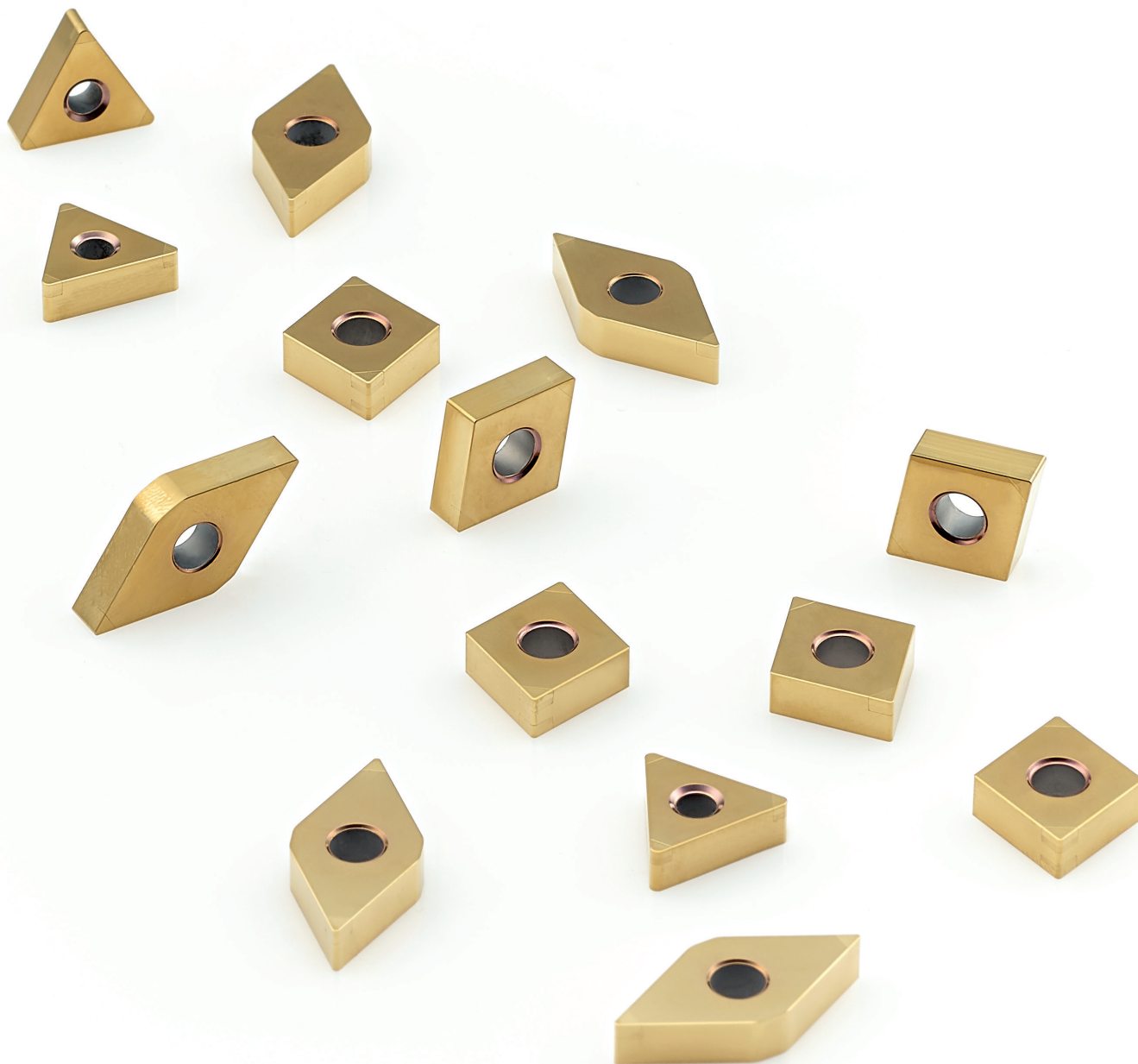


Complete range on PCBN turning inserts



PCBN
Turning



PCBN grades selection

Seleção de graus | Selección de calidades

PCBN (Polycrystalline-Cubic-Boron-Nitride) is not found in nature, it is a synthetic material which is the result of an high temperature and high pressure process (HTHP). When PCBN tips are brazed to a carbide insert a powerful cutting tool is born.

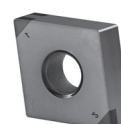
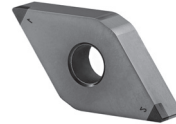
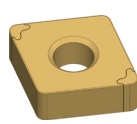
PCBN insert excel in the finishing and semi-finishing process of hardened steels (45-68 HRC) as well as hard cast iron and heat-resistant super alloys (HRSA).

Grades description

Grade	Code	Characteristics	Application
PBY603	Y5	Low PCBN content grade with medium grain size and ceramic binder. Great wear and abrasion resistance.	- For continuously and lightly interrupted cutting of Hardened Steel (H01-H10); - Finishing abrasive high strength cast irons; - Can also be used to machine HRSA (S01-S10);
PBY620	Y4	Low PCBN content grade with medium grain size which provides enhanced crater and flank wear resistance with an excellent balance of toughness.	For moderately to heavily interrupted turning of all hardened steels (H10-H20).
PBY625	4C	Low PCBN content grade with very fine grain size for improved toughness.	Heavily interrupted machining of hardened steels.
PBH920	S4	High PCBN content with excellent abrasion resistance.	- For machining all types of cast iron (K01-K30); - First choice for machining ferrous powder metals; - Can also be used to machine HRSA (S20-S30);
PBY930	W3	High abrasive wear resistance; High impact toughness;	For Cast Iron with high Niquel and Chrome content (pumps and engine blocks).
PBY940	W4	High fracture toughness; High thermal conductivity;	For Alloy steels with high content of Cr, grey cast irons and hardened steels with Ni.

NEW

NEW



Geometry selection Seleção da geometria | Selección de la geometria

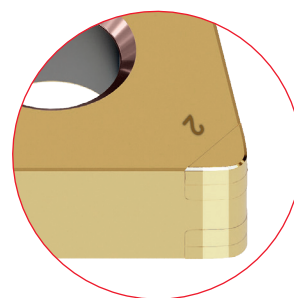
The insert geometry and edge preparation are extremely important in hard part turning since they have a significant influence on tool life and productivity. Palbit product range includes standard and wiper inserts. The standard nose radius generates the lowest cutting forces and has the lowest stability requirements while wiper gives an unbeatable combination of high productivity and excellent surface finish.

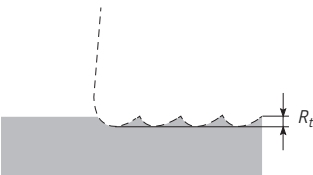
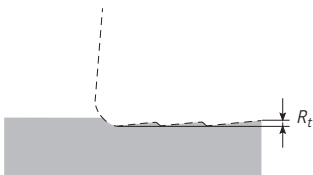
A large nose radius provides a greater edge strength and therefore extended tool life. For this reason, it is advised to use the largest allowed nose radius to each process requirements.

Wiper insert Pastilha wiper | Plaquita wiper

Wiper inserts provide two possibilities for process improvement:

- Improved surface finish with standard cutting data;
- Maintained surface finish at substantially higher feed rate;



	Standard ($r_E = 0,8\text{mm}$)	Wiper ($r_E = 0,8\text{mm}$)
Insert type		
Surface Roughness (R_a)	0,81 μm	0,42 μm

Note

This values were achieved with the next cutting conditions:

H Steel HRC60 | $V_c = 130 \text{ m/min}$ | $f_n = 0,12 \text{ mm/rev}$ | $a_p = 0,2 \text{ mm}$ | $\lambda = 2,5 \text{ mm}$ / ISO 4287

Formulas for surface roughness calculation

Fórmulas para calculo da rugosidade da superfície | Fórmulas para calcular la rugosidad de la superficie

$$R_a = 0,032 \times \frac{f_n^2}{r_E} \times 1000 \mu\text{m}$$

$$R_t = 3,91 \times R_a \mu\text{m}$$

R_a - Mean Surface Roughness (μm)

R_t - Roughness Total Height (μm)

f_n - Feed Rate (mm/rev)

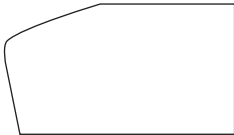
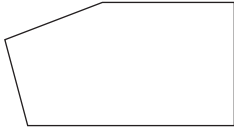
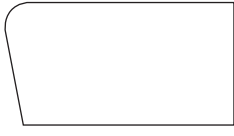
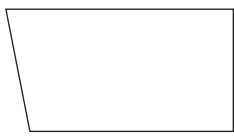
r_E - Insert Radius (mm)

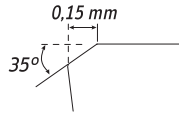
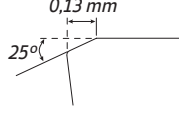
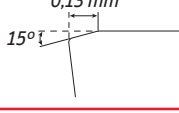
Edge Preparation Selection

Seleção da preparação de aresta | Selección de la preparación de arista

The most important criteria for the stability and cutting edge tool-life is to define the correct cutting edge preparation. Its choice is mainly required in order to achieve the best economical result.

Edge preparation

Cutting forces edge strength		S - Land 	S Preparation with chamfer and honing - Standard - First choice for hard part turning; - Stronger edge than T - land, with more resistance to chipping and fracture, resulting in more predictable tool life; - Generates consistent surface finish; - Critical in interrupted cutting and when using large depth of cut; - Feed rate must be greater than hone size;
		T - Land 	T Preparation with chamfer - T - land is a common edge preparation for PCBN; - Preferred choice for cast iron; - Good alternative to S - land in hard part turning when reduced cutting forces and tighter tolerances are required;
		E - Land 	E Preparation with edge honing - Recommended for HRSA finishing operation; - Honing helps strengthen the edge, giving resistance to chipping and fracturing; - Feed rates must be greater than the hone size to allow actual cutting action to take place and prevent rubbing;
		F - Land 	F Preparation without honing - Sharp cutting edge; - F - Standard is a common edge preparation for PCD; - Recommended for aluminium or other non-ferrous materials;

Honing Types	Specifications
S3515 For interrupted machining	  Difficult Conditions
S2513 For general purpose machining	  Average Conditions
S1513 For stable continuous machining	  Good Conditions

Note
Based on our experience sometimes it is necessary to define edge preparation during several tests to provide the best possible solution for each application.

Chip-Breaker Tailor-Made

Quebra-Aparas personalizados | Rompevirutas personalizados

Our laser machining and grinding machining technology can reach a wide range of tailor-made solutions. The Chip-Breakers can be customized according to our customer's needs and still remain with a high cutting edge quality.

PCBN recommended cutting data

Condições de corte recomendadas para PCBN | Datos de corte recomendadas para PCBN

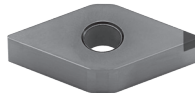
Workpiece material	Recommend grade for PCBN				VC (m/min)	
	PBH920	PBY603	PBY620	PBY625		
Hardened Steel (HRC 45-68) Tool-Steel, Case Hardened Steel, Continuous Cut (recommended without Coolants)		Ⓐ			Semi-finish	80 - 200
					Finish	80 - 180
Hardened Steel (HRC 45-68) Tool-Steel, Case Hardened Steel, Interrupted Cut (recommended without Coolants)	○		Ⓐ	NEW Ⓐ	Semi-finish	70 - 180
					Finish	70 - 160
Grey Cast Iron	Ⓐ				Semi-finish	500 - 1000
					Finish	600 - 2000
High Temperature Alloys (Inconel, Waspoloy, Hasteloy) Exotic and High Nickel + Cobalt basis	Ⓐ	Ⓐ			Finish	50 - 300

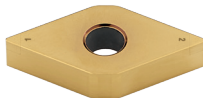
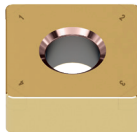
Ⓐ Recommended ○ Second choice

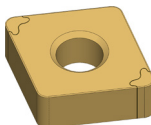
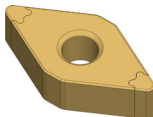
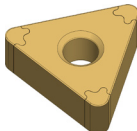
Overview

Negative Inserts Overview

Vista genérica pastilhas negativas | Visión general de plaquitas negativas

CNGA Z1 Single Tip		DNGA Z1 Single Tip	
			
Size 12		Size 15	
Page 8		Page 8	

CNGA Z2 Z4 Multiple Tips		DNGA Z2 Z4 Multiple Tips		SNGA Z4 Multiple Tips	
					
Size 12		Size 11 15		Size 12	
Page 8		Page 10		Page 10	

CNGA Z4S Solid Tips		DNGA Z4S Solid Tips		TNGA Z6S Solid Tips	
NEW 		NEW 		NEW 	
Size 12		Size 11 15		Size 16	
Page 14		Page 14		Page 14	

RNGN S

Solid CBN



Size 06 | 09 | 12

Page 16

TNGA Z3 | Z6

Multiple Tips

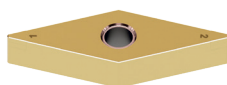


Size 16

Page 12

VNGA Z2

Multiple Tips

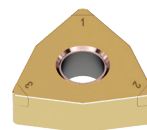


Size 16

Page 12

WNGA Z3 | Z6

Multiple Tips



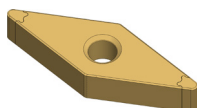
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VNGA Z4S

Solid Tips

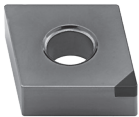
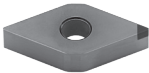
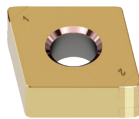
NEW



Size 16

Page 14

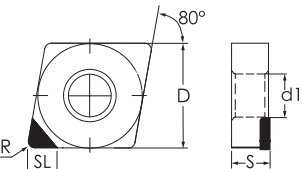
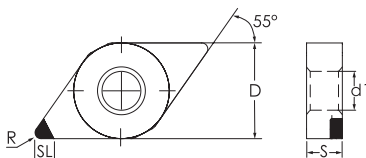
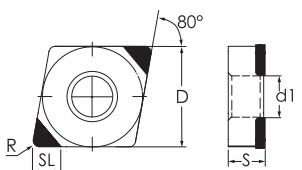
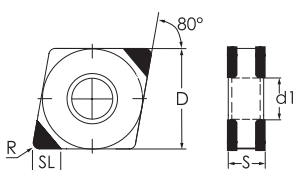
Inserts Negative

				K	H	
		⁽²⁾ Grade code		S4	Y5	Y4
Inserts Pastilhas Plaquetas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBH920	PBY603	PBY620
 CNGA Z1	1124300	CNGA 120404-S2513 Z1	CNGA 431-S2513 Z1	○		
	1124111	CNGA 120408-S2513 Z1	CNGA 432-S2513 Z1	⊗		
	1124301	CNGA 120412-S2513 Z1	CNGA 433-S2513 Z1	○		
	1124302	CNGA 120416-S2513 Z1	CNGA 434-S2513 Z1	○		
 DNGA Z1	1124306	DNGA 150404-S2513 Z1	DNGA 431-S2513 Z1	○		○
	1124112	DNGA 150408-S2513 Z1	DNGA 432-S2513 Z1	⊗		○
	1124536	DNGA 150412-S2513 Z1	DNGA 433-S2513 Z1	○		○
	1124307	DNGA 150608-S2513 Z1	DNGA 442-S2513 Z1	○		
	1124308	DNGA 150612-S2513 Z1	DNGA 443-S2513 Z1	○		
 CNGA Z2	1124343	CNGA 120402-S2513 Z2	CNGA 431.5-S2513 Z2	○		
	1124344	CNGA 120404-S2513 Z2	CNGA 431-S2513 Z2	⊗	⊗	⊗
	1124175	CNGA 120408-S2513 Z2	CNGA 432-S2513 Z2	⊗	⊗	⊗
	1124568	CNGA 120408-S3515 Z2	CNGA 432-S3515 Z2			⊗
	1124468	CNGA 120412-S2513 Z2	CNGA 433-S2513 Z2	⊗	⊗	⊗
	1124569	CNGA 120412-S3515 Z2	CNGA 433-S3515 Z2			○
 CNGA Z4	1124474	CNGA 120404-S2513 Z4	CNGA 431-S2513 Z4		⊗	○
	1124692	CNGA 120408-S1513 Z4	CNGA 432-S1513 Z4		○	
	1124134	CNGA 120408-S2513 Z4	CNGA 432-S2513 Z4	○	⊗	○
	1124570	CNGA 120408-S3515 Z4	CNGA 432-S3515 Z4			○
	1124475	CNGA 120412-S2513 Z4	CNGA 433-S2513 Z4		⊗	○
	1124571	CNGA 120412-S3515 Z4	CNGA 433-S3515 Z4			○
 CNGA WG Z4	1124534	CNGA 120404-S1513 WG Z4	CNGA 431-S1513 WG Z4		○	○
	1124535	CNGA 120404-S2513 WG Z4	CNGA 431-S2513 WG Z4		○	⊗
	1124517	CNGA 120408-S1513 WG Z4	CNGA 432-S1513 WG Z4		⊗	○
	1124518	CNGA 120408-S2513 WG Z4	CNGA 432-S2513 WG Z4		⊗	⊗

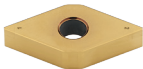
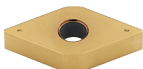
⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

Dimensions (mm) Dimensões (mm) Dimenciones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
1	12,70	4,76	0,40	5,16	2,50	0,15	0,08	0,50	0,08	0,05	0,20	
1	12,70	4,76	0,80	5,16	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
1	12,70	4,76	1,20	5,16	2,30	0,25	0,08	0,50	0,12	0,08	0,30	
1	12,70	4,76	1,60	5,16	2,20	0,30	0,05	0,50	0,15	0,08	0,30	
1	12,70	4,76	0,40	5,16	2,50	0,15	0,08	0,50	0,08	0,05	0,20	
1	12,70	4,76	0,80	5,16	2,50	0,20	0,08	0,50	0,10	0,08	0,30	
1	12,70	4,76	1,20	5,16	2,20	0,25	0,08	0,50	0,12	0,08	0,30	
1	12,70	6,35	0,80	5,16	2,50	0,20	0,08	0,50	0,10	0,08	0,30	
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2	12,70	4,76	0,80	5,16	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
2	12,70	4,76	0,80	5,16	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
2	12,70	4,76	1,20	5,16	2,30	0,25	0,08	0,50	0,12	0,08	0,30	
2	12,70	4,76	1,20	5,16	2,30	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	4,76	0,40	5,16	2,50	0,15	0,08	0,40	0,08	0,05	0,20	
4	12,70	4,76	0,80	5,16	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	4,76	0,80	5,16	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	4,76	0,80	5,16	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	4,76	1,20	5,16	2,30	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	4,76	1,20									

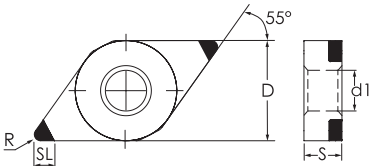
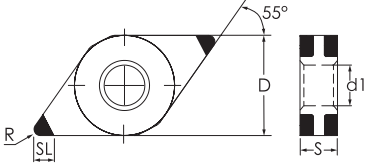
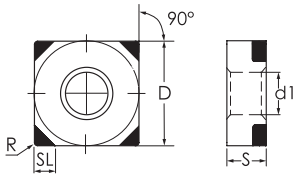
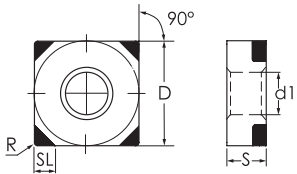
Inserts Negative

				K	H	
		⁽²⁾ Grade code		S4	Y5	Y4
Inserts Pastilhas Plaquitas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBH920	PBY603	PBY620
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	1124615	DNGA 110408-S2513 Z2	DNGA 332-S2513 Z2		⊗	⊗
	1124617	DNGA 110412-S2513 Z2	DNGA 333-S2513 Z2		⊗	⊗
	1124482	DNGA 150404-S2513 Z2	DNGA 431-S2513 Z2		⊗	⊗
	1124483	DNGA 150408-S2513 Z2	DNGA 432-S2513 Z2		⊗	⊗
	1124537	DNGA 150412-S2513 Z2	DNGA 433-S2513 Z2		○	⊗
	1124348	DNGA 150604-S2513 Z2	DNGA 441-S2513 Z2	⊗	⊗	⊗
	1124177	DNGA 150608-S2513 Z2	DNGA 442-S2513 Z2	⊗	⊗	⊗
	1124572	DNGA 150608-S3515 Z2	DNGA 442-S3515 Z2			○
	1124377	DNGA 150612-S2513 Z2	DNGA 443-S2513 Z2	⊗	⊗	⊗
 DNGA Z4	1124573	DNGA 150612-S3515 Z2	DNGA 443-S3515 Z2			○
	1124479	DNGA 150604-S2513 Z4	DNGA 441-S2513 Z4		⊗	○
	1124133	DNGA 150608-S2513 Z4	DNGA 442-S2513 Z4		⊗	○
	1124575	DNGA 150608-S3515 Z4	DNGA 442-S3515 Z4			○
	1124480	DNGA 150612-S2513 Z4	DNGA 443-S2513 Z4		⊗	○
	1124576	DNGA 150612-S3515 Z4	DNGA 443-S3515 Z4			○
 SNGA Z4	1124178	SNGA 120404-S2513 Z4	SNGA 431-S2513 Z4	○	○	⊗
	1124538	SNGA 120404-T2513 Z4	SNGA 431-T2513 Z4	○		
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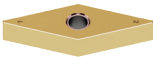
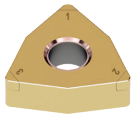
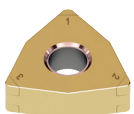
⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

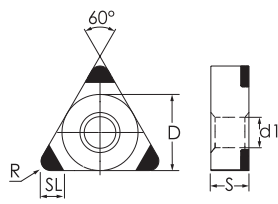
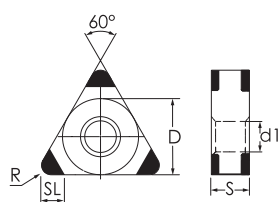
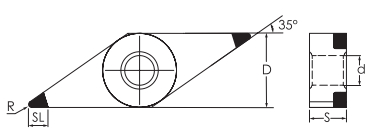
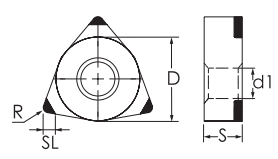
Dimensions (mm) Dimensões (mm) Dimensiones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
2	9,525	4,76	0,40	3,81	2,5	0,1	0,08	0,4	0,08	0,05	0,20	
2	9,525	4,76	0,80	3,81	2,0	0,15	0,08	0,4	0,10	0,08	0,30	
2	9,525	4,76	1,20	3,81	2,0	0,2	0,08	0,4	0,15	0,08	0,30	
2	12,70	4,76	0,40	5,16	2,50	0,15	0,08	0,50	0,08	0,05	0,20	
2	12,70	4,76	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
2	12,70	4,76	1,20	5,16	2,20	0,25	0,08	0,50	0,12	0,08	0,30	
2	12,70	6,35	0,40	5,16	2,50	0,15	0,08	0,50	0,08	0,05	0,20	
2	12,70	6,35	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
2	12,70	6,35	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
2	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
2	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
2	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	6,35	0,40	5,16	2,50	0,15	0,08	0,40	0,08	0,05	0,20	
4	12,70	6,35	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	6,35	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	6,35	1,20	5,16	2,00	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	4,76	0,40	5,16	2,40	0,15	0,08	0,40	0,08	0,05	0,20	
4	12,70	4,76	0,40	5,16	2,40	0,15	0,08					

Inserts Negative

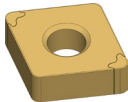
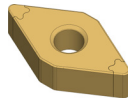
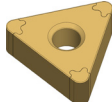
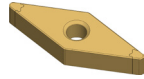
				K	H	
		⁽²⁾ Grade code		S4	Y5	Y4
Inserts Pastilhas Plaquitas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBH920	PBY603	PBY620
 TNGA Z3	1124357	TNGA 160404-S2513 Z3	TNGA 331-S2513 Z3	○	⊗	⊗
	1124179	TNGA 160408-S2513 Z3	TNGA 332-S2513 Z3	○	⊗	⊗
	1124579	TNGA 160408-S3515 Z3	TNGA 332-S3515 Z3			○
	1124469	TNGA 160412-S2513 Z3	TNGA 333-S2513 Z3	○	⊗	⊗
	1124746	TNGA 160412-S3515 Z3	TNGA 333-S3515 Z3			⊗
	1124603	TNGA 160416-S2513 Z3	TNGA 334-S2513 Z3		⊗	⊗
	1124604	TNGA 160420-S2513 Z3	TNGA 335-S2513 Z3		⊗	⊗
 TNGA Z6	1124477	TNGA 160404-S2513 Z6	TNGA 331-S2513 Z6	⊗	⊗	○
	1124097	TNGA 160408-S2513 Z6	TNGA 332-S2513 Z6	⊗	⊗	○
	1124581	TNGA 160408-S3515 Z6	TNGA 332-S3515 Z6			○
	1124478	TNGA 160412-S2513 Z6	TNGA 333-S2513 Z6		⊗	○
	1124582	TNGA 160412-S3515 Z6	TNGA 333-S3515 Z6			○
 VNGA Z2	1124361	VNGA 160402-S2513 Z2	VNGA 331.5-S2513 Z2	○		
	1124163	VNGA 160404-S2513 Z2	VNGA 331-S2513 Z2	○	⊗	⊗
	1124098	VNGA 160408-S2513 Z2	VNGA 332-S2513 Z2	○	⊗	⊗
	1124470	VNGA 160412-S2513 Z2	VNGA 333-S2513 Z2	○	⊗	⊗
 WNGA Z3	1124471	WNGA 080404-S2513 Z3	WNGA 431-S2513 Z3	○	⊗	⊗
	1124472	WNGA 080408-S2513 Z3	WNGA 432-S2513 Z3	○	⊗	⊗
	1124583	WNGA 080408-S3515 Z3	WNGA 432-S3515 Z3			○
	1124473	WNGA 080412-S2513 Z3	WNGA 433-S2513 Z3	○	⊗	⊗
	1124584	WNGA 080412-S3515 Z3	WNGA 433-S3515 Z3			○
 WNGA Z6	1124589	WNGA 080404-S2513 Z6	WNGA 431-S2513 Z6		○	○
	1124588	WNGA 080408-S2513 Z6	WNGA 432-S2513 Z6		○	○
	1124585	WNGA 080408-S3515 Z6	WNGA 432-S3515 Z6			○
	1124587	WNGA 080412-S2513 Z6	WNGA 433-S2513 Z6		○	○
	1124586	WNGA 080412-S3515 Z6	WNGA 433-S3515 Z6			○

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Dimensions (mm) Dimensões (mm) Dimenciones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
3	9,53	4,76	0,40	3,81	2,30	0,15	0,08	0,50	0,08	0,05	0,20	
3	9,53	4,76	0,80	3,81	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
3	9,53	4,76	0,80	3,81	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
3	9,53	4,76	1,20	3,81	2,00	0,25	0,08	0,60	0,12	0,08	0,30	
3	9,53	4,76	1,20	3,81	2,00	0,25	0,08	0,60	0,12	0,08	0,30	
3	9,53	4,76	1,6	3,81	3,00	0,30	0,08	0,70	0,14	0,10	0,35	
3	9,53	4,73	2,0	3,81	3,00	0,35	0,10	0,55	0,16	0,10	0,40	
6	9,53	4,76	0,40	3,81	2,30	0,15	0,08	0,50	0,08	0,05	0,20	
6	9,53	4,76	0,80	3,81	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
6	9,53	4,76	0,80	3,81	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
6	9,53	4,76	1,20	3,81	2,00	0,25	0,08	0,60	0,12	0,08	0,30	
6	9,53	4,76	1,20	3,81	2,00	0,25	0,08	0,60	0,12	0,08	0,30	
2	9,53	4,76	0,20	3,81	3,00	0,13	0,08	0,50	0,05	0,05	0,20	
2	9,53	4,76	0,40	3,81	2,80	0,15	0,08	0,50	0,08	0,05	0,20	
2	9,53	4,76	0,80	3,81	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	4,76	1,20	3,81	1,90	0,25	0,08	0,50	0,12	0,08	0,30	
3	12,70	4,76	0,40	5,16	2,30	0,15	0,08	0,40	0,08	0,05	0,20	
3	12,70	4,76	0,80	5,16	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
3	12,70	4,76	0,80	5,16	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
3	12,70											

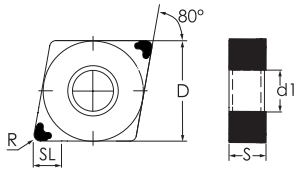
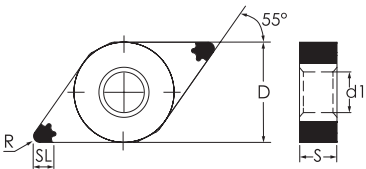
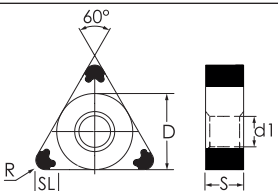
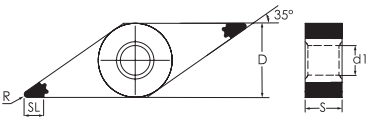
Inserts Negative

				H
		⁽²⁾ Grade code		4C
Inserts Pastilhas Plaquetas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBY625
NEW  CNGA Z4S	1124982	CNGA 120404-S2515 Z4S	CNGA 431-S2515 Z4S	○
	1124983	CNGA 120408-S2515 Z4S	CNGA 432-S2515 Z4S	⊗
	1124804	CNGA 120412-S2515 Z4S	CNGA 433-S2515 Z4S	⊗
NEW  DNGA Z4S	1124992	DNGA 110404-S2515 Z4S	DNGA 331-S2515 Z4S	○
	1124993	DNGA 110408-S2515 Z4S	DNGA 332-S2515 Z4S	⊗
	1124994	DNGA 110412-S2515 Z4S	DNGA 333-S2515 Z4S	⊗
	1124986	DNGA 150404-S2515 Z4S	DNGA 431-S2515 Z4S	○
	1124987	DNGA 150408-S2515 Z4S	DNGA 432-S2515 Z4S	○
	1124988	DNGA 150412-S2515 Z4S	DNGA 433-S2515 Z4S	○
	1124989	DNGA 150604-S2515 Z4S	DNGA 441-S2515 Z4S	○
	1124990	DNGA 150608-S2515 Z4S	DNGA 442-S2515 Z4S	⊗
NEW  TNGA Z6S	1124984	TNGA 160404-S2515 Z6S	TNGA 331-S2515 Z6S	○
	1124985	TNGA 160408-S2515 Z6S	TNGA 332-S2515 Z6S	⊗
	1124836	TNGA 160412-S2515 Z6S	TNGA 333-S2515 Z6S	⊗
NEW  VNGA Z4S	1124995	VNGA 160404-S2515 Z4S	VNGA 331-S2515 Z4S	○
	1124996	VNGA 160408-S2515 Z4S	VNGA 332-S2515 Z4S	⊗
	1124997	VNGA 160412-S2515 Z4S	VNGA 333-S2515 Z4S	⊗

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

Dimensions (mm) Dimensões (mm) Dimensiones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
4	12,70	4,76	0,40	5,16	2,20	0,15	0,08	0,50	0,08	0,05	0,20	
4	12,70	4,76	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	4,76	1,20	5,16	2,0	0,25	0,08	0,50	0,12	0,08	0,30	
4	9,525	4,76	0,40	3,81	2,20	0,1	0,08	0,4	0,08	0,05	0,20	
4	9,525	4,76	0,80	3,81	2,10	0,15	0,08	0,4	0,10	0,08	0,30	
4	9,525	4,76	1,20	3,81	2,0	0,2	0,08	0,4	0,15	0,08	0,30	
4	12,70	4,76	0,40	5,16	2,20	0,15	0,08	0,50	0,08	0,05	0,20	
4	12,70	4,76	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	4,76	1,20	5,16	2,0	0,25	0,08	0,50	0,12	0,08	0,30	
4	12,70	6,35	0,40	5,16	2,20	0,15	0,08	0,40	0,08	0,05	0,20	
4	12,70	6,35	0,80	5,16	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	12,70	6,35	1,20	5,16	2,0	0,25	0,08	0,50	0,12	0,08	0,30	
6	9,53	4,76	0,40	3,81	2,20	0,15	0,08	0,50	0,08	0,05	0,20	
6	9,53	4,76	0,80	3,81	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
6	9,53	4,76	1,20	3,81	2,0	0,25	0,08	0,60	0,12	0,08	0,30	
4	9,53	4,76	0,40	3,81	2,20	0,15	0,08	0,50	0,08	0,05	0,20	
4	9,53	4,76	0,80	3,81	2,10	0,20	0,08	0,50	0,10	0,08	0,30	
4	9,53	4,76	1,20	3,81	2,0	0,25	0,08	0,50	0,12	0,08	0,30	

Inserts Negative

				H	
		⁽²⁾ Grade code		W3	W4
Inserts Pastilhas Plaquetas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBY930	PBY940
 RNGN S	1124631	RNGN 060300-S2020 S	RNGN 220-S2020 S	○	⊗
	1124630	RNGN 090300-S2020 S	RNGN 320-S2020 S	○	⊗
	1124629	RNGN 120300-S2020 S	RNGN 420-S2020 S	○	⊗
	1124699	RNGN 120400-S2020 S	RNGN 430-S2020 S	○	⊗

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

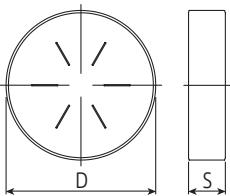
Reground Inserts

		H	
		W3	W4
Repair Code	Reference Referência Referencia	PBY930	PBY940
3120072	RNGN 06 (2.18) 00-S2020S (0603)	○	○
3120058	RNGN 060200-S2020 S (0903)	○	○
3120068	RNGN 060300-S2020 S (0903)	○	○
3120071	RNGN 060300-S2020 S (1203)	○	○
3120057	RNGN 090300-S2020 S (1203)	○	○
3120070	RNGN 090400-S2020 S (1204)	○	○
3120056	RNGN 120300-S2020 S (1204)	○	○

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

Dimensions (mm) Dimensões (mm) Dimensiones (mm)		Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
D	S	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
6,35	3,18	0,15	0,08	0,50	0,12	0,08	0,30	
9,53	3,18	0,20	0,08	0,50	0,15	0,08	0,30	
12,70	3,18	0,30	0,08	0,50	0,20	0,08	0,30	
12,70	4,76	0,30	0,08	0,50	0,20	0,08	0,30	

Final Dimensions (mm)		Raw Material
D	S	
6,35	2,18	RNGN 060300-S2020 S
6,35	2,38	RNGN 090300-S2020 S
6,35	3,18	RNGN 090300-S2020 S
6,35	3,18	RNGN 120300-S2020 S
9,53	3,18	RNGN 120300-S2020 S
9,53	4,76	RNGN 120400-S2020 S
12,70	3,18	RNGN 120400-S2020 S

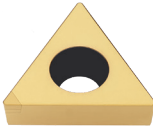
Overview

Positive Inserts Overview

Vista genérica pastilhas positivas | Visión general de plaquitas positivas

TPGW Z1

Single Tip



Size 11
Page 20

CCGW Z2

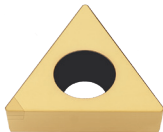
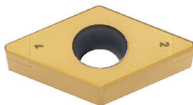
Multiple Tips

DCGW Z2

Multiple Tips

TCGW | TPGW Z3

Multiple Tips



Size 06 09	Size 07 11	Size 09 11
Page 18	Page 18	Page 20

VBGW Z2
Multiple Tips



Size 11 | 16

Page 20

VCGW Z2
Multiple Tips



Size 16

Page 20

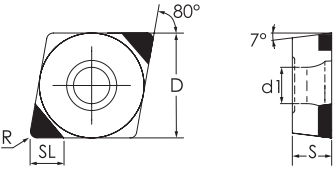
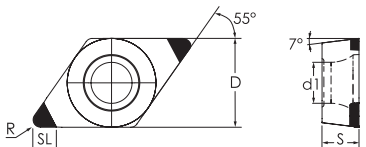
Inserts Positive

				H	
		⁽²⁾ Grade code		Y5	Y4
Inserts Pastilhas Plaquetas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBY603	PBY620
 CCGW Z2	1124605	CCGW 060202-S1513 Z2	CCGW 21.50.5-S1513 Z2	⊗	⊗
	1124635	CCGW 060202-S2513 Z2	CCGW 21.50.5-S2513 Z2	⊗	⊗
	1124606	CCGW 060204-S1513 Z2	CCGW 21.51-S1513 Z2	⊗	⊗
	1124555	CCGW 060204-S2513 Z2	CCGW 21.51-S2513 Z2	⊗	⊗
	1124607	CCGW 060208-S1513 Z2	CCGW 21.52-S1513 Z2	⊗	⊗
	1124636	CCGW 060208-S2513 Z2	CCGW 21.52-S2513 Z2	⊗	⊗
	1124638	CCGW 09T302-S2513 Z2	CCGW 32.50.5-S2513 Z2	⊗	⊗
	1124640	CCGW 09T304-S2513 Z2	CCGW 32.51-S2513 Z2	⊗	⊗
	1124632	CCGW 09T308-S2513 Z2	CCGW 32.52-S2513 Z2	⊗	⊗
	1124637	CCGW 09T302-S2513 WG Z2	CCGW 32.50.5-S2513 WG Z2	○	○
	1124639	CCGW 09T304-S2513 WG Z2	CCGW 32.51-S2513 WG Z2	⊗	⊗
	1124641	CCGW 09T308-S2513 WG Z2	CCGW 32.52-S2513 WG Z2	⊗	⊗
	1124608	CCGW 09T302-S1513 Z2	CCGW 32.50.5-S1513 Z2	⊗	⊗
	1124609	CCGW 09T304-S1513 Z2	CCGW 32.51-S1513 Z2	⊗	⊗
	1124610	CCGW 09T308-S1513 Z2	CCGW 32.52-S1513 Z2	⊗	⊗
 DCGW Z2	1124642	DCGW 070202-S1513 Z2	DCGW 21.50.5-S1513 Z2	⊗	○
	1124611	DCGW 070202-S2513 Z2	DCGW 21.50.5-S2513 Z2	⊗	⊗
	1124643	DCGW 070204-S1513 Z2	DCGW 21.51-S1513 Z2	⊗	○
	1124436	DCGW 070204-S2513 Z2	DCGW 21.51-S2513 Z2	⊗	⊗
	1124644	DCGW 070208-S1513 Z2	DCGW 21.52-S1513 Z2	○	○
	1124612	DCGW 070208-S2513 Z2	DCGW 21.52-S2513 Z2	⊗	⊗
	1124613	DCGW 11T302-S2513 Z2	DCGW 32.50.5-S2513 Z2	⊗	⊗
	1124554	DCGW 11T304-S2513 Z2	DCGW 32.51-S2513 Z2	⊗	⊗
	1124744	DCGW 11T304-S3515 Z2	DCGW 32.51-S3515 Z2		⊗
	1124614	DCGW 11T308-S2513 Z2	DCGW 32.52-S2513 Z2	⊗	⊗
	1124745	DCGW 11T308-S3515 Z2	DCGW 32.52-S3515 Z2		⊗
	1124645	DCGW 11T302-S1513 Z2	DCGW 32.50.5-S1513 Z2	⊗	○
	1124647	DCGW 11T304-S1513 Z2	DCGW 32.51-S1513 Z2	⊗	○
	1124649	DCGW 11T308-S1513 Z2	DCGW 32.52-S1513 Z2	⊗	○

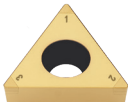
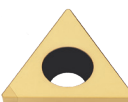
⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

Dimensions (mm) Dimensões (mm) Dimenciones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
2	6,35	2,38	0,20	2,80	2,00	0,15	0,05	0,20	0,08	0,05	0,20	
2	6,35	2,38	0,20	2,80	2,40	0,15	0,05	0,20	0,08	0,05	0,20	
2	6,35	2,38	0,40	2,80	2,00	0,15	0,05	0,40	0,08	0,05	0,25	
2	6,35	2,38	0,40	2,80	2,00	0,15	0,05	0,40	0,08	0,05	0,25	
2	6,35	2,38	0,80	2,80	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	6,35	2,38	0,80	2,80	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,20	4,40	2,50	0,15	0,05	0,20	0,08	0,05	0,20	
2	9,53	3,97	0,40	4,40	2,50	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,80	4,40	2,50	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,20	4,40	2,40	0,15	0,05	0,20	0,08	0,05	0,20	
2	9,53	3,97	0,40	4,40	2,40	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,80	4,40	2,40	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,20	4,40	2,00	0,15	0,05	0,20	0,08	0,05	0,20	
2	9,53	3,97	0,40	4,40	2,00	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	6,35	2,38	0,20	2,80	2,50	0,15	0,08	0,20	0,08	0,05	0,20	
2	6,35	2,38	0,20	2,80	2,00	0,15	0,08	0,20	0,08	0,05	0,20	
2	6,35	2,38	0,40	2,80	2,50	0,15	0,08	0,40	0,08	0,05	0,25	
2	6,35	2,38	0,40	2,80	2,40	0,15	0,08	0,40	0,08	0,05	0,25	
2	6,35	2,38	0,80	2,80	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	6,35	2,38	0,80	2,80	2,50	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,20	4,40	2,70	0,15	0,08	0,20	0,08	0,05	0,20	
2	9,53	3,97	0,40	4,40	2,50	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,40	4,40	2,50	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	3,97	0,20	4,40	2,70	0,15	0,08	0,20	0,08	0,05	0,20	
2	9,53	3,97	0,40	4,40	2,50	0,20	0,08	0,40	0,10	0,05	0,25	
2	9,53	3,97	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	

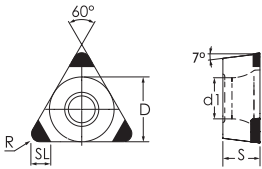
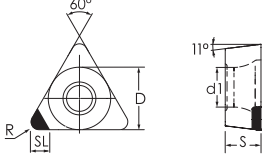
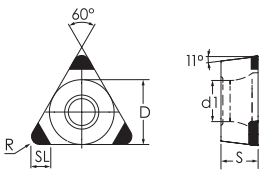
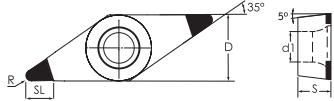
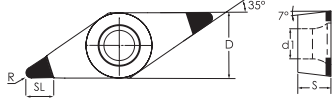
Inserts Positive

				H	
		⁽²⁾ Grade code		Y5	Y4
Inserts Pastilhas Plaquetas	⁽¹⁾ Geometry code	ISO Reference	ANSI Reference	PBY603	PBY620
 TCGW Z3	1124715	TCGW 110204-S2513 Z3	TCGW 21.51-S2513 Z3	○	
	1124434	TCGW 16T304-S2513 Z3	TCGW 32.51-S2513 Z3	⊗	⊗
	1124651	TCGW 16T308-S2513 Z3	TCGW 32.52-S2513 Z3	⊗	⊗
 TPGW Z1	1124657	TPGW 110302-S2513 Z1	TPGW 220.5-S2513 Z1	○	○
	1124660	TPGW 110304-S2513 Z1	TPGW 221-S2513 Z1	⊗	○
	1124598	TPGW 110308-S2513 Z1	TPGW 222-S2513 Z1	⊗	⊗
 TPGW Z3	1124652	TPGW 090202-S1513 Z3	TPGW 1.81.50.5-S1513 Z3	⊗	○
	1124653	TPGW 090202-S2513 Z3	TPGW 1.81.50.5-S2513 Z3	⊗	○
	1124654	TPGW 090204-S1513 Z3	TPGW 1.81.51-S1513 Z3	⊗	○
	1124655	TPGW 090204-S2513 Z3	TPGW 1.81.51-S2513 Z3	⊗	⊗
	1124658	TPGW 110302-S2513 Z3	TPGW 220.5-S2513 Z3	⊗	⊗
	1124661	TPGW 110304-S2513 Z3	TPGW 221-S2513 Z3	⊗	⊗
	1124663	TPGW 110308-S2513 Z3	TPGW 222-S2513 Z3	○	⊗
	1124656	TPGW 110302-S1513 Z3	TPGW 220.5-S1513 Z3	⊗	○
	1124659	TPGW 110304-S1513 Z3	TPGW 221-S1513 Z3	⊗	○
 VBGW Z2	1124662	TPGW 110308-S1513 Z3	TPGW 222-S1513 Z3	○	○
	1124664	VBGW 110302-S2513 Z2	VBGW 220.5-S2513 Z2	⊗	⊗
	1124665	VBGW 110304-S2513 Z2	VBGW 221-S2513 Z2	⊗	⊗
	1124666	VBGW 110308-S2513 Z2	VBGW 222-S2513 Z2	○	⊗
	1124618	VBGW 160402-S2513 Z2	VBGW 330.5-S2513 Z2	⊗	⊗
	1124619	VBGW 160404-S2513 Z2	VBGW 331-S2513 Z2	⊗	⊗
	1124620	VBGW 160408-S2513 Z2	VBGW 332-S2513 Z2	⊗	⊗
	1124621	VBGW 160402-S1513 Z2	VBGW 330.5-S1513 Z2	⊗	⊗
	1124622	VBGW 160404-S1513 Z2	VBGW 331-S1513 Z2	⊗	⊗
 VCGW Z2	1124623	VBGW 160408-S1513 Z2	VBGW 332-S1513 Z2	⊗	⊗
	1124667	VCGW 160404-S2513 Z2	VCGW 331-S2513 Z2	⊗	⊗
	1124668	VCGW 160408-S2513 Z2	VCGW 332-S2513 Z2	⊗	⊗

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: ⁽¹⁾ Geometry code + ⁽²⁾ Grade code

Dimensions (mm) Dimensões (mm) Dimensiones (mm)						Cutting conditions Condições de corte Condiciones de corte						Technical drawing Desenho técnico Dibujo técnico
Z	D	S	R	d1	SL	ap (mm)	Min	Max	fn (mm/r)	Min	Max	
3	6,35	2,38	0,20	4,40	2,50	0,15	0,08	0,40	0,08	0,05	0,20	
3	9,53	3,97	0,40	4,40	2,50	0,15	0,08	0,45	0,08	0,05	0,20	
3	9,53	3,97	0,80	4,40	2,00	0,20	0,08	0,45	0,10	0,08	0,30	
1	6,35	3,18	0,20	2,80	2,40	0,15	0,08	0,20	0,08	0,05	0,15	
1	6,35	3,18	0,40	2,80	2,30	0,15	0,08	0,40	0,08	0,05	0,20	
1	6,35	3,18	0,80	2,80	2,40	0,20	0,08	0,45	0,10	0,08	0,20	
3	5,56	2,38	0,20	2,50	2,50	0,10	0,08	0,20	0,08	0,05	0,15	
3	5,56	2,38	0,20	2,50	2,50	0,10	0,05	0,20	0,08	0,05	0,15	
3	5,56	2,38	0,40	2,50	2,30	0,15	0,08	0,40	0,08	0,05	0,15	
3	5,56	2,38	0,40	2,50	2,30	0,15	0,08	0,40	0,08	0,05	0,15	
3	6,35	3,18	0,20	2,80	2,40	0,15	0,08	0,20	0,08	0,05	0,15	
3	6,35	3,18	0,40	2,80	2,30	0,15	0,08	0,40	0,08	0,05	0,20	
3	6,35	3,18	0,80	2,80	2,00	0,20	0,08	0,50	0,10	0,08	0,20	
3	6,35	3,18	0,20	2,80	2,40	0,15	0,08	0,20	0,08	0,05	0,15	
3	6,35	3,18	0,40	2,80	2,30	0,15	0,08	0,40	0,08	0,05	0,20	
3	6,35	3,18	0,80	2,80	2,00	0,20	0,08	0,50	0,10	0,08	0,20	
2	6,35	3,18	0,20	2,80	3,20	0,10	0,08	0,20	0,05	0,05	0,15	
2	6,35	3,18	0,40	2,80	2,80	0,15	0,08	0,40	0,08	0,05	0,20	
2	6,35	3,18	0,80	2,80	2,00	0,15	0,08	0,50	0,10	0,08	0,25	
2	9,53	4,76	0,20	4,40	2,00	0,10	0,08	0,20	0,08	0,05	0,15	
2	9,53	4,76	0,40	4,40	2,00	0,15	0,08	0,40	0,08	0,05	0,20	
2	9,53	4,76	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	4,76	0,20	4,40	2,00	0,10	0,08	0,20	0,08	0,05	0,15	
2	9,53	4,76	0,40	4,40	2,00	0,15	0,08	0,40	0,08	0,05	0,20	
2	9,53	4,76	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	
2	9,53	4,76	0,40	4,40	2,80	0,15	0,08	0,40	0,08	0,05	0,20	
2	9,53	4,76	0,80	4,40	2,00	0,20	0,08	0,50	0,10	0,08	0,30	

PCBN Turning

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