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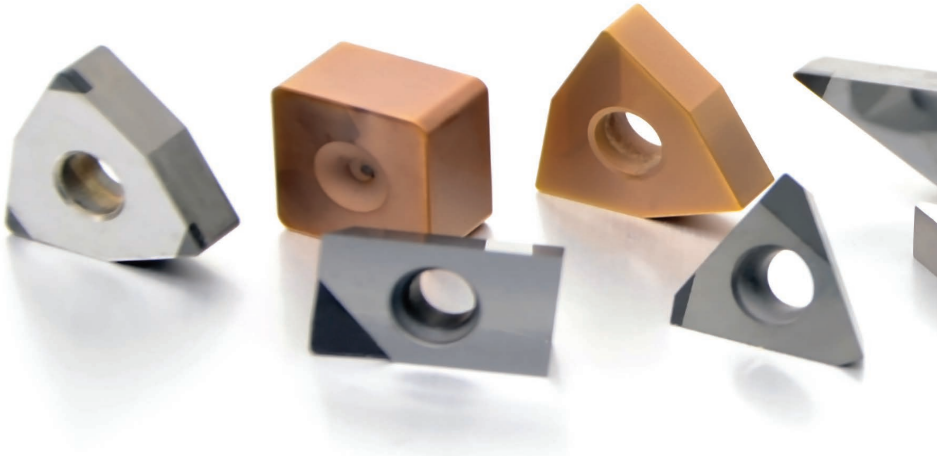


CONTENTS

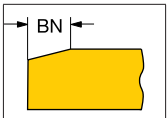
CODE KEY

C N M A 12 04 08 S 02

INSERT SHAPE

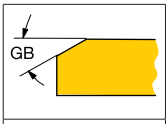
C	
D	
K	
R	
S	
T	
V	
W	

CHAMFER WIDTH



010 BN = 0.10
015 BN = 0.15
020 BN = 0.20
025 BN = 0.25
070 BN = 0.70
150 BN = 1.50
200 BN = 2.00

CHAMFER ANGLE



15 GB = 15°
20 GB = 20°
25 GB = 25°
30 GB = 30°
35 GB = 35°

WIPER GEOMETRY

WG	Wiper geometry for general purpose machining Allows high feed rates in HPT Suitable for finish machining of GCI
WH	Wiper geometry optimized for HPT Low cutting forces for superior surface finish Designed for peak performance at HPT finishing feed rates

C	N	M	A	12	04	08	S	02	15	
ISO TURNING INSERT CODES							EDGE PREPARATION	CHAMFER WIDTH	CHAMFER ANGLE	
							SEE PAGE 8	SEE PAGE 9		

NICHE INSERT ICONS

−	Refers to a Negative Insert
+	Refers to a Positive Insert

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GRADES

NBT TYPE PCBN INSERTS

Continues Cut ● Light Interrupted ◔ Heavy Interrupted ✹

Grade	Application		Coolant	Work Piece	m/min.	Features
NB7510	Finish/Semi-finish	◔	Y/N	Cast Iron	600–1200	IMPACT RESISTANCE ↑ / WEAR RESISTANCE ↓
NB7520	Finish/Semi-finish	◔	Y/N	Cast Iron	600–1200	
				PM	100–300	
NB7530	Semi-finish/Rough	◔	N	PM	100–300	
NB9540	Finish/Semi-finish	●	Y/N	Hardened Steel	180–300	
NB9550	Finish/Semi-finish	◔	Y/N	Carburized Steel	100–175	
NB9560	Semi-finish/Rough	✹	N	Carburized Steel	100–200	

NBC/NBS TYPE PCBN INSERTS

Grade	Application		Coolant	Work Piece	m/min.	Features
NB7000	Finish/Semi-finish	◔	N	Cast Iron	400–1000	IMPACT RESISTANCE ↑ / WEAR RESISTANCE ↓
				Hardened Steel	90–140	
NB7200	Finish	●	Y/N	Cast Iron	100–1200	
NB7600	Finish/Semi-finish	◔	N	Cast Iron	400–1000	
				Hardened Steel	25–80	
NB9500	Finish/Semi-finish	◔	Y/N	Hardened Steel	100–150	

W	FV	2	NBT	C	9550
WIPER	CHIP BREAKER	NO. OF CUTTING EDGES	CBN TYPE	COATING	GRADE
			NBT Tipped PCBN	Default Uncoated	
			NBC Cornered PCBN	C With coating	
			NBS Solid PCBN		

P C B N

POLYCRYSTALLINE CUBIC BORON NITRIDE

PCBN is a synthesis of CBN powder and special binder under ultra-high pressure and high temperature conditions. PCBN has high hardness, high thermal stability and high chemical inertness. Best suited to machining in hardened steel with hardness above HRC45 (eg carbon tool steel, bearing steel and die steel), gray cast iron, high hardness cast iron, Ni-based, Cobased, and Fe-based superalloy.

GRINDING VS. HARD TURNING

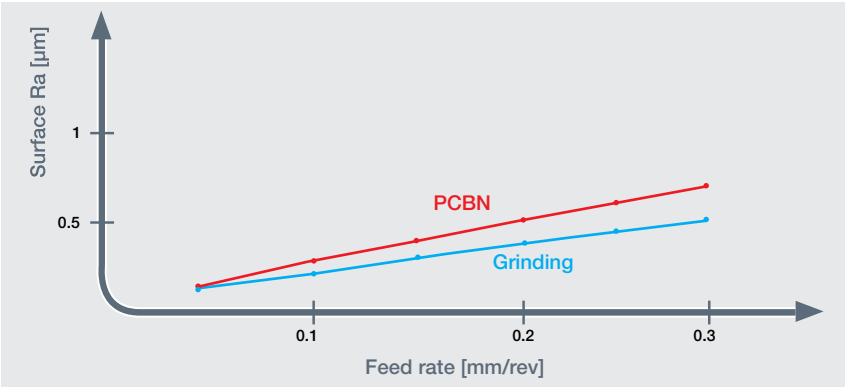
An important advantage in using PCBN inserts is that they can replace the slow and expensive grinding operations of hardened parts. Turning with PCBN inserts significantly reduces the cost per part when compared to grinding.

GRINDING

- Size tolerance specifications beyond the capability of turning
- Surface finish requirements too tight for hard turning

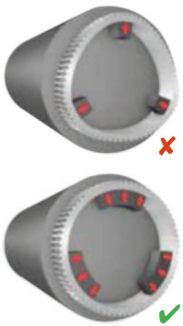
HARD TURNING

- Size tolerance specifications beyond the capability of turning
- Complex geometry makes single-point turning practical
- High metal removal rates
- Dry machining
- Faster machine setup
- Faster cycle times
- I.D. & O.D. machining on one machine



COMPONENT CLAMPING

Wide clamping jaws have more benefits compared to ordinary three point jaws. Thin walled components require extremely secure clamping. The component should be as close as possible to the spindle bearings. As a general guideline, a length-to-diameter ratio of 2:1 is recommended for work-pieces supported on one end only, with acceptable maximum of 4:1. Where there is additional tailstock support, the ratio can be extended to 8:1. Correct alignment of the headstock and tailstock also adds to the rigidity of the setup.



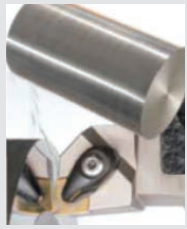
CARBIDE INSERTS ARE NOT SUITABLE FOR HPT

It's not advisable to use carbide inserts for hard part turning due to low chemical stability between carbide and the hard materials. The high pressure and high temperatures generated during HPT cause rapid wear and short tool life for the carbide insert.

HARD PART TURNING (HPT)

Hard part turning (HPT) applications are similar to standard turning applications: Continuous machining, Light interrupted cut, and a combination of continuous machining and light interrupted cut applications

- PCBN possesses high thermal conductivity with chemical stability at very high temperatures.
- Machining of hardened materials at high cutting parameters.
- PCBN's massive wear resistance ensures extended tool life, maintain dimensional tolerances and superior surface finish.
- The demand is growing exponentially as the use of hardened materials rises throughout the automotive, bearing, and die & mold industries.



CONTINUOUS CUT

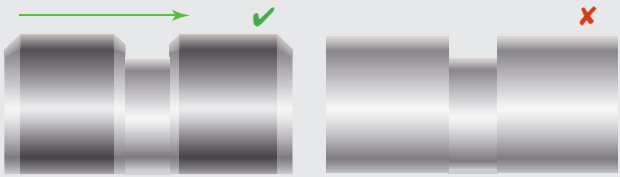
CONTINUOUS & INTERRUPTED CUT

INTERRUPTED CUT

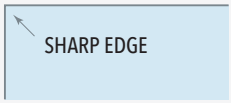
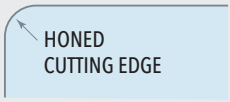
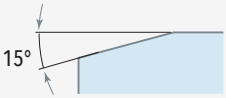
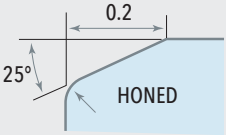
DESIGN AND PREPARATION

By carefully preparing the component in its soft (unhardened) state will be beneficial in the hard part turning process. Due to the small depths of cut used in hard part turning, tight dimensional tolerances in soft machining are key to achieving a consistent process. This delivers longer tool life and high quality components. The use of features such as chamfers and radii on the component will optimise entry and exit paths for maximum tool life. Points to remember when planning your soft machining conditions:

- Avoid burrs
- Keep close dimensional tolerances
- Chamfer and make radii in the soft state
- Do not enter or leave cut abruptly
- Enter or leave by programming radius movements



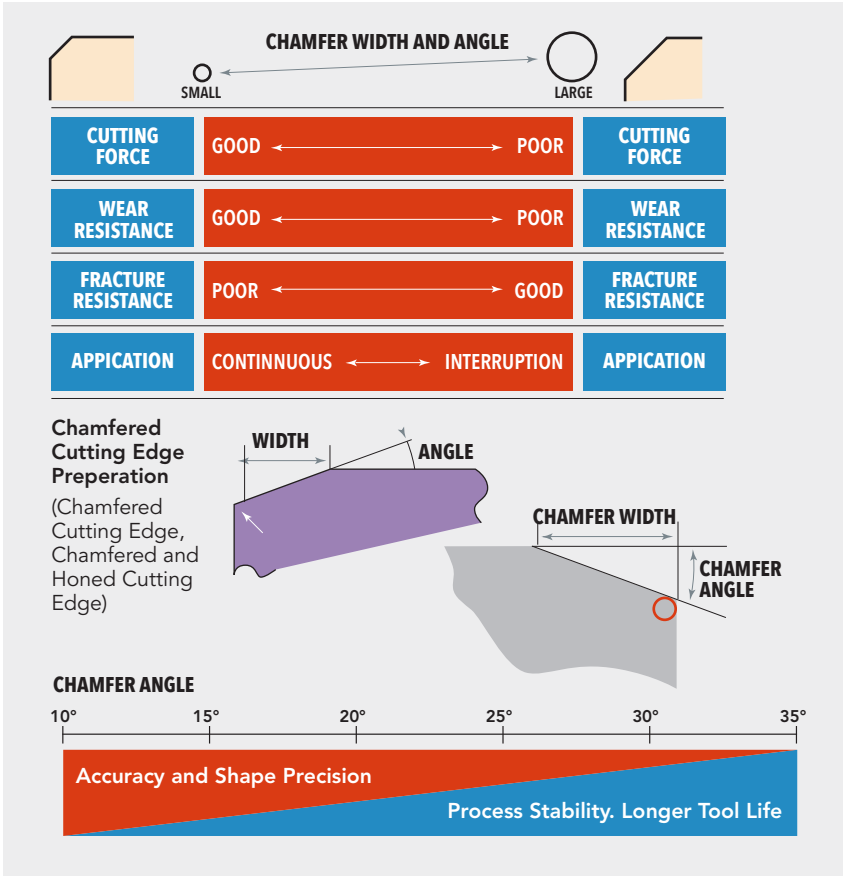
EDGE PREPARATION

Code	Description	Example		Features
F	**Sharp**	F	Sharp Edge 	• Generally not recommended on PCBN since the sharp edge can chip or break quickly • A sharp edge can be used when cutting forces need to be reduced due to unstable workpiece clamping or machine limitations"
E	**Honed**	E003	R0.003" Honed 	• Recommended for HRSA finishing operations • 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
T	**Chamfered**	T02015	0.2X15° Chamfered 	• T-land is a common edge preparation for CBN • Preferred choice for cast iron • Good alternative to S-land in hard part turning when reduced cutting forces and tighter tolerances are required"
S	**Chamfered + Honed**	S02025	0.2X25° Chamfered + Honed 	• 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

The combination of the nose radius and edge preparation has a significant influence on tool life, surface finish and integrity of the machined part. It is very important to select the chamfer size and edge condition best suited to your application.

FEATURES OF CHAMFER WIDTH $^{R}/_{L}$ ANGLE

In general, the strength of the cutting edge on CBN inserts increases with increasing chamfer angle and width, but also results in increased cutting forces and temperature.
A wide chamfer spreads the cutting forces over a larger area, which provides a more robust cutting edge, allowing for higher feed rates. Where process stability and consistent tool life are the most important factors, the best solution will be obtained using a large chamfer.
If surface finish and dimensional accuracy are the main requirements, a small chamfer will provide the best results.
Cutting forces and temperature will be reduced and there will be less vibration. In some cases, where surface finish is critical, a honed edge (E-land) can be beneficial, even though the tool life will be shorter.
Since hard part turning is usually employed as a finishing operation, it is necessary to find the optimum edge design which produces high quality components



CUTTING STRATEGY

When deciding between a one- or a two cut strategy, these factors must be considered:

- Machine capability
- What the most important process measures are.

ONE-CUT STRATEGY

With a high quality machine tool and a stable setup, a single cut can produce acceptable levels of surface quality and dimensional tolerance.

TWO-CUT STRATEGY

When the machine setup is unstable, if there is any inconsistency in the component or if a very high final tolerance or surface quality is required, a two-cut strategy is likely to be the best option.

TROUBLE SHOOTING

TOOL WEAR	SOLUTIONS
Flank wear	• Increase cutting speed. • Increase feed.
Crater wear	• Reduce cutting speed. • Increase feed.
Chipping	• Check stability, eliminate vibration. • Do not use coolant. • Use a stronger cutting edge; - S-edge geometry - Increase chamfer size (angle and /or width) - Use larger nose radius.
Cracking /fracture	• Use uncoated inserts. • Check stability, eliminate vibration. • Check/ replace shim. • Make sure tool is aligned to centre. • Do not use coolant. • Decrease feed. • Decrease depth of cut. • Use a stronger cutting edge; - S-edge geometry - Increase chamfer size (angle and /or width) - Use larger nose radius. - Use wiper.
Notch wear	• Increase speed. • Reduce feed. • Reduce/ vary depth of cut.

WET OR DRY MACHINING

Dry cutting is one of the key advantages of hard part turning. CBN inserts can tolerate cutting temperatures in excess of 1,000°C (1800°F). In general, the use of CBN in dry conditions has a positive effect on tool life, particularly in interrupted cutting.

WHEN COOLANT IS REQUIRED:

- To facilitate chip breaking
- To control the thermal stability of the workpiece
- To remove heat when machining big components

Coolant must always be applied as a consistent flow over the entire cutting length.

ELIMINATION OF COOLANT:

- Reduces costs
- Leads to easier chip handling
- Is more environmentally friendly

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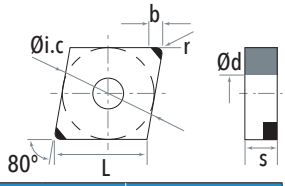
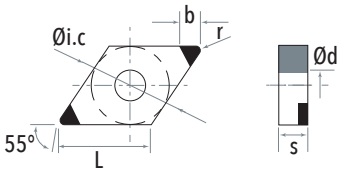
RHOMBIC 80°



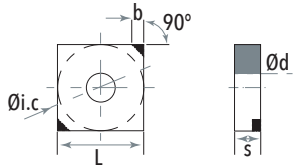
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
CNGA120402-2S	12	12,7	4,76	5,15	0,2	2,5	T01020 T02020 S01020 S02020
CNGA120404-2S	12	12,7	4,76	5,15	0,4	2,5	
CNGA120408-2S	12	12,7	4,76	5,15	0,8	2,3	
CNGA120412-2S	12	12,7	4,76	5,15	1,2	2,3	

RHOMBIC 55°



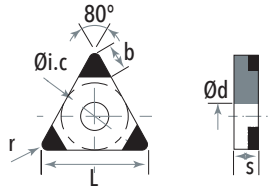
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
DNGA110402-2S	11	9,525	4,76	3,81	0,2	2,5	T01020 T02020 S01020 S02020
DNGA110404-2S	11	9,525	4,76	3,81	0,4	2,5	
DNGA110408-2S	11	9,525	4,76	3,81	0,8	2,1	
DNGA150402-2S	15	12,7	4,76	5,16	0,2	2,5	
DNGA150404-2S	15	12,7	4,76	5,16	0,4	2,5	
DNGA150408-2S	15	12,7	4,76	5,16	0,8	2,1	
DNGA150412-2S	15	12,7	4,76	5,16	1,2	1,8	

SQUARE



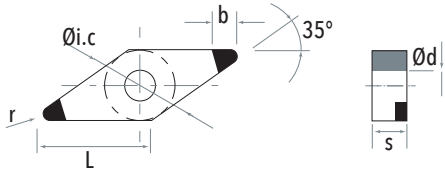
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
SNGA120402-2S	12	12,700	4,76	5,16	0,2	2,5	T01020 T02020 S01020 S02020
SNGA120404-2S	12	12,7	4,76	5,16	0,4	2,5	
SNGA120408-2S	12	12,7	4,76	5,16	0,8	2,3	
SNGA120412-2S	12	12,7	4,76	5,16	1,2	2,3	

TRIANGULAR 60°



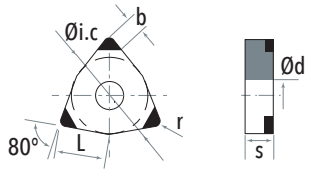
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
TNGA160402-3S	16	9,525	4,76	3,81	0,2	2,3	T01020 T02020 S01020 S02020
TNGA160404-3S	16	9,525	4,76	3,81	0,4	2,3	
TNGA160408-3S	16	9,525	4,76	3,81	0,8	2	
TNGA160412-3S	16	9,525	4,76	3,81	1,2	1,7	
TNGA160416-3S	16	9,525	4,76	3,81	1,6	1,5	

RHOMBIC 35°



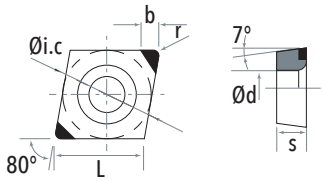
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
VNGA160402-2S	16	9,525	4,76	3,81	0,2	2,8	T01020 T02020 S01020 S02020
VNGA160404-2S	16	9,525	4,76	3,81	0,4	2,8	
VNGA160408-2S	16	9,525	4,76	3,81	0,8	2	
VNGA160412-2S	16	9,525	4,76	3,81	1,2	1,7	

TRIGON 80°



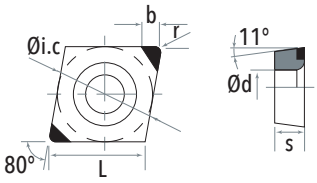
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
WNGA060402-3S	6	9,525	4,76	3,81	0,2	2,6	T01020 T02020 S01020 S02020
WNGA060404-3S	6	9,525	4,76	3,81	0,4	2,5	
WNGA060408-3S	6	9,525	4,76	3,81	0,8	2,3	
WNGA080402-3S	8	12,7	4,76	5,16	0,2	2,6	
WNGA080404-3S	8	12,7	4,76	5,16	0,4	2,5	
WNGA080408-3S	8	12,7	4,76	5,16	0,8	2,3	
WNGA080412-3S	8	12,7	4,76	5,16	1,2	2,2	

RHOMBIC 80°



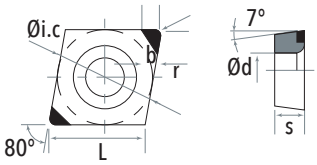
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
CCGW060202-2S	6	6,35	2,38	2,8	0,2	1,9	T01020 T02020 S01020 S02020
CCGW060204-2S	6	6,35	2,38	2,8	0,4	1,9	
CCGW060208-2S	6	6,35	2,38	2,8	0,8	1,7	
CCGW09T302-2S	9	9,525	3,97	4,4	0,2	2,5	
CCGW09T304-2S	9	9,525	3,97	4,4	0,4	2,5	
CCGW09T308-2S	9	9,525	3,97	4,4	0,8	2,3	
CCGW09T312-2S	9	9,525	3,97	4,4	1,2	2,2	
CCGW120402-2S	12	12,7	4,76	5,5	0,2	2,5	
CCGW120404-2S	12	12,7	4,76	5,5	0,4	2,5	
CCGW120408-2S	12	12,7	4,76	5,5	0,8	2,3	
CCGW120412-2S	12	12,7	4,76	5,5	1,2	2,2	

RHOMBIC 80°



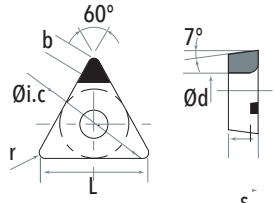
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
CPGW060202-2S	6	6,35	2,38	2,8	0,2	1,9	T01020 T02020 S01020 S02020
CPGW060204-2S	6	6,35	2,38	2,8	0,4	1,9	
CPGW060208-2S	6	6,35	2,38	2,8	0,8	1,7	
CPGW090302-2S	9	9,525	3,18	4,4	0,2	2,5	
CPGW090304-2S	9	9,525	3,18	4,4	0,4	2,5	
CPGW090308-2S	9	9,525	3,18	4,4	0,8	2,3	
CPGW090312-2S	9	9,525	3,18	4,4	1,2	2,2	
CPGW09T302-2S	9	9,525	3,97	4,4	0,2	2,5	
CPGW09T304-2S	9	9,525	3,97	4,4	0,4	2,5	
CPGW09T308-2S	9	9,525	3,97	4,4	0,8	2,3	
CPGW09T312-2S	9	9,525	3,97	4,4	1,2	2,2	

RHOMBIC 55°



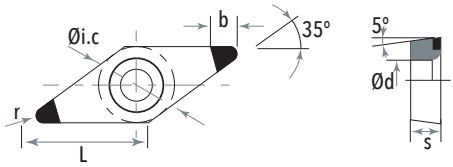
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
DCGW070202-2S	7	6,35	2,38	2,8	0,2	2,4	T01020 T02020 S01020 S02020
DCGW070204-2S	7	6,35	2,38	2,8	0,4	2,4	
DCGW070208-2S	7	6,35	2,38	2,8	0,8	2	
DCGW11T302-2S	11	9,525	3,97	4,4	0,2	2,4	
DCGW11T304-2S	11	9,525	3,97	4,4	0,4	2,4	
DCGW11T308-2S	11	9,525	3,97	4,4	0,8	2	

TRIANGULAR 60°



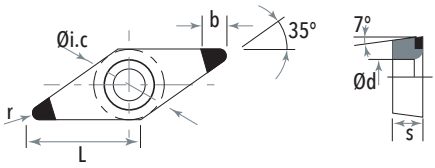
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
TCGW090202-3S	9	5,56	2,38	2,5	0,2	2,2	T01020 T02020 S01020 S02020
TCGW090204-3S	9	5,56	2,38	2,5	0,4	2,1	
TCGW090208-3S	9	5,56	2,38	2,5	0,8	1,8	
TCGW110202-3S	11	6,35	2,38	2,8	0,2	2,2	
TCGW110204-3S	11	6,35	2,38	2,8	0,4	2,1	
TCGW110208-3S	11	6,35	2,38	2,8	0,8	1,8	
TCGW110302-3S	11	6,35	3,18	2,8	0,2	2,2	
TCGW110304-3S	11	6,35	3,18	2,8	0,4	2,1	
TCGW110308-3S	11	6,35	3,18	2,8	0,8	1,8	
TCGW16T302-3S	16	9,525	3,97	4,4	0,2	2,2	
TCGW16T304-3S	16	9,525	3,97	4,4	0,4	2,1	
TCGW16T308-3S	16	9,525	3,97	4,4	0,8	1,8	
TCGW16T312-3S	16	9,525	3,97	4,4	1,2	1,5	

RHOMBIC 35°



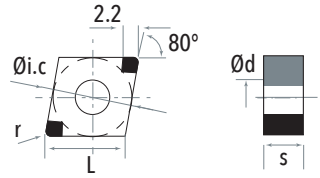
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
VBGW110302-2S	11	6,35	3,18	2,8	0,2	2,8	T01020 T02020 S01020 S02020
VBGW110304-2S	11	6,35	3,18	2,8	0,4	2,8	
VBGW110308-2S	11	6,35	3,18	2,8	0,8	2,0	
VBGW110312-2S	11	6,35	3,18	2,8	1,2	1,7	
VBGW160402-2S	16	9,525	4,76	4,4	0,2	2,8	
VBGW160404-2S	16	9,525	4,76	4,4	0,4	2,8	
VBGW160408-2S	16	9,525	4,76	4,4	0,8	2,0	
VBGW160412-2S	16	9,525	4,76	4,4	1,2	1,7	

RHOMBIC 35°



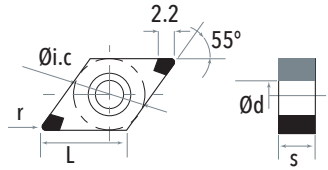
Type	Dimensions (mm)						Edge Preparation
ISO	L	φi.c	s	φd	r	b	
VCGW110302-2S	11	6,35	3,18	2,8	0,2	2,8	T01020 T02020 S01020 S02020
VCGW110304-2S	11	6,35	3,18	2,8	0,4	2,8	
VCGW110308-2S	11	6,35	3,18	2,8	0,8	2,0	
VCGW110312-2S	11	6,35	3,18	2,8	1,2	1,7	
VCGW160402-2S	16	9,525	4,76	4,4	0,2	2,8	
VCGW160404-2S	16	9,525	4,76	4,4	0,4	2,8	
VCGW160408-2S	16	9,525	4,76	4,4	0,8	2,0	
VCGW160412-2S	16	9,525	4,76	4,4	1,2	1,7	

RHOMBIC 80°



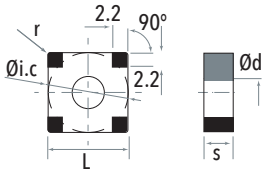
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
CNGA120404-4S	12	12,7	4,76	5,16	0,4	S01020 S02020
CNGA120408-4S	12	12,7	4,76	5,16	0,8	
CNGA120412-4S	12	12,7	4,76	5,16	1,2	
CNGA160404-4S	16	15,875	4,76	5,16	0,4	
CNGA160408-4S	16	15,875	4,76	5,16	0,8	
CNGA160412-4S	16	15,875	4,76	5,16	1,2	

RHOMBIC 55°



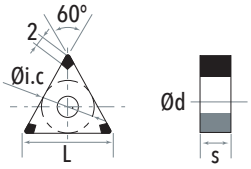
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
DNGA110404-4S	11	9,525	4,76	3,81	0,4	S01020 S02020
DNGA110408-4S	11	9,525	4,76	3,81	0,8	
DNGA110412-4S	11	9,525	4,76	3,81	1,2	
DNGA150404-4S	15	12,7	4,76	5,16	0,4	
DNGA150408-4S	15	12,7	4,76	5,16	0,8	
DNGA150412-4S	15	12,7	4,76	5,16	1,2	

SQUARE



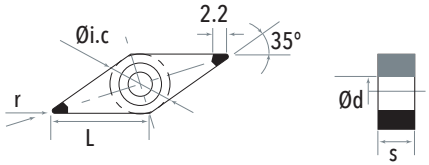
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
SNGA120404-8S	12	12,7	4,76	5,16	0,4	S01020 S02020
SNGA120408-8S	12	12,7	4,76	5,16	0,8	
SNGA120412-8S	12	12,7	4,76	5,16	1,2	

TRIANGULAR 60°



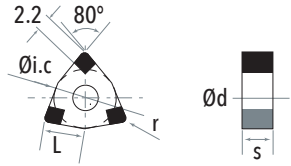
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
TNGA160404-6S	16	9,525	4,76	3,81	0,4	S01020 S02020
TNGA160408-6S	16	9,525	4,76	3,81	0,8	
TNGA160412-6S	16	9,525	4,76	3,81	1,2	
TNGA220404-6S	22	12,7	4,76	5,16	0,4	
TNGA220408-6S	22	12,7	4,76	5,16	0,8	
TNGA220412-6S	22	12,7	4,76	5,16	1,2	

RHOMBIC 35°

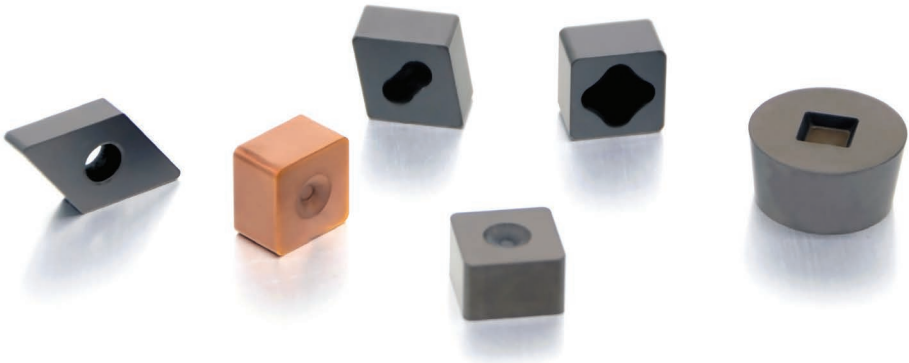


Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
VNGA160404-2S	16	9,525	4,76	3,81	0,4	S01020 S02020
VNGA160408-2S	16	9,525	4,76	3,81	0,8	
VNGA160412-2S	16	9,525	4,76	3,81	1,2	

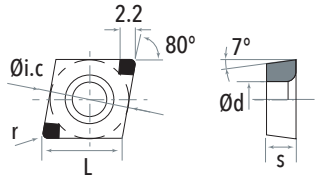
TRIGON 80°



Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
WNGA060404-6S	6	9,525	4,76	3,81	0,4	S01020 S02020
WNGA060408-6S	6	9,525	4,76	3,81	0,8	
WNGA060412-6S	6	9,525	4,76	3,81	1,2	
WNGA080404-6S	8	12,7	4,76	5,16	0,4	
WNGA080408-6S	8	12,7	4,76	5,16	0,8	
WNGA080412-6S	8	12,7	4,76	5,16	1,2	

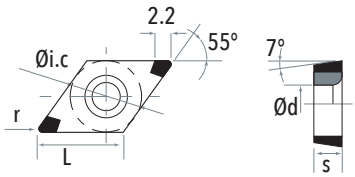


RHOMBIC 80°



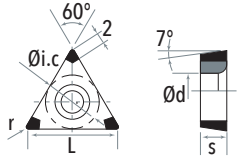
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
CCGW09T304-2S	9	9,525	3,97	4,4	0,4	S01020 S02020
CCGW09T308-2S	9	9,525	3,97	4,4	0,8	
CCGW09T312-2S	9	9,525	3,97	4,4	1,2	
CCGW120404-2S	12	12,7	4,76	5,5	0,4	
CCGW120408-2S	12	12,7	4,76	5,5	0,8	
CCGW120412-2S	12	12,7	4,76	5,5	1,2	

RHOMBIC 55°



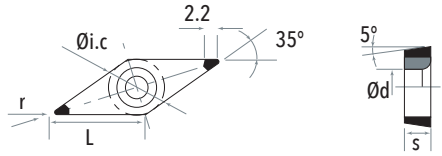
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
DCGW11T304-2S	11	9,525	3,97	4,4	0,4	S01020 S02020
DCGW11T308-2S	11	9,525	3,97	4,4	0,8	
DCGW11T312-2S	11	9,525	3,97	4,4	1,2	

TRIANGULAR 60°



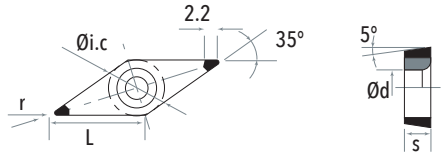
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
TCGW110304-3S	11	6,35	3,18	2,8	0,4	S01020 S02020
TCGW110308-3S	11	6,35	3,18	2,8	0,8	
TCGW110312-3S	11	6,35	3,18	2,8	1,2	

RHOMBIC 35°



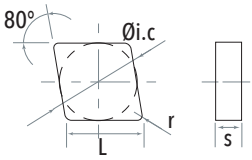
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
VBGW160404-2S	16	9,525	4,76	4,4	0,4	S01020 S02020
VBGW160408-2S	16	9,525	4,76	4,4	0,8	
VBGW160412-2S	16	9,525	4,76	4,4	1,2	

RHOMBIC 35°



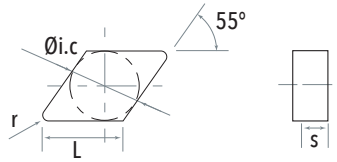
Type	Dimensions (mm)					Edge Preparation
ISO	L	φi.c	s	φd	r	
VCGW160404-2S	16	9,525	4,76	4,4	0,4	S01020 S02020
VCGW160408-2S	16	9,525	4,76	4,4	0,8	
VCGW160412-2S	16	9,525	4,76	4,4	1,2	

RHOMBIC 80°



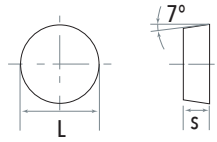
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
CNMN090404	9	9,525	4,76	0,4	S02020
CNMN090408	9	9,525	4,76	0,8	
CNMN090412	9	9,525	4,76	1,2	
CNMN120404	12	12,7	4,76	0,4	
CNMN120408	12	12,7	4,76	0,8	
CNMN120412	12	12,7	4,76	1,2	
CNMN120704	12	12,7	7,94	0,4	
CNMN120708	12	12,7	7,94	0,8	
CNMN120712	12	12,7	7,94	1,2	
CNMN120804	12	12,7	8	0,4	
CNMN120808	12	12,7	8	0,8	
CNMN120812	12	12,7	8	1,2	
CNMN160708	16	15,875	7,94	0,8	
CNMN160712	16	15,875	7,94	1,2	
CNMN160716	16	15,875	7,94	1,6	

RHOMBIC 55°



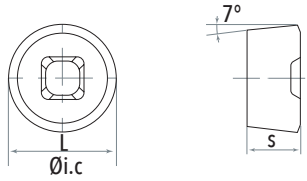
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
DNUN110404	11	9,525	4,76	0,4	S01020 S02020
DNUN110408	11	9,525	4,76	0,8	
DNUN110412	11	9,525	4,76	1,2	
DNUN110604	11	9,525	6,35	0,4	
DNUN110608	11	9,525	6,35	0,8	
DNUN110612	11	9,525	6,35	1,2	
DNUN150604	15	12,7	6,35	0,4	
DNUN150608	15	12,7	6,35	0,8	
DNUN150612	15	12,7	6,35	1,2	

ROUND



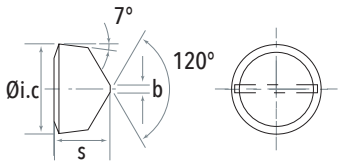
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
RCMN 060400	6	6,35	4,76	-	S02020 S05020 S10020
RCMN 090400	9	9,525	4,76	-	
RCMN 090600	9	9,525	6,35	-	
RCMN 120600	12	12,7	6,35	-	
RCMN 120700	12	12,7	7,94	-	
RCMN 150700	15	15,875	7,94	-	
RCMN 190700	19	19,05	7,94	-	

SOLID WITH DIMPLE



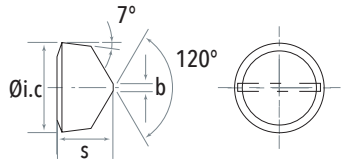
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
RCMS090600	9	9,525	6,35		S02020
RCMS120700	12	12,7	7,94		
RCMS150700	15	15,875	7,94		
RCMS201000	20	20	10		

ROUND



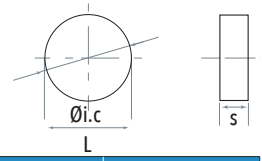
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
RCMX 060400V	6	6,35	4,76	0,8	S02020 S05020 S10020 S20020
RCMX 060600V	6	6,35	6,35	0,8	
RCMX 090700V	9	9,525	7,94	1	
RCMX 120700V	12	12,7	7,94	2	
RCMX 151000V	15	15,875	10	2	
RCMX 191000V	19	19,05	10	2	
RCMX 201200V	20	20	12	2	
RCMX 251200V	25	25,4	12	2	

ROUND



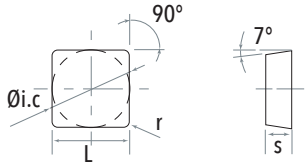
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
RCMX060400Y	6	6,35	4,76	0,6	S02020 S05020 S10020 S20020
RCMX060500Y	6	6,35	5	0,6	
RCMX060700Y	6	6,35	7,94	0,6	
RCMX090700Y	9	9,525	7,94	1	
RCMX120700Y	12	12,7	7,94	1,2	

ROUND



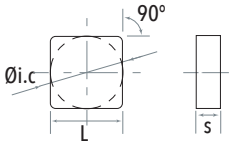
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
RNMN060400	6	6,35	4,76	-	S02020 S05020 S10020
RNMN090300	9	9,525	3,18	-	
RNMN090400	9	9,525	4,76	-	
RNMN120400	12	12,7	4,76	-	
RNMN120600	12	12,7	6,35	-	
RNMN120700	12	12,7	7,94	-	
RNMN150700	15	15,875	7,94	-	
RNMN160700	16	16	7,94	-	
RNMN190100	19	19,05	7,94	-	
RNMN200700	20	20	7,94	-	
RNMN201000	20	20	10	-	
RNMN250600	25	25,4	6,35	-	
RNMN250700	25	25,4	7,94	-	
RNMN251000	25	25,4	10	-	
RNMN251200	25	25,4	12	-	

SQUARE



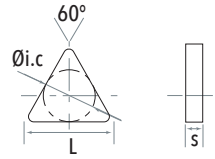
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
SCGN090304	9	9,525	3,18	0,4	T01020 S10020 S20020
SCGN090308	9	9,525	3,18	0,8	
SCGN090312	9	9,525	3,18	1,2	
SCGN090404	9	9,525	4,76	0,4	
SCGN090408	9	9,525	4,76	0,8	
SCGN090412	9	9,525	4,76	1,2	

SQUARE



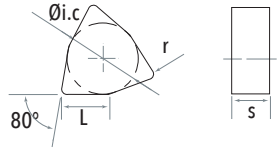
Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
SNMN090304	9	9,525	3,18	0,4	S02020 S05020 S10020
SNMN090308	9	9,525	3,18	0,8	
SNMN090312	9	9,525	3,18	1,2	
SNMN090404	9	9,525	4,76	0,4	
SNMN090408	9	9,525	4,76	0,8	
SNMN090412	9	9,525	4,76	1,2	
SNMN120404	12	12,7	4,76	0,4	
SNMN120408	12	12,7	4,76	0,8	
SNMN120712	12	12,7	7,94	1,2	
SNMN150704	15	15,875	7,94	0,4	
SNMN150708	15	15,875	7,94	0,8	
SNMN201020	20	20	10	2,0	
SNMN201024	20	20	10	2,4	

TRIANGULAR 60°



Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
TNGN110304	11	6,35	3,18	0,4	S02020 S10020
TNGN110308	11	6,35	3,18	0,8	
TNGN110312	11	6,35	3,18	1,2	
TNGN160404	16	9,25	4,76	0,4	
TNGN160408	16	9,25	4,76	0,8	
TNGN160412	16	9,25	4,76	1,2	

TRIGON 80°



Type	Dimensions (mm)				Edge Preparation
ISO	L	φi.c	s	r	
WNMN080404	8	12,7	4,76	0,4	S02020
WNMN080408	8	12,7	4,76	0,8	
WNMN080412	8	12,7	4,76	1,2	
WNMN080604	8	12,7	6,35	0,4	
WNMN080608	8	12,7	6,35	0,8	
WNMN080612	8	12,7	6,35	1,2	

C	N	M	A	12	04	08	1S	NCD	810
ISO Turning Insert Codes							No. of Cutting Edges	PCD Inserts	Grade

- 810 ALUMINIUM
- 820 COPPER

INSERT SHAPE

C	
D	
K	
R	
S	
T	
V	
W	

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−	Refers to a Negative Insert
+	Refers to a Positive Insert

INSERT THICKNESS

CODE	INSCRIBED RADIUS DIAMETER (INCH)
1.5	0.094
2	0.125
2.5	0.156
3	0.187
4	0.250
4.5	0.266
5	0.313
6	0.375

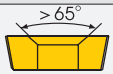
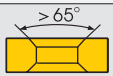
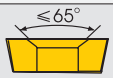
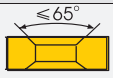
INSCRIBED CIRCLE DIAMETER

CODE	INSCRIBED RADIUS DIAMETER (INCH)
2	0.250
3	0.375
4	0.500
5	0.625
6	0.750
8	1.000

NO. OF CUTTING EDGES

CODE	NUMBER	TYPE
-	Single Edge	
2	Double Edge	
3	Three Edges	
4	Four Edges	

CHIPBREAKER & CLAMPING

CODE	WITH/ WITHOUT HOLE	INSERT SECTON
N	Without	
B	With	
C	With	
A	With	
W	With	
Q	With	

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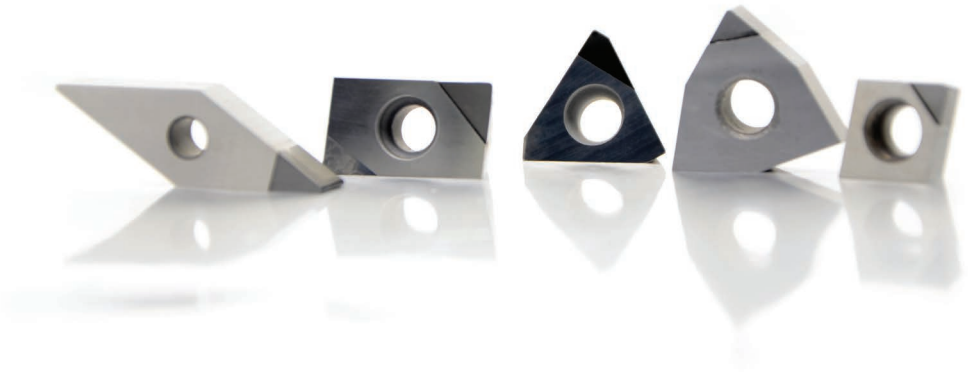
NON-FERROUS MACHINING

When it comes to non-ferrous materials processing such as aluminum alloys, titanium, carbon fiber, reinforced plastics, ceramic and other non-metallic materials, PCD (polycrystalline cubic diamond) is an advanced material that significantly reduces machining time and provides excellent surface quality due to excellent abrasion resistance and low coefficient of friction. High grinding efficiency, low grinding force: Less heat will be generated by the hole in the grinding process. This can decrease or prevent burns and cracks on the surface of the workpiece, and decrease the equipment's wear and energy consumption. High wear resistance: Diamond grinding tools' change in dimension is small. This can lead to good grinding quality and high grinding precision. PCD has a high thermal conductivity and good heat dissipation from the cutting area. PCD possesses the highest flexural strength of all cutting materials. PCD is very well adapted for aluminum machining with high Si content or other abrasive filler materials. Temperature hardness up to approx. 650 °C. Long lifespan, long dressing period: This can greatly increase work efficiency and decrease the product's labor intensity. Low comprehensive cost: The processing cost of each workpiece is lower.

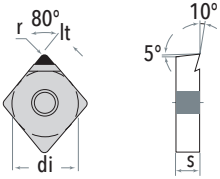
P C D

POLYCRYSTALLINE **CUBIC** **DIAMOND**

PCD has high hardness, excellent abrasion resistance, thermal conductivity, low coefficient of friction, suitable for cutting in non-ferrous metal and their alloys (such as: Cu, Al, Mg, etc.), non-metallic materials, and composite materials (such as: MMC, ceramics and reinforced plastics.

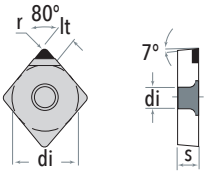


RHOMBIC 80°



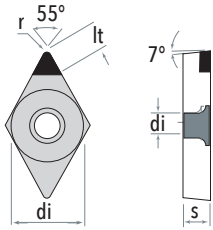
Specification	Dimension			
	di	S	r	l_t
CNMA120404	12,7	4,76	0,4	3,9
CNMA120408	12,7	4,76	0,8	3,6
CNMA120412	12,7	4,76	1,2	3,4

RHOMBIC 80°



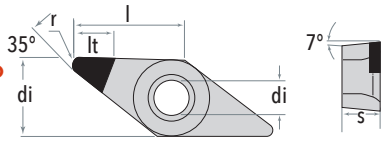
Specification	Dimension			
	di	S	r	l_t
CCMT060202	6,35	2,38	0,2	3,1
CCMT060204	6,35	2,38	0,4	3,0
CCMT060208	6,35	2,38	0,8	2,8
CCMT09T302	9,52	3,97	0,2	4,5
CCMT09T304	9,52	3,97	0,4	4,4
CCMT09T308	9,52	3,97	0,8	4,2

RHOMBIC 55°



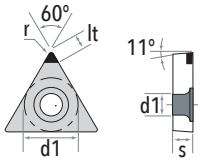
Specification	Dimension			
	di	S	r	l_t
DCMT 070201	6,35	2,38	0,1	3
DCMT 070202	6,35	2,38	0,2	3
DCMT 070204	6,35	2,38	0,4	2,8
DCMT 11T301	9,52	3,97	0,1	3,8
DCMT11T302	9,52	3,97	0,2	3,7
DCMT11T304	9,52	3,97	0,4	3,6
DCMT11T308	9,52	3,97	0,8	3,3

RHOMBIC 35°



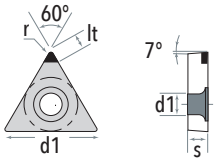
Specification	Dimension			
	di	S	r	l_t
VCMT 110302	6,35	3,18	0,2	3,2
VCMT 110304	6,35	3,18	0,4	3
VCMT 110308	6,35	3,18	0,8	2,8
VCMT 160404	9,52	4,76	0,4	3,8
VCMT 160408	9,52	4,76	0,8	3,6
VCMT 160412	9,52	4,76	1,2	3,4

TRIANGULAR 60°



Specification	Dimension			
	di	S	r	l_t
TPGT090202	5,56	2,38	0,2	3,1
TPGT090204	5,56	2,38	0,4	3
TPGT110302	6,35	3,18	0,2	3,4
TPGT110304	6,35	3,18	0,4	3,8

TRIANGULAR 60°



Specification	Dimension			
	di	S	r	l_t
TCMT080202	4,76	2,38	0,2	3
TCMT080204	4,76	2,38	0,4	2,8
TCMT090202	5,56	2,38	0,2	3
TCMT090204	5,56	2,38	0,4	2,8
TCMT110202	6,35	2,38	0,2	4
TCMT110204	6,35	2,38	0,4	3,8
TCMT110208	6,35	2,38	0,8	3,6
TCMT110302	6,35	3,18	0,1	3,2
TCMT110304	6,35	3,18	0,2	3
TCMT110308	6,35	3,18	0,4	2,8

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