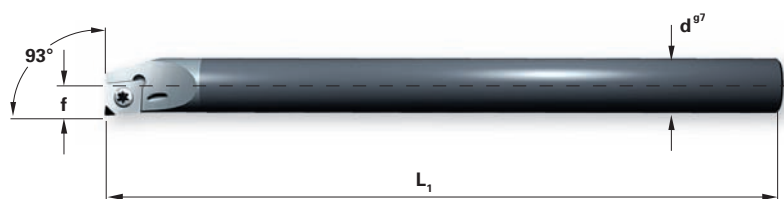
insert size	uncoated				coated																																dimensions									
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S													
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	W	T	r	r		
BFTV-0,10-R/L		●				●		●																																			5	5	0,10	
BFTV-0,14-R/L		●				●		●																																			5	5	0,14	
BFTV-0,18-R/L		●				●		●																																			5	5	0,18	
BFTV-0,21-R/L		●				●		●																																			5	5	0,21	
BFTV-0,25-R/L		●				●		●																																			5	5	0,25	
BFTV-0,28-R/L		●				●		●																																			5	5	0,28	
BFTV-0,36-R/L						●		●																																			5	5	0,36	
BFTV-0,43-R/L						●		●																																			5	5	0,43	

Size of radius for metric ISO-thread.			
Size of radius	Pitch P (max.)	Pitch P (min.)	Pitch P (average)
r = 0,10	P = 0,80	P = 0,69	P = 0,75
r = 0,14	P = 1,12	P = 0,97	P = 1,00
r = 0,18	P = 1,44	P = 1,25	P = 1,35
r = 0,21	P = 1,68	P = 1,46	P = 1,55
r = 0,25	P = 2,00	P = 1,74	P = 1,87
r = 0,28	P = 2,24	P = 1,95	P = 2,10
r = 0,36	P = 2,99	P = 2,50	P = 2,70
r = 0,43	P = 3,44	P = 2,99	P = 3,20



Boring bars solid carbide

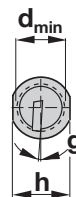
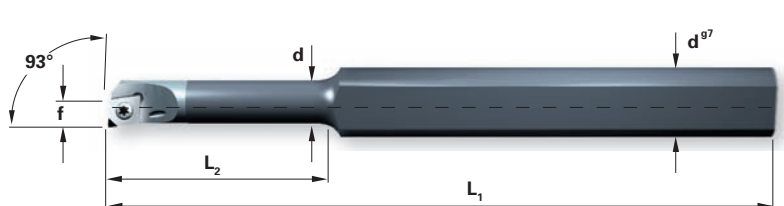
Design E...SEUP L/R



right hand shown

Right-hand boring bar with cylindrical solid carbide shank and internal coolant feed.

order number	insert	dimensions				
		d _{min}	d ⁹⁷	f	L ₁	g
E 06 F - SEUP L/R 04	EPH.. 0401..	6,8	6	3,4	80	9°
E 07 H - SEUP L/R 04	EPH.. 0401..	8,4	7	4,4	100	5°
E 08 H - SEUP L/R 04	EPH.. 0401..	9,5	8	4,9	100	5°
E 10 K - SEUP L/R 06	EPH.. 06T1..	11,5	10	5,8	125	5°
E 12 M - SEUP L/R 06	EPH.. 06T1..	13,5	12	6,9	150	3°
E 16 R - SEUP L/R 06	EPH.. 06T1..	18,5	16	9,8	200	0°



right hand shown

Right-hand boring bar with cylindrical solid carbide shank, two clamping surfaces and internal coolant feed.

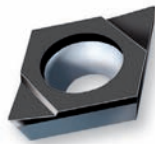
order number	insert	dimensions							
		d _{min}	d	f	L ₁	L ₂	d ⁹⁷	h	g
E 06 10 H - SEUP L/R 04	EPH.. 0401..	6,8	6	3,4	100	36	10	8	9°
E 07 10 K - SEUP L/R 04	EPH.. 0401..	8,4	7	4,4	125	42	10	8	5°
E 08 10 K - SEUP L/R 04	EPH.. 0401..	9,5	8	4,9	125	48	10	8	5°

Spare parts

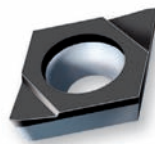
screws and keys					
order number	SCR 1101	SCR 1102	KEY 2101	KEY 2102	VAR 5101
suitable for	EPH 0401..	EPH 06T1..	SCR 1101	SCR 1102	



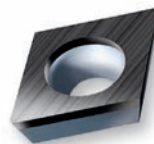
EPHT EPHW Fullface



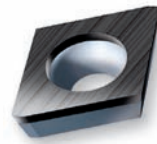
positive-VM



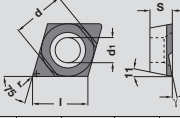
Wiper-VM



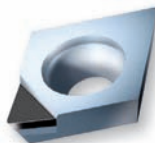
VM



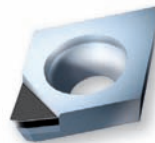
Wiper-VM

insert size	uncoated				coated																																dimensions											
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S															
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁		
EPHT040102-VM			●		●																																											0,2
EPHT040103-VM			●		●																																											0,3
EPHT040104-VM			●		●																																											0,4
EPHT040102R/L-W-VM					●																																											0,2
EPHW040102-VM	●	●			●																																											0,2
EPHW040103-VM	●	●			●	●																																										0,3
EPHW040104-VM	●	●			●	●																																										0,4
EPHW040102R/L-W-VM					●	●	●	●																																							0,2	
EPHW040103R/L-W-VM					●	●	●	●																																							0,3	
EPHW040104R/L-W-VM					●	●	●	●																																							0,4	

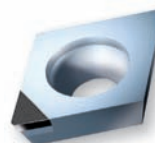
EPHT EPHW Standard tipped corners



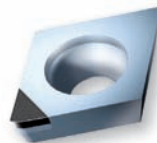
positive-EW



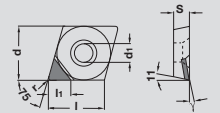
Wiper-EW



EW

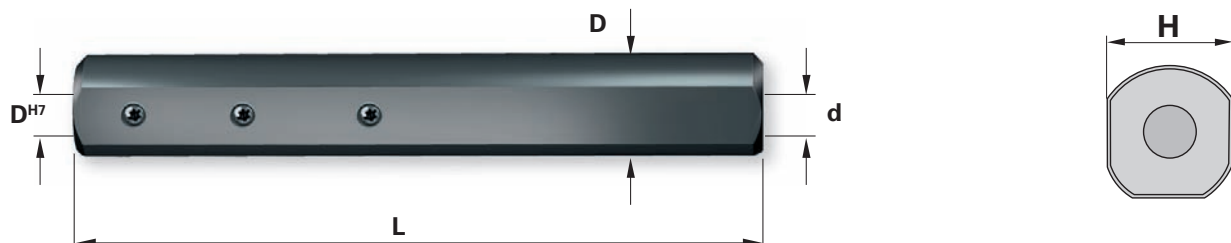


Wiper-EW

insert size	uncoated				coated																																dimensions												
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S																
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁			
EPHT06T102-EW	●				●		●																																									0,2	3,0
EPHT06T104-EW	●				●		●																																									0,4	2,8
EPHT06T102R/L-W-EW					●		●																																									0,2	3,0
EPHW06T101-EW	●	●			●	●	●	●																																							0,1	3,1	
EPHW06T102-EW	●	●			●	●	●	●																																							0,2	3,0	
EPHW06T104-EW	●	●			●	●	●	●																																							0,4	2,8	
EPHW06T108-EW	●	●			●	●	●	●																																							0,8	2,4	
EPHW06T102R/L-W-EW					●	●																																										0,2	3,0

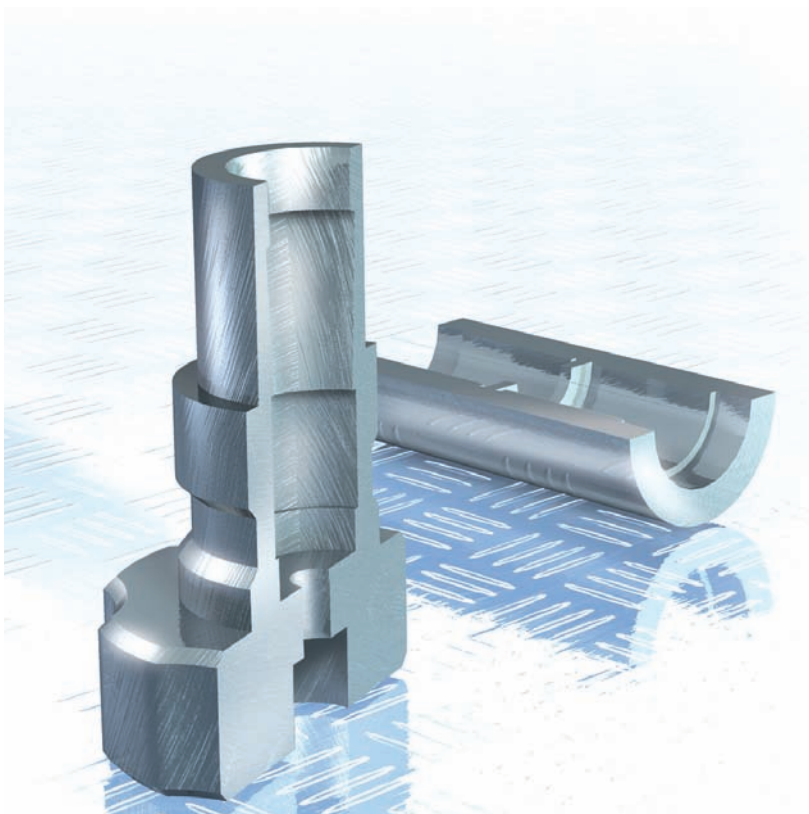
■ Adapter sleeve

Boring bars design X...GEUP



Adapter sleeves enable versatile use of the boring bars in all areas.
Coolant feed is provided through the adapter.

order number	for boring bars	dimensions				
		D	d	d ^{H7}	H	L
Adap - 1635	X 3,5 F-GEUP L/R	16	4	3,5	14	100
Adap - 1640	X 04 F-GEUP L/R	16	5	4,0	14	100
Adap - 1650	X 06 H-GEUP L/R	16	6	5,0	14	100
Adap - 1660	X 05 H-GEUP L/R	16	8	6,0	14	100



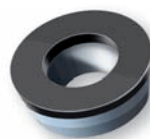
X-GE R/L

Solide carbide boring bars with one clamping surface, brazed cutting edges and internal coolant feed. Adapter sleeve look left.



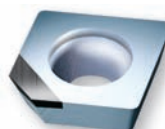
right hand shown

order number	uncoated							coated																dimensions						
	SBC1		SBC10		SBC25		SBC40		SBC-25C								SBC-40C													
	H	A	G	A	F	A	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	dg ⁷	d _{min}	f	l ₁	l ₂	r	
X3,5F-GEUP-R/L		●	●	●	●																				3,5	4,0	2,0	80	12	0,1
X3,5F-GEUP-R/L		●	●	●	●																								0,2	
X04F-GEUP-R/L		●	●	●	●																								0,1	
X04F-GEUP-R/L		●	●	●	●																				4,0	5,0	2,5	80	14	0,2
X04F-GEUP-R/L		●	●	●	●																								0,4	
X05H-GEUP-R/L		●	●	●	●																								0,1	
X05H-GEUP-R/L		●	●	●	●																				5,0	6,0	3,0	100	18	0,2
X05H-GEUP-R/L		●	●	●	●																								0,4	
X06H-GEUP- R/L		●	●	●	●																								0,1	
X06H-GEUP- R/L		●	●	●	●																				6,0	7,0	3,5	100	20	0,2
X06H-GEUP- R/L		●	●	●	●																								0,4	



Fullface

VM

[illegible]

SDHW-AEN

Standard tipped corners

MW

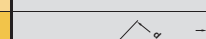
[illegible]

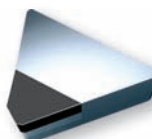


MW

SPKN-EDR

Standard tipped corners

insert size	uncoated				coated																																dimensions													
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S																	
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁				
1203EDR-MW		●				●																																									12,7	3,18	12,7	4,0



MW

TPKN-PDR

Standard tipped corners

insert size	uncoated				coated																																dimensions															
	PBC-10		PBC-15		PBC-25		PBC-40		PBC-10S								PBC-15S								PBC-25S								PBC-40S																			
	A	F	A	C	A	D	A	E	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	d	d ₁	s	l	r	l ₁						
1603PDR-MW		●				●																																									9,52		3,18	16,50		4,0



cutting materials

ultrahard

■ Important Information

Change of item description

Below we have listed the precise allocation of the old item description "F" and "T" to the new item description. Please bear in mind that the items have solely been renamed. Geometries have not been changed. You may still use the old item description in your orders. As of January 1, 2012 the inserts in question will bear the new item description when delivered.

Change of item description for the chamfer geometry of all uncoated PcBN-grades		
PcBN-grade	Geometry "OLD"	Geometry "NEW"
SBC - 1	T	H
	F	A
SBC - 10	T	G
	F	A
SBC - 25	T	F
	F	A
SBC - 40	T	G
	F	A
PBC - 10	T	F
	F	A
PBC - 15	T	C
	F	A
PBC - 25	T	D
	F	A
PBC - 40	T	E
	F	A

Cutting length and cutting time

In order to fully exploit the performance of our PcBN cutting materials, measured by the number of parts produced, the following factors are crucial.

The total cutting length of a workpiece has to be calculated and observed. This varies enormously depending on the feed rate. Therefore the required surface finish has to be observed precisely (see pages 12 and 19). The real cutting length that can be achieved during hardturning is between 3,000 and 12,000 meters per cutting edge. The real cutting time per item determines the number of parts produced, and is controlled by the cutting speed and the feed rate. Thus the ideal aim for each workpiece to strive for is the lowest possible cutting length, the shortest cutting time at the highest possible cutting speed. Please refer to our diagrams on pages 14 to 17.

Cutting length in meters

$$SCL = \frac{Dm \times 3,14 \times lm}{1000 \times fn}$$

Operating duration in minutes

$$Tc = \frac{lm}{fn \times n}$$

SCL = Cutting length in meters
(spiral cutting length)

Dm = Diameter in mm

lm = Turning length

fn = Feed rate per revolution in mm

Vc = Cutting speed in m/min

n = Spindle RPM

Tc = Operating duration in minutes

**Please observe our full range
of tools with ultrahard cutting materials**



■ Imprint

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PcBN

Cutting Tools



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