

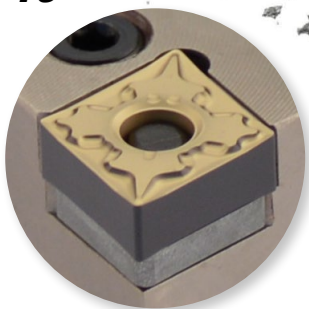


# INSERTS

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# Turning *line*

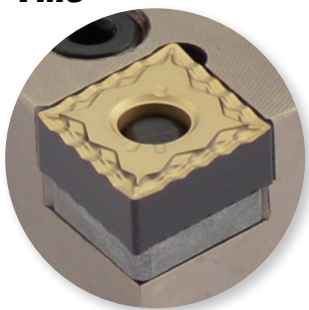
## **-FC**



**Recommendation for light cutting of carbon steel, alloy steel and stainless steel.**

Double sided chipbreaker.  
Can be used at low depth of cuts and high feed rates.  
The curved edge allows smooth chip discharge.  
Recommended for workpieces in the 160-250HB range.

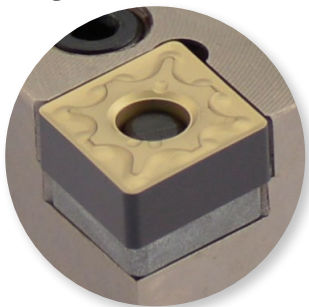
## **-FMC**



**Alternative breaker for light cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Superior chip control at small depth of cuts.  
Covers copying and back turning with wavy edge.  
Recommended for workpieces in the 200-300HB range.

## **-MC**



**Recommendation for medium cutting of carbon steel and alloy steel.  
First recommendation for finish to light cutting of cast iron.**

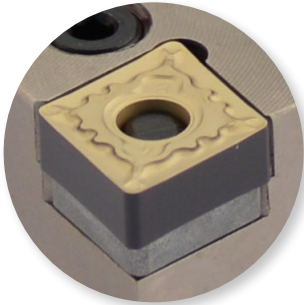
Double sided chipbreaker.  
Positive land provides sharp cutting action.



**Available in**

***TN15, TN20, TN30 and TN35***

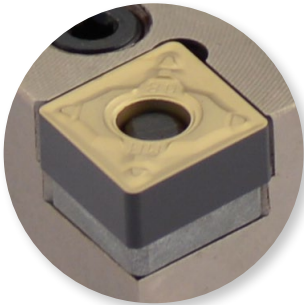
**-MFC**



**Alternative breaker for medium cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Suitable for medium to light cutting.  
Breaker geometry appropriate for copying and back turning.  
Good balance of sharpness and strength.

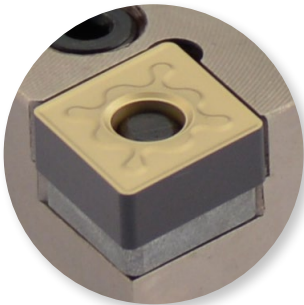
**-MHC**



**Recommendation for medium-heavy cutting of mild steel.  
Alternative breaker for medium cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Flat land offers high edge strength.  
A wide chip pocket prevents chip jamming at large depth of cut.

**-RC**



**Recommendation for rough cutting of carbon steel, alloy steel and stainless steel.**

Double sided chipbreaker.  
For interrupted cut and removing scale.  
A combination of wide land and large chip pocket allows high feeds.



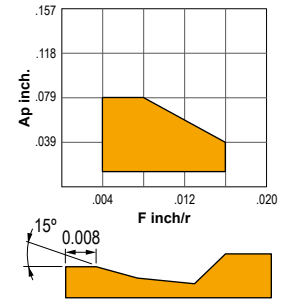
# Geometries

## -FC



**Recommendation for light cutting of carbon steel, alloy steel and stainless steel.**

Double sided chipbreaker.  
Can be used at low depth of cuts and high feed rates.  
The curved edge allows smooth chip discharge.  
Recommended for workpieces in the 160-250HB range.

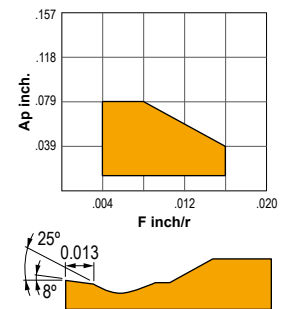


## -FMC



**Alternative breaker for light cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Superior chip control at small depth of cuts.  
Covers copying and back turning with wavy edge.  
Recommended for workpieces in the 200-300HB range.

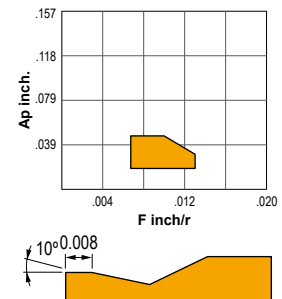


## -CC



**Recommendation for light cutting of mild steel.**

Double sided chipbreaker.  
Effectively controls chips.  
Recommended for workpieces in the 200-300HB range.

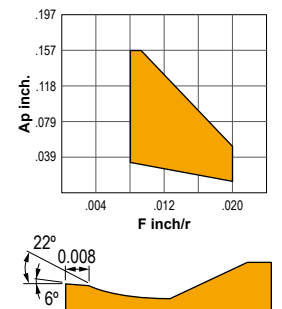


## -MC



**Recommendation for medium cutting of carbon steel and alloy steel.  
First recommendation for finish to light cutting of cast iron.**

Double sided chipbreaker.  
Positive land provides sharp cutting action.





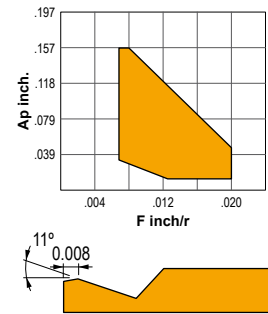
# Geometries

## -MFC



**Alternative breaker for medium cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Suitable for medium to light cutting.  
Breaker geometry appropriate for copying and back turning.  
Good balance of sharpness and strength.

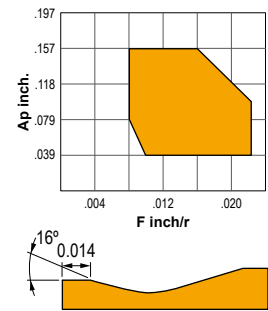


## -MHC



**Recommendation for medium-heavy cutting of mild steel.  
Alternative breaker for medium cutting of carbon steel and alloy steel.**

Double sided chipbreaker.  
Flat land offers high edge strength.  
A wide chip pocket prevents chip jamming at large depth of cut.

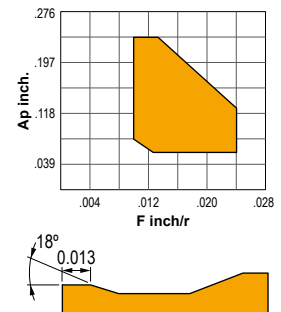


## -RC



**Recommendation for rough cutting of carbon steel, alloy steel and stainless steel.**

Double sided chipbreaker.  
For interrupted cut and removing scale.  
A combination of wide land and large chip pocket allows high feeds.

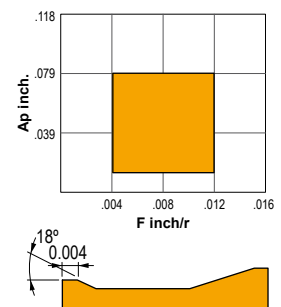


## -KC



**Recommendation for medium cutting of cast iron.**

Optimum balance between sharpness and high edge strength for general use.



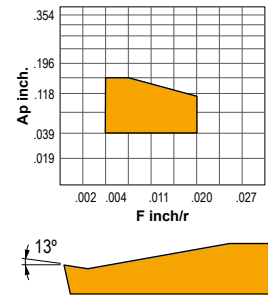


# Geometries

## -TC



First recommendation for medium cutting of stainless and mild steel and for light cutting of difficult-to-cut materials. Double-sided chipbreaker. The sharp cutting edge gives best performance.

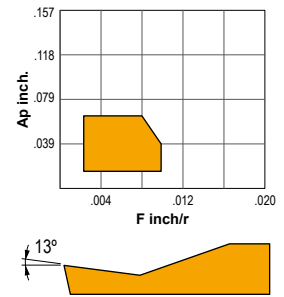


## ..NGP



Light cutting of difficult-to-cut materials. Ideal for heat-resistant alloy and titanium alloy.

The curved cutting edges support changes in cutting depth-smooth chip discharge and disposal. The high rake angle is highly suitable for finish- light cutting difficult to cut materials.

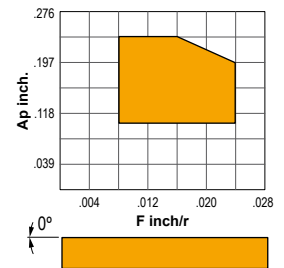


## ..NMA



Recommendation for rough cutting of cast iron.

Double sided flat insert. Most effective in unstable machining i.e. interrupted cuts due to high edge strength and stable fitting on the shim.

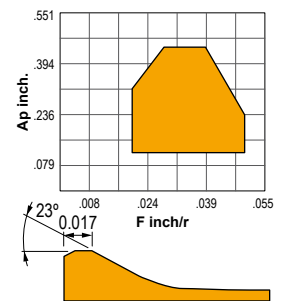


## ..NMM

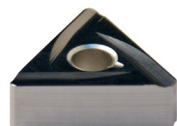


Recommendation for heavy cutting of carbon steel and alloy steel.

Single sided chipbreaker. Appropriate for the medium range of the heavy cutting region. The flat edge and chamfer provide a balance of sharpness and strength. Variable land and a wavy chipbreaker for good chip control.

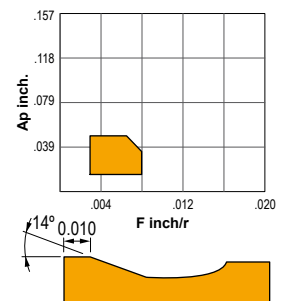


## ..NMX



Light cutting.

Double sided chipbreaker. Parallel chipbreaker. Excellent chip control at low to medium feed rates.



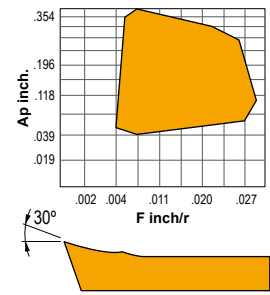


# Geometries

**-AL**



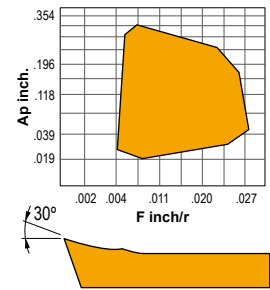
This geometry can be used for turning aluminium, light alloys, non ferrous materials, high-melting metals, plastics, glass fiber, reinforced plastics, laminated board, carbon and fine ceramics.



**-AP**



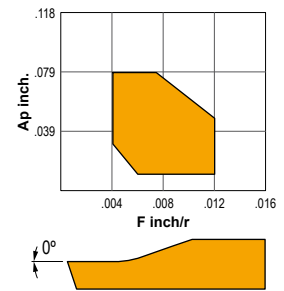
Suitable for aluminium, light alloys, non ferrous materials, high-melting metals, plastics, glass fiber, reinforced plastics, laminated board, carbon and fine ceramics.



**..MR**



Light to medium cutting of carbon steel, alloy steel and stainless steel.  
Standard, general purpose chipbreaker.

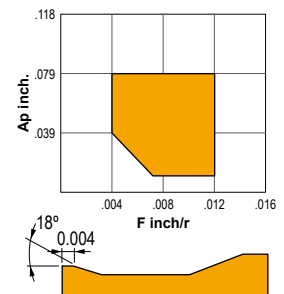


**..MT**



Recommendation for medium cutting of carbon and alloy steel.

The small flat land at cutting edge provides an excellent balance of wear and fracture resistance.  
The wide chip gullet decreases cutting resistance, reduces vibration and chip jamming in elevated depth of cut applications.

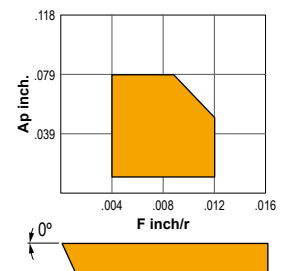


**..MW**



For cast iron.

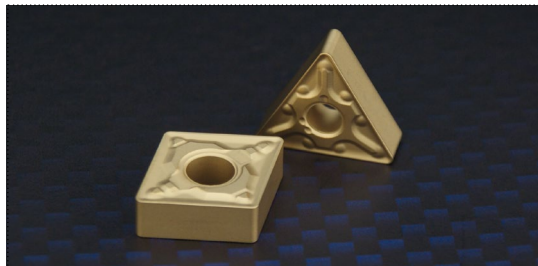
Most effective in unstable machining due to high edge strength.







## CVD



### CVD coated carbide

The CVD coatings are generated by a chemical reaction at high temperatures (1292-1922 °F). All CVD coatings provide a high wear resistance due to its excellent adhesion to cemented carbide.

CVD coatings are the first choice in a large turning range where wear resistance is important.

## Features of CVD coated carbide

Material		Grade	Colour	Coating composition	Definition
P Steel		<b>TN15</b>		TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	Wear resistant finishing to intermediate grade suitable for many applications on steel, cast iron, stainless steel and high temperature alloys. It is generally used at higher speeds where deformation may be a problem. The multi-layer coating includes TiCN and aluminium oxide.
		<b>TN20</b>		TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	General purpose wear resistant grade. It has an enriched substrate that has exceptionally good deformation as well as fracture resistance. The multi-layer coating includes aluminium oxide to add additional heat and wear resistance. It is used to machine steel and stainless steel at lower speeds than TN15.
		<b>TN30</b>		TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	General purpose wear resistant turning grade. The multi-layer coating includes aluminium oxide to add additional heat and wear resistance. It is used to machine steel at lower speeds than TN15. This turning grade is for demanding metal removal operations, including cutting through scale at low speeds through heavy interruption, and problem machining of stainless steel at low speed and poor rigidity.
M Stainless		<b>TN35</b>		TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	New coated grade developed to machine stainless steel and heat-resistance alloys. This grade is only used in combination with the MC chipbreaker. First choice for stainless steel applications.
K Cast iron		<b>TK15</b>		TiCN+Al <sub>2</sub> O <sub>3</sub>	CVD grade for gray, ductile nodular cast iron with excellent balance of wear and fracture resistance. The smooth coating prevents insert failure such as welding and chipping, providing a consistent cutting performance.

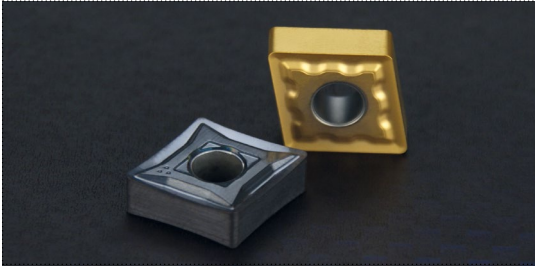
## Grade characteristics

Grade	Substrate			Coating Layer	
	Hardness (HRA)	T.R.S (GPa)	Surface	Composition	Thickness
<b>TN15</b>	90.3	2.0	Tough	Accumulated TiCN-Al <sub>2</sub> O <sub>3</sub> +Ti Compound	Thick
<b>TN20</b>	90.3	2.0	Tough	Accumulated TiCN-Al <sub>2</sub> O <sub>3</sub> +Ti Compound	Thick
<b>TN30</b>	90.0	2.2	Tough	Accumulated TiCN-Al <sub>2</sub> O <sub>3</sub> +Ti Compound	Thick
<b>TN35</b>	89.0	2.6	-	Ti Compound	Thin
<b>TK15</b>	91.0	2.2	-	TiCN-Al <sub>2</sub> O <sub>3</sub> Compound	Thick





## PVD



### PVD coated carbide

PVD coatings offer wear resistance due to their hardness. The coating process involves the evaporation of metal, which reacts with nitrogen to form a hard nitride coating. The full process is made at relatively low temperatures (752-1112 °F). PVD coatings are recommended when sharp cutting edges are needed.

## Features of PVD coated carbide

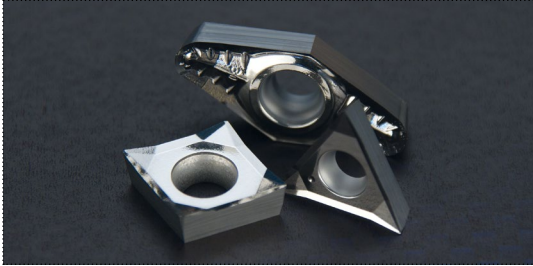
Material		Grade	Colour	Coating composition	Definition
<b>P</b> Steel		<b>TL20</b>	●	TiAlN	Carbide with TiAlN and lubricity layer PVD coating. It has a lower friction coefficient and a lower cutting energy during finishing. The sharper cutting edge reduces the built-up edge damage and gives the workpiece an excellent surface finish. Recommended for alloyed steel.
		<b>TIN25</b>	●	TiN-TiC-TiN	Coated with TiN-TiC-TiN. The coating has a thickness of 3-5 microns for use on steel, alloyed steel and stainless steel, with or without coolant.
<b>M</b> Stainless		<b>TS15</b>	●	TiAlN	Coated TiAlN grade in the K20 range. It is used on cast iron, aluminium and heat-resistant alloys. It works well on cobalt based alloys and synthetic materials, and is suitable for finishing on heat-resistant alloys.
<b>S</b> Heat resistant alloys		<b>TS20</b>	●	TiN+TiAlN+TiN	Coated TiN+TiAlN+TiN grade for machining super alloys. It has a fine grain of 0.8 µm and a hardness of HV30 1820 and it offers an excellent rupture and heat resistance.
<b>N</b> Non ferrous materials		<b>ZR10</b>	○	TiB <sub>2</sub>	Micrograin grade with an extremely hard single TiB <sub>2</sub> layer for machining aluminium, copper alloys and plastics.

## Grade characteristics

Grade	Substrate		Coating Layer	
	Hardness (HrA)	T.R.S (GPa)	Composition	Thickness
<b>TL20</b>	91.5	2.5	(Al,Ti)N	Thin
<b>TIN25</b>	90.5	2.0	TiN	Thin
<b>TS15</b>	91.5	2.5	(Al,Ti)N	Thin
<b>TS20</b>	90.5	2.5	(Al,Ti)N-Ti Compound	Thin
<b>ZR10</b>	99.2	2.8	TiB <sub>2</sub>	Thin



## UNCOATED CARBIDE



### UNCOATED CARBIDE

- Excellent thermal crack resistance makes it possible to machine in wet cutting conditions.
- Cemented carbide can be applied for various workpieces.
- High toughness and low cutting force.
- Low affinity to workpiece.

## Features of UNCOATED CARBIDE

Material		Grade	Colour	Composition	Definition
<b>P</b> Steel		<b>PM25</b>		WC+TiC+TaC+Co	General purpose uncoated grade in the P30 range. This tough, economical grade is suitable to work carbon steels, alloyed steels, tool steels and stainless steels. PM25 provides toughness and resistance to deformation in roughing and semi-finishing applications.
		<b>PM40</b>		WC+TiC+TaC+Co	Roughing grade in the P35 range. This tough grade is for structural, cast and tool steels. It is recommended when toughness is more important than wear resistance.
<b>K</b> Cast iron		<b>KM15</b>		WC+Co	Finishing grade in the K10 range. This carbide grade is for use on cast iron, aluminium and heat-resistant alloys. This grade works well on cobalt based alloys and synthetic materials and is suitable for finishing on heat-resistant alloys.

## Application

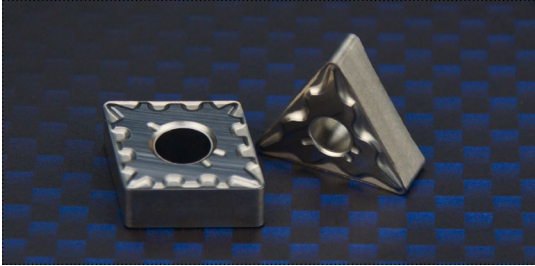
ISO	Composition	Features	Workpiece
<b>P</b>	WC+TiC+TaC+Co	Heat resistance, excellent plastic deformation resistance.	Carbon steel, alloy steel, stainless steel.
<b>M</b>	WC+TiC+TaC+Co	General tools stable heat resistance with strength.	Carbon steel, alloy steel, stainless steel, cast steel.
<b>K</b>	WC+Co	High strength and superior wear resistance.	Carbon iron, non-ferrous metal, plastic, etc.

## Properties

Grade	Hardness (HRA)	TRS (Kg/mm <sup>2</sup> )	Young's modulus (103Kg/mm <sup>2</sup> )	Thermal expansion coefficient (10 <sup>-6</sup> /°C)	Thermal conductivity (cal/cm-sec-°C)
<b>KM15</b>	90.9	250	63	-	105
<b>PM25</b>	91.9	200	56	5.2	45
<b>PM40</b>	91.3	230	53	5.2	-



# CERMET



## CERMET

- Maximum heat and wear resistance.
- Excellent resistance to oxidation.
- For very high cutting speeds.
- Ideal for finishing.
- Universal application.

## Features of CERMET

Material		Grade	Colour	Composition	Definition
P Steel		NC25		Ti+W+Ta/Nb	NC25 is a newly developed Cermet applicable for a wide range of cutting conditions as a standard grade for general machining of steel. It can successfully be used for a range of cutting speeds from 100 to 200 m/min with better wear resistance than conventional TiC Cermet. It gives an excellent performance from semi-finish to finish operation of ductile cast iron at cutting speeds of 200 m/min. or less.

### Application recommendations

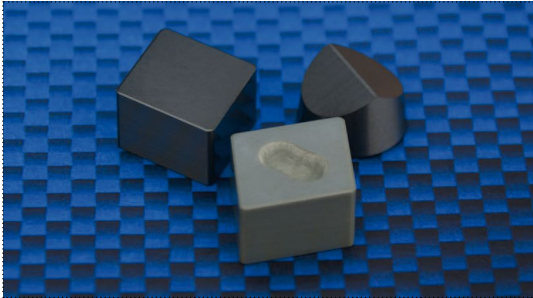
**i** It is required to prerough following the profile precisely.

**i** Use conventional approach for face turning.

**i** Several cuts are required for deep applications.



# CERAMIC



## CERAMIC

Ceramic grades are able of running at high speeds, thus reducing expensive machining time. Ceramic inserts are recommended for hard turning of 38HRC to 64HRC hardened steel, or for roughing and finishing of cast iron. Ceramic maintains good surface finishes due to its low affinity to workpiece materials.

## Features of CERAMIC

Material		Grade	Colour	Composition	Definition
<b>K</b> Cast iron		<b>CX9</b>		Al <sub>2</sub> O <sub>3</sub>	CX9 is a highly wear-resistant tool that has been formed into microstructure by adding a trace amount of zirconia (ZrO <sub>2</sub> ) to highly pure alumina (Al <sub>2</sub> O <sub>3</sub> ), the main component of this tool material.
		<b>CC2</b>		Al <sub>2</sub> O <sub>3</sub> +TiC	This material is well-balanced between wear resistance and fracture resistance, and it works well in a wide range of cutting cast iron and in the turning of hard materials.
		<b>CX6</b>		SiAlON	CX6 is an ultimate silicon-nitride material that has been developed to improve the notch wear of the conventional ceramics that contain silicon nitride. It reduces notch wear amount in machining gray cast iron.
<b>S</b> Heat resistant alloys		<b>CW1</b>		Al <sub>2</sub> O <sub>3</sub> -based	CW1 is a whisker-reinforced composite ceramic material with silicon-carbide whisker added to alumina. Excellent wear resistance with high toughness and crack resistance for heat-resistant alloys and high-hardened mill rolls.
<b>P</b> Steel		<b>CC7</b>		Al <sub>2</sub> O <sub>3</sub> +TiC	Since it has the finest grain size particle with a high melting point, the composite CC7 improves both hardness and strength, and it shows superior performance as a special material for machining high-hardened materials.

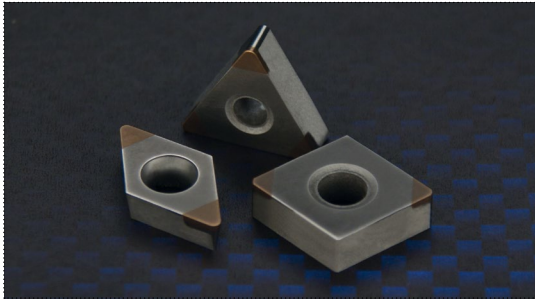
## Ceramic main application areas

Cast iron	Aerospace	Roll turning	Hardened materials





## CBN / PCD



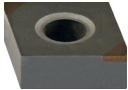
### CBN

- High thermal conductivity, which provides stable cutting.
- Suitable for high speed cutting of cast iron and sintered steel.
- Superior wear resistance when cutting hardened materials.

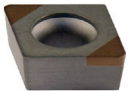
### PCD

- Applicable for turning and milling of non-ferrous materials and non-metals.
- Long tool life due to extreme hardness.
- High cutting speeds and increased cutting productivity.

## Features of CBN / PCD

Material		Grade	Colour	Composition	Definition
<b>H</b> Hard materials		<b>CB10</b>	●	TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	These CBN are formed with a special ceramic binder based on CBN (Cubic Boron Nitride) particles, and the CBN sintered layer increases the thickness of the carbide base. CBN are high-performance tool materials that have high hardness at room temperature and high temperature and are almost free from chemical reactions against the material to be cut.

	Materials to be machined with polycrystalline boron nitride <b>Material</b>	<b>Vc = m/min.</b>	<b>Infeed f = inch./U</b>	<b>Depth of cut ap=inch.</b>
<b>CBN</b>	- Hardened materials and nitriding steels.	60-120	0.001-0.007	0.039
	- High temperature and corrosion resistant alloys with high nickel or cobalt content.	70-150	0.001-0.006	0.039
	- Gray cast iron, especially hard and abrasion resistant types.	300-600	0.004-0.020	0.118
	- High speed steel (HSS).	60-120	0.001-0.004	0.039
	- Metal powder spraying.	60-120	0.078	0.039

Material		Grade	Colour	Composition	Definition
<b>N</b> Non ferrous materials		<b>PD10</b>	●	TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	PCD consists of a 0.019 inches thick diamond layer, which is inseparably connected to a carbide base. This polycrystalline diamond layer originates at a pressing operation by bonding of the smallest diamond grains, supported by a metallic bonding agent. This cutting material has also a very long tool life.

	Materials to be machined with polycrystalline diamond <b>Material</b>	<b>Vc = m/min.</b>	<b>Infeed f = inch./U</b>	<b>Depth of cut ap=inch.</b>
<b>PCD</b>	- Aluminium alloys under 3% SIC	200-2000	0.002-0.015	up to the whole diamond cutting edge
	- Aluminium alloys up to 12% SIC	150-1000	0.002-0.015	
	- Aluminium alloys up to approx. 21% SIC	100-800	0.002-0.015	
	- Brass, magnesium, zinc alloys.	200-2000	0.002-0.015	
	- Copper, bronze, lead alloys.	200-1000	0.002-0.015	
	- Duro and thermoplastics with and without fillers e.g. epoxy resin.	100-1000	0.002-0.007	
	- Hard papers.	200-600	0.004-0.011	
	- Hard and soft rubber with and without fillers.	100-500	0.004-0.011	
	- Graphite and pre-sintered carbide.	100-500	0.004-0.015	
	- Aluminium oxide, silicon, tungsten.	50-180	0.004	



# Insert selection

● Main application  
○ Extended application

		Machining type	Material	Continuous	Slight interruption	Interruption
				●	◐	⊗
<b>- FC</b>		Finishing ●	●	TN15	TN15	TN30
		Medium ○	○	TN15	-	-
		Roughing	○	TN15	-	-
<b>- FMC</b>		Finishing ●	●	TN15	TN15	-
		Medium ○	○	-	-	-
		Roughing		-	-	-
<b>- CC</b>		Finishing ●	●	NC25	NC25	-
		Medium	○	-	-	-
		Roughing	●	NC25	-	-
<b>- MC</b>		Finishing ●	●	TN15	TN15	TN30
		Medium ●	●	TN35	TN35	TN35
		Roughing ○	○	TN15	-	-
<b>- MFC</b>		Finishing ○	●	TN15	TN15	TN30
		Medium ●	○	-	-	-
		Roughing ○	○	-	-	-
<b>- MHC</b>		Finishing	●	TN15	TN20	TN30
		Medium ●	○	-	-	-
		Roughing ●	○	-	-	-
<b>- RC</b>		Finishing	●	TN15	TN15	TN30
		Medium ○	○	-	-	TN30
		Roughing ●	○	-	-	-
<b>- TC</b>		Finishing ●	●	TS20	TS20	-
		Medium ●	○	-	-	-
		Roughing ●	●	TS20	TS20	-
<b>- KC</b>		Finishing ●	○	-	-	-
		Medium ●	○	-	-	-
		Roughing ●	●	TK15	TK15	TK15



- Main application
- Extended application

		Machining type	Material	Continuous	Slight interruption	Interruption
				●	◐	⊗
<b>..NGP</b> 	Finishing	●	●	TS15	TS15	-
	Medium	●	○	TS15	TS15	-
	Roughing		●	TS15	-	-
<b>..NMA</b> 	Finishing	●		-	-	-
	Medium	●		-	-	-
	Roughing	●	●	TK15	TK15	TK15
<b>..NMM</b> 	Finishing		●	-	TN15	TN30
	Medium		○	-	-	TN30
	Roughing	●		-	-	-
<b>..NMX</b> 	Finishing	●	●	NC25	NC25	-
	Medium	○		-	-	-
	Roughing		○	NC25	-	-
<b>- AL</b> 	Finishing	●		-	-	-
	Medium	●	●	KM15 - ZR10	KM15 - ZR10	KM15 - ZR10
	Roughing	●	○	KM15 - ZR10	-	-
<b>- AP</b> 	Finishing	●		-	-	-
	Medium	●	●	KM15 - ZR10	KM15 - ZR10	KM15 - ZR10
	Roughing	○	○	KM15 - ZR10	-	-
<b>..MR</b> 	Finishing	●	●	TN15	TN30	TN30
	Medium	●	○	TN15	TN30	-
	Roughing	○	○	TN15	-	-
<b>..MT</b> 	Finishing	●	●	TN15	TN15	TN30
	Medium	●	●	TN35	TN35	TN35
	Roughing		●	TN15	-	-
<b>..MW</b> 	Finishing	●	●	PM25	PM25	PM25
	Medium	●		-	-	-
	Roughing		●	KM15	KM15	KM15



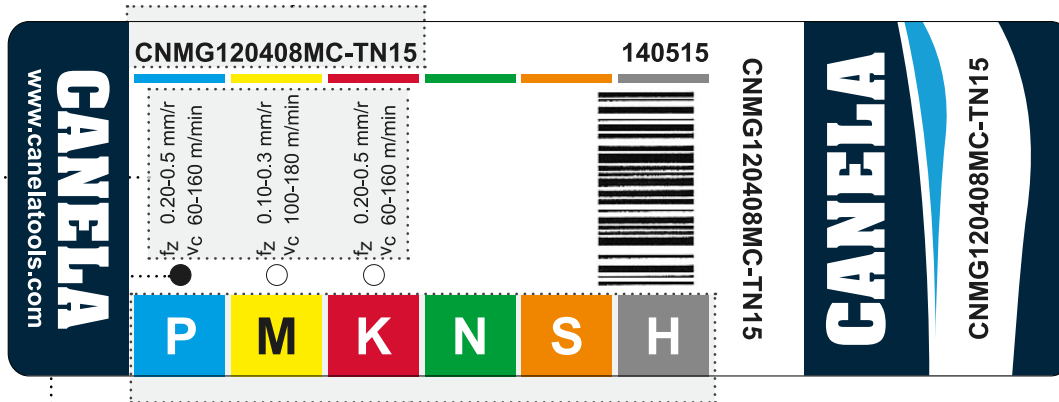
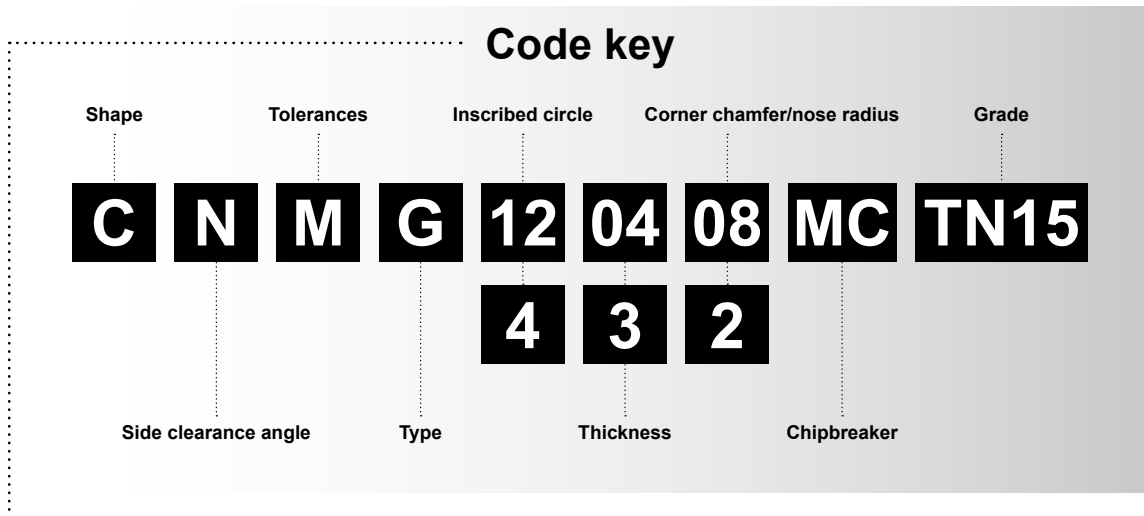
# Grade chart

		KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
<b>P</b>	P05				▶									
	P10				▶	▶								
	P15				▶	▶	▶							
	P20		▶		▶	▶	▶						▶	
	P25		▶	▶		▶	▶	▶					▶	
	P30		▶	▶		▶	▶	▶					▶	
	P35		▶	▶										
	P40								▶					
	P45								▶					
	P50													
	<b>M</b>	M05				▶								
M10					▶	▶								
M15					▶	▶					▶			
M20						▶					▶	▶		
M25						▶					▶	▶	▶	
M30											▶	▶	▶	
M35									▶					
M40									▶					
<b>K</b>	K05	▶			▶	▶								▶
	K10	▶			▶	▶	▶							▶
	K15	▶			▶	▶	▶			▶				▶
	K20	▶			▶	▶	▶			▶				▶
	K25													
	K30													
	K35													
	K40													
<b>N</b>	N05	▶												▶
	N10	▶												▶
	N15													
	N20													
	N25													
	N30													
<b>S</b>	S05	▶				▶								▶
	S10					▶								
	S15					▶								
	S20											▶		
	S25											▶		
	S30											▶		
<b>H</b>	H05													
	H10													
	H15													
	H20													
	H25													
	H30													





# Label designation system



### Material group

#### Application area

- Main application
- Extended application

#### Cutting data

fz: Feed  
vc: Speed

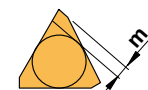
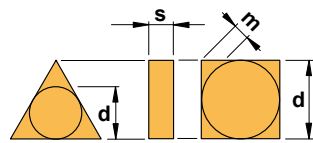
P	<b>Blue: Steel</b> Machining, cementation, tempered and constructional steels.
M	<b>Yellow: Stainless steel</b> Machining, cementation, tempered and constructional steels.
K	<b>Red: Cast iron</b> Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron.
N	<b>Green: Non ferrous materials</b> Al wrought and Al cast alloys, copper, copper alloys, non metal materials.
S	<b>Orange: Heat-resistant alloys / titanium</b> Ni/Co-base alloys, Ti alloys.
H	<b>Grey: Hard materials</b> Hardened steels (≥ 45 HRC), chilled castings, hard cast irons.



# ISO Code key

INSERT SHAPE		
V	Rhombic 35°	
D	Rhombic 55°	
E	Rhombic 75°	
C	Rhombic 80°	
M	Rhombic 86°	
K	Parallelogram 55°	
B	Parallelogram 82°	
A	Parallelogram 85°	
L	Rectangular 90°	
P	Pentagonal 108°	
H	Hexagonal 120°	
O	Octagonal 135°	
R	Round	
S	Square 90°	
T	Triangular 60°	
W	Trigon 80°	
X	Special design	

TOLERANCES										
	m	Ø d	s	Detail of M Class insert tolerance (Tolerance of nose height m)						
A	±0.005	±0.025	±0.025	D.I.C						
F	±0.005	±0.013	±0.025	<b>6.35</b>	±0.08	±0.08	±0.08	±0.11	±0.16	-
C	±0.013	±0.025	±0.025	<b>9.525</b>	±0.08	±0.08	±0.08	±0.11	±0.16	-
H	±0.013	±0.013	±0.025	<b>12.70</b>	±0.13	±0.13	±0.13	±0.15	-	-
E	±0.025	±0.025	±0.025	<b>15.875</b>	±0.15	±0.15	±0.15	±0.18	-	-
G	±0.025	±0.025	±0.013	<b>19.05</b>	±0.15	±0.15	±0.15	±0.18	-	-
J	±0.005	±0.05 - ±0.15	±0.025	<b>25.40</b>	-	±0.18	-	-	-	-
K	±0.013	±0.05 - ±0.15	±0.025	<b>31.75</b>	-	±0.20	-	-	-	-
L	±0.025	±0.05 - ±0.15	±0.025	Detail of M Class insert tolerance (Tolerance of inscribed circle d)						
M	±0.08 - ±0.20	±0.05 - ±0.15	±0.13	D.I.C						
N	±0.08 - ±0.20	±0.05 - ±0.15	±0.025	<b>6.35</b>	±0.05	±0.05	±0.05	±0.05	±0.05	-
U	±0.13 - ±0.38	±0.08 - ±0.25	±0.13	<b>9.525</b>	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
				<b>12.70</b>	±0.08	±0.08	±0.08	±0.08	-	±0.08
				<b>15.875</b>	±0.10	±0.10	±0.10	±0.10	-	±0.10
				<b>19.05</b>	±0.10	±0.10	±0.10	±0.10	-	±0.10
				<b>25.40</b>	-	±0.13	-	-	-	±0.13
				<b>31.75</b>	-	±0.15	-	-	-	±0.15



Triangular insert with a facet (Secondary cutting edge)

## C N M G

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

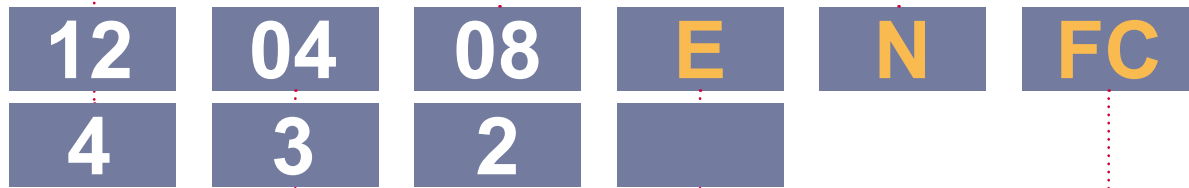
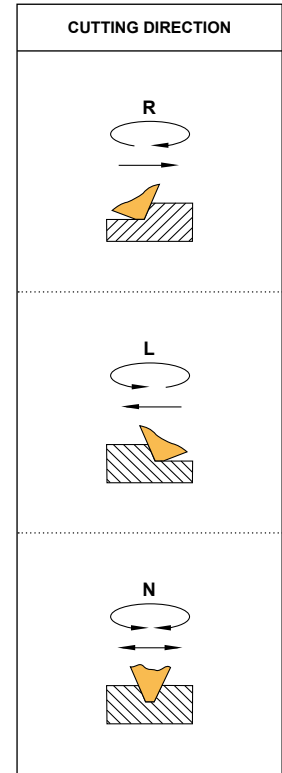
SYMBOL FOR FIXING AND/OR FOR CHIPBREAKER (Metric)				
	Hole	Hole configuration	Chipbreaker	Figure
N	Without hole	-	No	
R	Without hole	-	One-sided	
F	Without hole	-	Double-sided	
A	With hole	Cylindrical hole	No	
M	With hole	Cylindrical hole	One-sided	
G	With hole	Cylindrical hole	Double-sided	
W	With hole	Cylindrical hole + One countersink (40-60°)	No	
T	With hole	Cylindrical hole + One countersink (40-60°)	One-sided	
Q	With hole	Cylindrical hole + Double countersink (40-60°)	No	
U	With hole	Cylindrical hole + Double countersink (40-60°)	Double-sided	
B	With hole	Cylindrical hole + One countersink (70-90°)	No	
H	With hole	Cylindrical hole + One countersink (70-90°)	One-sided	
C	With hole	Cylindrical hole + Double countersink (70-90°)	No	
J	With hole	Cylindrical hole + Double countersink (70-90°)	Double-sided	
X	-	-	-	Special



SYMBOL FOR INSERT SIZE									
	04	03	03	06			5/32	3,97	
08	05	04	04	08				4,76	
09	06	05	05	09	03		7/32	5,56	
						06		6,00	
11	07	06	06	11	04		1/4	6,35	
13	09	08	07	13	05			7,94	
						08		8,00	
16	11	09	09	16	06		3/8	9,52	
						10		10,00	
						12		12,00	
22	15	12	12	22	08		1/2	12,70	
		19	16	15	27	10		5/8	15,87
		23	19	19	33	13		3/4	19,00
						20			20,00
		27	22	22	38				22,22
						25			25,00
		31	25	25	44		1		25,40
		38	32	31	54				31,75
						32			32,00

SYMBOL FOR INSERT SIZE (inch.)	
2	1/4
3	3/8
4	1/2
5	5/8
6	3/4
8	1

INSERT CORNER			
00	0,0	12	1,2
M0	0,0	16	1,6
02	0,2	20	2,0
04	0,4	24	2,4
08	0,8	32	3,2
SECONDARY CUTTING EDGE			
A	45°	F	85°
D	60°	P	90°
E	75°		
CLEARANCE ANGLE			
A	3°	F	25°
B	5°	G	30°
C	7°	N	0°
D	15°	P	11°
E	20°	Z	Special




















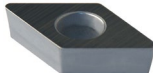

















SYMBOL FOR INSERT THICKNESS		
	inch.	mm
01	1/16	1,59
02	3/32	2,38
03	1/8	3,18
T3	5/32	3,97
04	3/16	4,76
05	7/32	5,56
06	1/4	6,35
07	5/16	7,94
09	3/8	9,52
SYMBOL FOR INSERT THICKNESS (inch.)		
1	1/16	
2	1/8	
3	3/16	
4	1/4	
5	5/16	
6	3/8	

SYMBOL FOR CUTTING EDGE CONDITION	
SYMBOL	CUTTING EDGE
F	Sharp
E	Honed
T	Chamfered
S	Chamfered and honed
K	Double-chamfered
P	Double-chamfered and honed
For special forms of the chip groove in the 10° position, manufacturer specific chip grooves and designations can be indicated.	










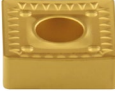



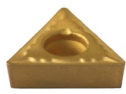
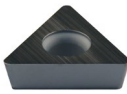
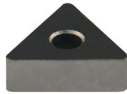



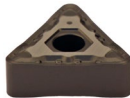





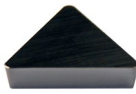

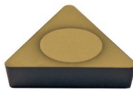








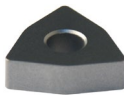







SYMBOL FOR CHIPBREAKER		
AL	AP	CC
FC	FMC	KC
MC	MFC	MHC
MR	MT	MW
NGP	NMA	NMM
NMX	RC	TC



<p><b>CCGT-AL</b></p>  <p>Page A23 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>CCGT-AP</b></p>  <p>Page A23 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>CCMT</b></p>  <p>Page A23 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>CCMW</b></p>  <p>Page A23 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>CNGP</b></p>  <p>Page A24 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMA</b></p>  <p>Page A24 <math>0^\circ</math> <input type="checkbox"/></p>
<p><b>CNMG-CC</b></p>  <p>Page A24 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-FC</b></p>  <p>Page A24 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-FMC</b></p>  <p>Page A25 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-KC</b></p>  <p>Page A25 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-MC</b></p>  <p>Page A25 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-MFC</b></p>  <p>Page A25 <math>0^\circ</math> <input type="checkbox"/></p>
<p><b>CNMG-MHC</b></p>  <p>Page A26 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-RC</b></p>  <p>Page A26 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMG-TC</b></p>  <p>Page A26 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>CNMM</b></p>  <p>Page A26 <math>0^\circ</math> <input type="checkbox"/></p>		
<p><b>DCGT-AL</b></p>  <p>Page A27 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>DCGT-AP</b></p>  <p>Page A27 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>DCMT</b></p>  <p>Page A27 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>DCMW</b></p>  <p>Page A27 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>DNGP</b></p>  <p>Page A28 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMA</b></p>  <p>Page A28 <math>0^\circ</math> <input type="checkbox"/></p>
<p><b>DNMG-FC</b></p>  <p>Page A28 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMG-FMC</b></p>  <p>Page A28 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMG-KC</b></p>  <p>Page A29 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMG-MC</b></p>  <p>Page A29 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMG-MFC</b></p>  <p>Page A29 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMG-MHC</b></p>  <p>Page A29 <math>0^\circ</math> <input type="checkbox"/></p>
<p><b>DNMG-TC</b></p>  <p>Page A30 <math>0^\circ</math> <input type="checkbox"/></p>	<p><b>DNMX</b></p>  <p>Page A30 <math>0^\circ</math> <input type="checkbox"/></p>				
<p><b>KNUX</b></p>  <p>Page A30 <math>0^\circ</math> <input type="checkbox"/></p>					
<p><b>RCGT-AL</b></p>  <p>Page A31 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>RCGT-AP</b></p>  <p>Page A31 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>RCMT</b></p>  <p>Page A31 <math>7^\circ</math> <input type="checkbox"/></p>	<p><b>RNMG</b></p>  <p>Page A31 <math>0^\circ</math> <input type="checkbox"/></p>		




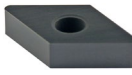

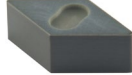







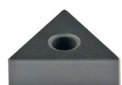


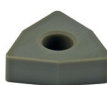




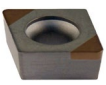
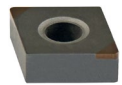
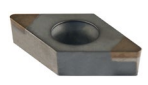
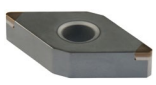



<p><b>SCGT-AL</b></p>  <p>Page A32 7° <input checked="" type="checkbox"/></p>	<p><b>SCMT</b></p>  <p>Page A32 7° <input checked="" type="checkbox"/></p>	<p><b>SCMT-39</b></p>  <p>Page A32 7° <input checked="" type="checkbox"/></p>	<p><b>SCMW</b></p>  <p>Page A32 7° <input checked="" type="checkbox"/></p>	<p><b>SNMG-FMC</b></p>  <p>Page A33 0° <input type="checkbox"/></p>	<p><b>SNMG-KC</b></p>  <p>Page A33 0° <input type="checkbox"/></p>
<p><b>SNMG-MHC</b></p>  <p>Page A33 0° <input type="checkbox"/></p>	<p><b>SNMG-RC</b></p>  <p>Page A33 0° <input type="checkbox"/></p>	<p><b>SNMG-TC</b></p>  <p>Page A34 0° <input type="checkbox"/></p>	<p><b>SNMM</b></p>  <p>Page A34 0° <input type="checkbox"/></p>	<p><b>SPMR</b></p>  <p>Page A35 11° <input checked="" type="checkbox"/></p>	<p><b>SPUN</b></p>  <p>Page A35 11° <input checked="" type="checkbox"/></p>
<p><b>TCGT-AL</b></p>  <p>Page A36 7° <input checked="" type="checkbox"/></p>	<p><b>TCMT</b></p>  <p>Page A36 7° <input checked="" type="checkbox"/></p>	<p><b>TCMW</b></p>  <p>Page A36 7° <input checked="" type="checkbox"/></p>	<p><b>TNMA</b></p>  <p>Page A37 0° <input type="checkbox"/></p>	<p><b>TNMG-CC</b></p>  <p>Page A37 0° <input type="checkbox"/></p>	<p><b>TNMG-FC</b></p>  <p>Page A37 0° <input type="checkbox"/></p>
<p><b>TNMG-FMC</b></p>  <p>Page A37 0° <input type="checkbox"/></p>	<p><b>TNMG-KC</b></p>  <p>Page A37 0° <input type="checkbox"/></p>	<p><b>TNMG-MC</b></p>  <p>Page A38 0° <input type="checkbox"/></p>	<p><b>TNMG-MFC</b></p>  <p>Page A38 0° <input type="checkbox"/></p>	<p><b>TNMG-MHC</b></p>  <p>Page A38 0° <input type="checkbox"/></p>	<p><b>TNMG-TC</b></p>  <p>Page A38 0° <input type="checkbox"/></p>
<p><b>TNMX</b></p>  <p>Page A38 0° <input type="checkbox"/></p>	<p><b>TPMN</b></p>  <p>Page A39 11° <input checked="" type="checkbox"/></p>	<p><b>TPMR</b></p>  <p>Page A39 11° <input checked="" type="checkbox"/></p>	<p><b>TPUN</b></p>  <p>Page A39 11° <input checked="" type="checkbox"/></p>	<p><b>TPUX</b></p>  <p>Page A39 11° <input checked="" type="checkbox"/></p>	
<p><b>VBMT</b></p>  <p>Page A40 5° <input checked="" type="checkbox"/></p>	<p><b>VCGT-AL</b></p>  <p>Page A40 7° <input checked="" type="checkbox"/></p>	<p><b>VCGT-AP</b></p>  <p>Page A40 7° <input checked="" type="checkbox"/></p>	<p><b>VCMT</b></p>  <p>Page A40 7° <input checked="" type="checkbox"/></p>		
<p><b>VNGP</b></p>  <p>Page A41 0° <input type="checkbox"/></p>	<p><b>VNMG</b></p>  <p>Page A41 0° <input type="checkbox"/></p>	<p><b>VNMG-TC</b></p>  <p>Page A41 0° <input type="checkbox"/></p>		<p><b>WNMA</b></p>  <p>Page A42 0° <input type="checkbox"/></p>	<p><b>WNMG-FC</b></p>  <p>Page A42 0° <input type="checkbox"/></p>
<p><b>WNMG-FMC</b></p>  <p>Page A42 0° <input type="checkbox"/></p>	<p><b>WNMG-KC</b></p>  <p>Page A42 0° <input type="checkbox"/></p>	<p><b>WNMG-MC</b></p>  <p>Page A43 0° <input type="checkbox"/></p>	<p><b>WNMG-MFC</b></p>  <p>Page A43 0° <input type="checkbox"/></p>	<p><b>WNMG-MHC</b></p>  <p>Page A43 0° <input type="checkbox"/></p>	<p><b>WNMG-TC</b></p>  <p>Page A43 0° <input type="checkbox"/></p>



**Ceramic inserts**

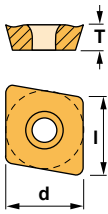
<p><b>CNGA</b></p>  <p>Page A45 0° <input type="checkbox"/></p>	<p><b>CNGN</b></p>  <p>Page A45 0° <input type="checkbox"/></p>	<p><b>CNGX</b></p>  <p>Page A45 0° <input type="checkbox"/></p>	<p><b>DNGA</b></p>  <p>Page A45 0° <input type="checkbox"/></p>	<p><b>DNGN</b></p>  <p>Page A46 0° <input type="checkbox"/></p>	<p><b>DNGX</b></p>  <p>Page A46 0° <input type="checkbox"/></p>
<p><b>RCGX</b></p>  <p>Page A46 7° <input checked="" type="checkbox"/></p>	<p><b>RNGN</b></p>  <p>Page A47 0° <input type="checkbox"/></p>	<p><b>RPGN</b></p>  <p>Page A47 0° <input type="checkbox"/></p>	<p><b>SNGA</b></p>  <p>Page A47 0° <input type="checkbox"/></p>	<p><b>SNGN</b></p>  <p>Page A47 0° <input type="checkbox"/></p>	<p><b>SNGX</b></p>  <p>Page A48 0° <input type="checkbox"/></p>
<p><b>SNGX</b></p>  <p>Page A48 0° <input type="checkbox"/></p>	<p><b>TNGA</b></p>  <p>Page A48 0° <input type="checkbox"/></p>	<p><b>TNGN</b></p>  <p>Page A48 0° <input type="checkbox"/></p>	<p><b>VNGA</b></p>  <p>Page A49 0° <input type="checkbox"/></p>	<p><b>WNGA</b></p>  <p>Page A49 0° <input type="checkbox"/></p>	

**CBN/PCD Inserts**

<p><b>CCMW</b></p>  <p>Page A50 7° <input checked="" type="checkbox"/></p>	<p><b>CNGA</b></p>  <p>Page A50 0° <input type="checkbox"/></p>	<p><b>DCMW</b></p>  <p>Page A50 7° <input checked="" type="checkbox"/></p>	<p><b>DNGA</b></p>  <p>Page A50 0° <input type="checkbox"/></p>	<p><b>SNGA</b></p>  <p>Page A51 0° <input type="checkbox"/></p>	<p><b>TCMW</b></p>  <p>Page A51 7° <input checked="" type="checkbox"/></p>
<p><b>TNGA</b></p>  <p>Page A51 0° <input type="checkbox"/></p>	<p><b>TPMN</b></p>  <p>Page A51 11° <input checked="" type="checkbox"/></p>				

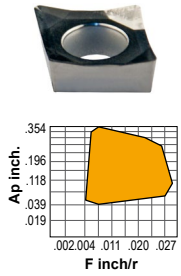


### 80° Rhombic inserts / Positive



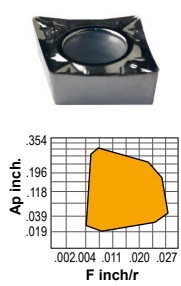
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	⊕															⊕
<b>M</b> Stainless		⊕	●	●	●					●										
<b>K</b> Cast iron	⊕	⊕	●	●	●					●										
<b>N</b> Non ferrous materials			●																	●
<b>S</b> Heat-resistant alloys																			●	⊕
<b>H</b> Hard materials																				



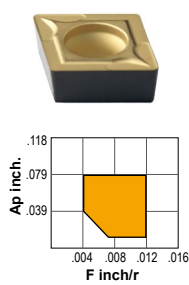
#### CCGT-AL

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CCGT21.50-AL	0.254	0.094	0.250	0.008	●												○
CCGT21.51-AL	0.254	0.094	0.250	0.016	●												○
CCGT32.50-AL	0.380	0.156	0.375	0.008	●												○
CCGT32.51-AL	0.380	0.156	0.375	0.016	●												○
CCGT32.52-AL	0.380	0.156	0.375	0.031	●												○
CCGT430-AL	0.508	0.187	0.500	0.008	●												○
CCGT431-AL	0.508	0.187	0.500	0.016	●												○
CCGT432-AL	0.508	0.187	0.500	0.031	●												○



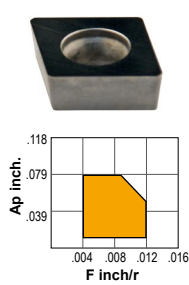
#### CCGT-AP

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CCGT21.50-AP	0.254	0.094	0.250	0.008	●												○
CCGT21.51-AP	0.254	0.094	0.250	0.016	●												○
CCGT32.50-AP	0.380	0.156	0.375	0.008	●												○
CCGT32.51-AP	0.380	0.156	0.375	0.016	●												○
CCGT32.52-AP	0.380	0.156	0.375	0.031	●												○
CCGT430-AP	0.508	0.187	0.500	0.008	●												○
CCGT431-AP	0.508	0.187	0.500	0.016	●												○
CCGT432-AP	0.508	0.187	0.500	0.031	●												○



#### CCMT

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CCMT21.50	0.254	0.094	0.250	0.008	●				●								
CCMT21.51	0.254	0.094	0.250	0.016	●			●	●							●	
CCMT32.51	0.380	0.156	0.375	0.016	●			●	●		●	●				●	
CCMT32.52	0.380	0.156	0.375	0.031	●			●	●		●	●				●	
CCMT432	0.508	0.187	0.500	0.031	●			●	●		●	●				●	

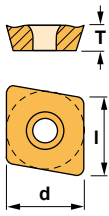


#### CCMW

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CCMW21.50	0.254	0.094	0.250	0.008													
CCMW21.51	0.254	0.094	0.250	0.016		●										○	
CCMW32.51	0.380	0.156	0.375	0.016		●										○	
CCMW32.52	0.380	0.156	0.375	0.031		●										○	
CCMW432	0.508	0.187	0.500	0.031		●										○	

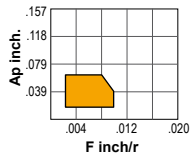


## 80° Rhombic inserts / Negative



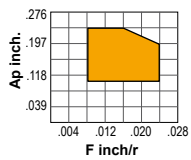
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	⊕														⊕
<b>M</b> Stainless		⊕		●				●											
<b>K</b> Cast iron		⊕		●				●						●					
<b>N</b> Non ferrous materials		●																	●
<b>S</b> Heat-resistant alloys															●	⊕			
<b>H</b> Hard materials																			



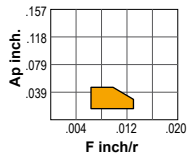
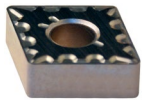
### CNGP

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CNGP431	0.508	0.187	0.500	0.016										●			
CNGP432	0.508	0.187	0.500	0.031										●			



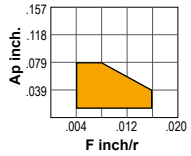
### CNMA

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CNMA432	0.508	0.187	0.500	0.031										●			
CNMA433	0.508	0.187	0.500	0.047									○				



### CNMG-CC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CNMG431CC	0.508	0.187	0.500	0.016				●									
CNMG432CC	0.508	0.187	0.500	0.031				●									



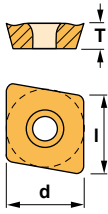
### CNMG-FC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
CNMG321FC	0.380	0.125	0.375	0.016					●								
CNMG322FC	0.380	0.125	0.375	0.031					●								
CNMG431FC	0.508	0.187	0.500	0.016					●		●						



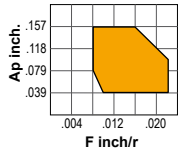


## 80° Rhombic inserts / Negative



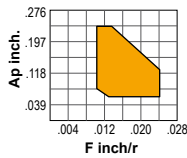
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	⊕															⊕	
<b>M</b> Stainless		⊕		●						●											
<b>K</b> Cast iron	⊕	⊕		●																⊕	
<b>N</b> Non ferrous materials				●																	●
<b>S</b> Heat-resistant alloys																				●	⊕
<b>H</b> Hard materials																					



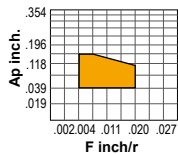
### CNMG-MHC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10	
CNMG432MHC	0.508	0.187	0.500	0.031					●		●							
CNMG433MHC	0.508	0.187	0.500	0.047						●								



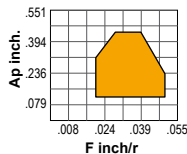
### CNMG-RC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10	
CNMG432RC	0.508	0.187	0.500	0.031					●		●							
CNMG433RC	0.508	0.187	0.500	0.047					●		●							
CNMG542RC	0.630	0.250	0.625	0.031							○							
CNMG543RC	0.630	0.250	0.625	0.047							○							
CNMG643RC	0.760	0.250	0.750	0.047							○							



### CNMG-TC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10	
CNMG431TC	0.508	0.187	0.500	0.016														
CNMG432TC	0.508	0.187	0.500	0.031											●			



### CNMM

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10	
CNMM432	0.508	0.187	0.500	0.031							○							
CNMM543	0.630	0.250	0.620	0.047							○							
CNMM643	0.760	0.250	0.750	0.047							○							

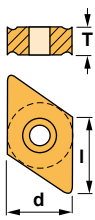






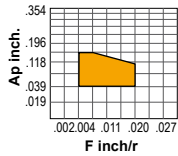


## 55° Rhombic inserts / Negative



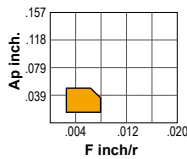
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	◐	⊕												⊕
<b>M</b> Stainless		⊕		●					●									
<b>K</b> Cast iron	◐	⊕		●									◐					
<b>N</b> Non ferrous materials		●																●
<b>S</b> Heat-resistant alloys															●	⊕		
<b>H</b> Hard materials																		



### DNMG-TC

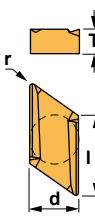
Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
DNMG442TC	0.610	0.250	0.500	0.031											●		



### DNMX

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
DNMX441R-22	0.610	0.250	0.500	0.016					●								
DNMX442R-22	0.610	0.250	0.500	0.031					●								

## KNUX inserts / Negative



- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	◐	⊕												⊕
<b>M</b> Stainless		⊕		●									●					
<b>K</b> Cast iron	◐	⊕		●									◐					
<b>N</b> Non ferrous materials		●																●
<b>S</b> Heat-resistant alloys															●	⊕		
<b>H</b> Hard materials																		

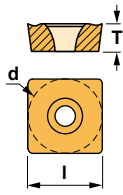


### KNUX

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
KNUX160405L-21	0.630	0.187	0.375	0.020					●		●						
KNUX160405R-21	0.630	0.187	0.375	0.020					●		●						
KNUX160405R-32	0.630	0.187	0.375	0.020					●								
KNUX160410L-21	0.630	0.187	0.375	0.039							●						
KNUX160410R-21	0.630	0.187	0.375	0.039					●		●						
KNUX160410R-32	0.630	0.187	0.375	0.039							●						

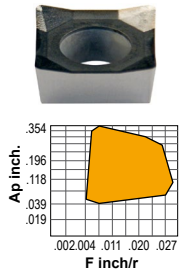


# Square inserts / Positive



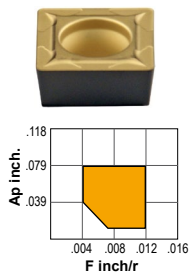
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	⊕															⊕
<b>M</b> Stainless		⊕		●																
<b>K</b> Cast iron		⊕	●																	
<b>N</b> Non ferrous materials			●																	●
<b>S</b> Heat-resistant alloys																			●	⊕
<b>H</b> Hard materials																				



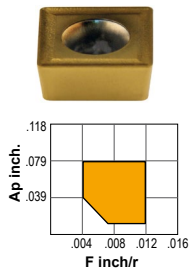
## SCGT-AL

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10		
SCGT32.51-AL	0.375	0.156	0.375	0.016	●														
SCGT32.52-AL	0.375	0.156	0.375	0.031	●														
SCGT432-AL	0.500	0.187	0.500	0.031	●														



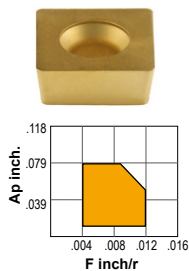
## SCMT

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10	
SCMT32.51	0.375	0.156	0.375	0.016					●									
SCMT32.52	0.375	0.156	0.375	0.031					●									
SCMT432	0.500	0.187	0.500	0.031					●									



## SCMT-39

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SCMT32.51-39	0.375	0.156	0.375	0.016		●										●	
SCMT32.52-39	0.375	0.156	0.375	0.031	○	●										●	
SCMT432-39	0.500	0.187	0.500	0.031	○	●										●	
SCMT433-39	0.500	0.187	0.500	0.047	●											●	



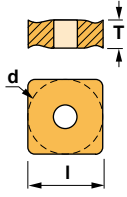
## SCMW

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SCMW32.52	0.375	0.156	0.375	0.031		●										○	
SCMW432	0.500	0.187	0.500	0.031	○	○										○	
SCMW433	0.500	0.187	0.500	0.047	○	○										○	



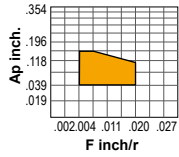


## Square inserts / Negative



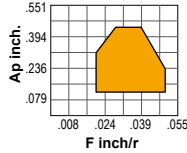
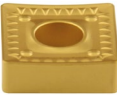
- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

<b>P</b> Steel	⊕	⊕	●	●	⊕													⊕
<b>M</b> Stainless		⊕		●				●										
<b>K</b> Cast iron		⊕	⊕	●				●					●					
<b>N</b> Non ferrous materials		●																●
<b>S</b> Heat-resistant alloys															●	⊕		
<b>H</b> Hard materials																		



### SNMG-TC

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SNMG432TC	0.500	0.187	0.500	0.031											●		



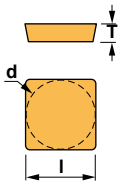
### SNMM

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SNMM644	0.750	0.250	0.750	0.063							○						
SNMM856	1.000	0.312	1.000	0.094							○						



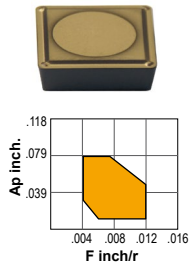


## Square inserts / Positive



- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

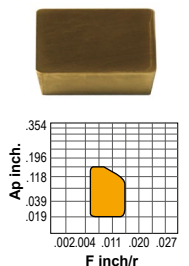
<b>P</b> Steel	⊕	⊕	●	●	⊕														⊕
<b>M</b> Stainless		⊕		●				●											
<b>K</b> Cast iron	⊕	⊕		●															⊕
<b>N</b> Non ferrous materials		●																	●
<b>S</b> Heat-resistant alloys																			⊕
<b>H</b> Hard materials																			



### SPMR

11°

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SPMR322	0.375	0.125	0.375	0.031						●							
SPMR421	0.500	0.125	0.500	0.016					●								
SPMR422	0.500	0.125	0.500	0.031	●					●							



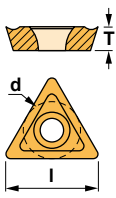
### SPUN

11°

Reference	l	T	d	r	KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10
SPUN321E	0.375	0.125	0.375	0.016		●										●	
SPUN322E	0.375	0.125	0.375	0.031		●										●	
SPUN421E	0.500	0.125	0.500	0.016		●										●	
SPUN422E	0.500	0.125	0.500	0.031		●										●	
SPUN422F	0.500	0.125	0.500	0.031	●												
SPUN423E	0.500	0.125	0.500	0.047		●										●	
SPUN432E	0.500	0.187	0.500	0.031		○											
SPUN532E	0.625	0.187	0.625	0.031		●											
SPUN533E	0.625	0.187	0.625	0.047		○											
SPUN632E	0.750	0.187	0.750	0.047		○											

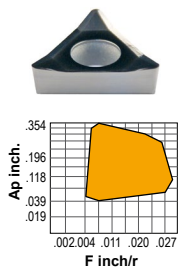


## Triangular inserts / Positive

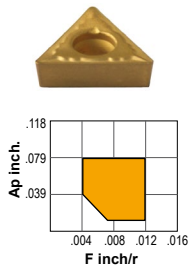


- USE CLASSIFICATION**
- Continuous
  - ◐ Slight interruption
  - ⊕ Interruption
- AVAILABILITY**
- Standard item
  - Check Availability

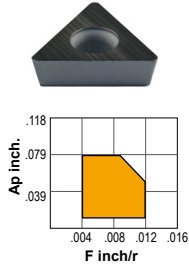
<b>P</b> Steel	⊕	⊕	●	●	⊕														⊕
<b>M</b> Stainless		⊕		●				●											
<b>K</b> Cast iron	⊕	⊕	●																
<b>N</b> Non ferrous materials	●																		●
<b>S</b> Heat-resistant alloys																	●	⊕	
<b>H</b> Hard materials																			



Reference	l	T	d	r	7°															
					KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10			
TCGT21.50-AL	0.433	0.094	0.250	0.008	●															
TCGT21.51-AL	0.433	0.094	0.250	0.016	●															
TCGT32.50-AL	0.650	0.156	0.375	0.008	●															
TCGT32.51-AL	0.650	0.156	0.375	0.016	●															
TCGT32.52-AL	0.650	0.156	0.375	0.031	●															



Reference	l	T	d	r	7°															
					KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10			
TCMT090204	0.379	0.094	0.218	0.016					●											
TCMT21.51	0.433	0.094	0.250	0.016		●			●											
TCMT32.51	0.650	0.156	0.375	0.016		●			●											
TCMT32.52	0.650	0.156	0.375	0.031		●			●											
TCMT432	0.866	0.187	0.500	0.031		○														
TCMT433	0.866	0.187	0.500	0.047		○														



Reference	l	T	d	r	7°															
					KM15	PM25	PM40	NC25	TN15	TN20	TN30	TN35	TK15	TS15	TS20	TIN25	ZR10			
TCMW21.51	0.433	0.094	0.250	0.016	●	●														
TCMW32.51	0.650	0.156	0.375	0.016	●															
TCMW32.52	0.650	0.156	0.375	0.031	●	●														



















## Turning insert wear and tool life

	Problem	Cause and remedy
<p><b>Flank and notch wear</b></p>	<ul style="list-style-type: none"> <li>▼ Rapid flank wear causing poor surface finish or out of tolerance (a).</li> <li>▼ Notch wear causing poor surface finish and risk of edge breakage.</li> </ul>	<ul style="list-style-type: none"> <li>▲ A too high cutting speed or insufficient wear resistance (a).</li> <li>▲ Oxidation or excessive attrition wear caused by a hard surface (b,c). Reduce the cutting speed. Select a more wear resistant grade.</li> <li>▲ Select an Al<sub>2</sub> O<sub>3</sub> coated grade for steel machining. For work hardening materials select a larger lead angle or a more wear resistant grade.</li> </ul>
<p><b>Crater wear</b></p>	<ul style="list-style-type: none"> <li>▼ Excessive crater wear causing a weakened edge. Cutting edge break through on the trailing edge causes poor surface finish.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Diffusion wear due to too high cutting temperatures on the rake face. Select an Al<sub>2</sub> O<sub>3</sub> coated grade. Select a positive insert geometry. Obtain a lower temperature by reducing the feed and speed.</li> </ul>
<p><b>Plastic deformation</b></p>	<ul style="list-style-type: none"> <li>▼ Plastic deformation (edge depression (a) or flank impression (b)) leading to poor chip control and poor surface finish. Risk of excessive flank wear leading to insert breakage.</li> </ul>	<ul style="list-style-type: none"> <li>▲ A too high cutting temperature in combination with a high pressure. Select a harder grade with better resistance to plastic deformation. (a) Reduce cutting speed. (b) Reduce feed.</li> </ul>
<p><b>Built-up edge</b></p>	<ul style="list-style-type: none"> <li>▼ Built-up edge (B.U.E.) causing poor surface finish and cutting edge frittering when the B.U.E. is torn away.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Workpiece material is welded to the insert due to:                             <ul style="list-style-type: none"> <li>- low cutting speed.</li> <li>- negative cutting geometry.</li> <li>- "sticky" material, e.g. certain stainless steels and pure aluminium.</li> </ul>                             Increase cutting speed. Select a positive geometry. Increase cutting speed drastically. If tool life turns out to be short, apply coolant in large quantities.                         </li> </ul>
<p><b>Chip hammering</b></p>	<ul style="list-style-type: none"> <li>▼ The part of the cutting edge not in cut is damaged through chip hammering. Both the top side and the support for the insert, can be damaged.</li> </ul>	<ul style="list-style-type: none"> <li>▲ The chips are of an excessive length and are deflected against the cutting edge. Change the feed slightly. Select an alternative insert geometry. Change the lead angle of the holder.</li> </ul>
<p><b>Frittering</b></p>	<ul style="list-style-type: none"> <li>▼ Small cutting edge fractures (frittling) causing poor surface finish and excessive flank wear.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Grade too brittle.</li> <li>▲ Insert geometry too weak.</li> <li>▲ Built-up edge. Select a tougher grade. Select an insert with a stronger geometry. Increase cutting speed or select a positive geometry.</li> </ul>
<p><b>Thermal cracks</b></p>	<ul style="list-style-type: none"> <li>▼ Small cracks perpendicular to the cutting edge causing frittling and poor surface finish.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Thermal cracks due to temperature variations caused by:                             <ul style="list-style-type: none"> <li>- Intermittent machining.</li> <li>- Varying coolant supply.</li> </ul>                             Select a tougher grade with better resistant to thermal shocks. Coolant should be applied copiously or not at all.                         </li> </ul>
<p><b>Insert breakage</b></p>	<ul style="list-style-type: none"> <li>▼ Insert breakage that damages not only the insert but also the shim and workpiece.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Grade too brittle.</li> <li>▲ Excessive load on the insert.</li> <li>▲ Insert geometry too weak.</li> <li>▲ Insert size is too small. Select a tougher grade. Reduce the feed and/or the depth of the cut. Select a stronger geometry, preferably a single sided insert. Select a thicker/larger insert.</li> </ul>





## Ceramic inserts

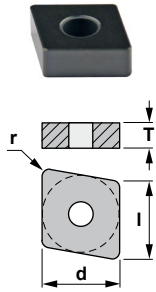
**i USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

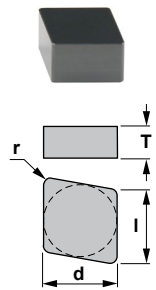
**i AVAILABILITY**

- Standard item
- Check availability

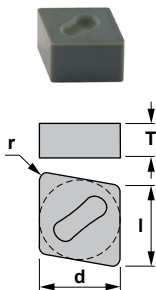
Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	CC2			
		CX6			
		CW1			
<b>S</b>	Heat-resistant alloys	CX9			
		CW1			
<b>H</b>	Hard materials	CC7			



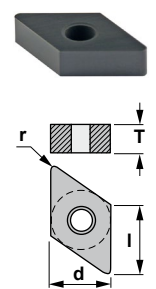
<b>CNGA</b>		80° rhombic negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
CNGA431	0.508	0.187	0.500	0.016					●		
CNGA432	0.508	0.187	0.500	0.031		●			●		
CNGA433	0.508	0.187	0.500	0.047		●			●		



<b>CNGN</b>		80° rhombic negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
CNGN432	0.508	0.187	0.500	0.031				●		●	
CNGN433	0.508	0.187	0.500	0.047				●		●	
CNGN452	0.508	0.312	0.500	0.031				●		●	
CNGN453	0.508	0.312	0.500	0.047				●		●	
CNGN454	0.508	0.312	0.500	0.063						●	



<b>CNGX</b>		80° rhombic negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
CNGX452	0.508	0.312	0.500	0.031		●	●				
CNGX453	0.508	0.312	0.500	0.047		●	●				
CNGX454	0.508	0.312	0.500	0.063		●	●				
CNGX553	0.634	0.312	0.625	0.047		●					
CNGX554	0.634	0.312	0.625	0.063		●	●				



<b>DNGA</b>		55° rhombic negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
DNGA431	0.508	0.187	0.500	0.016					●		
DNGA432	0.508	0.187	0.500	0.031		●			●		
DNGA433	0.508	0.187	0.500	0.047		●			●		



## Ceramic inserts

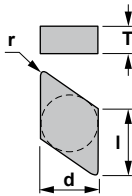
**USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

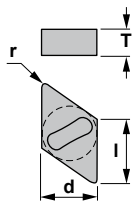
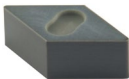
**AVAILABILITY**

- Standard item
- Check availability

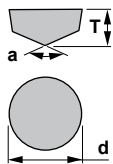
Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	CC2			
		CX6			
		CW1			
<b>S</b>	Heat-resistant alloys	CX9			
		CW1			
<b>H</b>	Hard materials	CC7			



<b>DNGN</b>		55° rhombic negative insert.								
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1	
DNGN452	0.610	0.312	0.500	0.031			●		●	
DNGN453	0.610	0.312	0.500	0.047			●		●	
DNGN454	0.610	0.312	0.500	0.063			●		●	



<b>DNGX</b>		55° rhombic negative insert.								
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1	
DNGX452	0.610	0.312	0.500	0.031	●					
DNGX453	0.610	0.312	0.500	0.047	●	●				
DNGX454	0.610	0.312	0.500	0.063	●	●				



<b>RCGX</b>		Round positive insert.							
Reference	T	d	a	CX6	CX9	CC2	CC7	CW1	
RCGX060700	0.312	0.250	120°			●		●	
RCGX090700	0.312	0.375	120°		●	●		●	
RCGX120700	0.312	0.500	120°		●	●		●	
RCGX151000	0.394	0.625	120°			●		●	
RCGX191000	0.394	0.750	120°		●	●		●	
RCGX251200	0.472	1.000	140°			●			



## Ceramic inserts

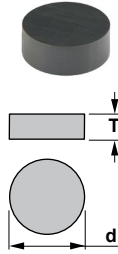
**i USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

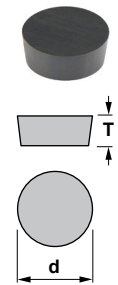
**i AVAILABILITY**

- Standard item
- Check availability

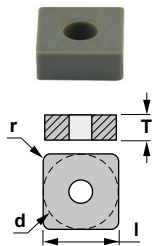
Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	CC2			
		CX6			
		CW1			
<b>S</b>	Heat-resistant alloys	CX9			
		CW1			
<b>H</b>	Hard materials	CC7			



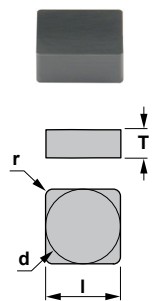
RNGN			Round negative inserts.				
Reference	T	d	CX6	CX9	CC2	CC7	CW1
RNGN43	0.187	0.500	●	●		●	●
RNGN45	0.312	0.500	●	●		●	●



RPGN			Round negative inserts.				
Reference	T	d	CX6	CX9	CC2	CC7	CW1
RPGN060200	0.094	0.250		●			
RPGN090300	0.125	0.375		●			
RPGN120400	0.187	0.500	●				



SNGA					Square negative insert.				
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1
SNGA432	0.500	0.187	0.500	0.031				●	
SNGA433	0.500	0.187	0.500	0.047	●			●	
SNGA434	0.500	0.187	0.500	0.063	●			●	



SNGN					Square negative insert.				
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1
SNGN431	0.500	0.187	0.500	0.016			●		
SNGN432	0.500	0.187	0.500	0.031			●		
SNGN433	0.500	0.187	0.500	0.047			●		
SNGN434	0.500	0.187	0.500	0.063			●		
SNGN435	0.500	0.187	0.500	0.078			○		
SNGN436	0.500	0.187	0.500	0.094			○		
SNGN452	0.500	0.312	0.500	0.031		●	●		●
SNGN453	0.500	0.312	0.500	0.047		●	●		●
SNGN454	0.500	0.312	0.500	0.063		●	●		●
SNGN455	0.500	0.312	0.500	0.078			○		



## Ceramic inserts

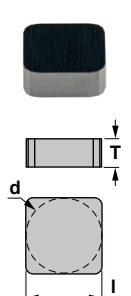
**USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

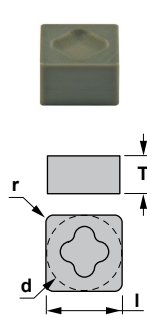
**AVAILABILITY**

- Standard item
- Check availability

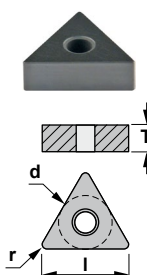
Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	CC2			
		CX6			
		CW1			
<b>S</b>	Heat-resistant alloys	CX9			
		CW1			
<b>H</b>	Hard materials	CC7			



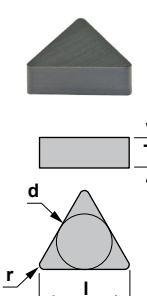
<b>SNGN</b>					Square negative insert.				
Reference	l	T	d		CX6	CX9	CC2	CC7	CW1
SNGN1204ENT	0.500	0.187	0.500		●				



<b>SNGX</b>					Square negative insert.				
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1
SNGX452	0.500	0.312	0.500	0.031	●				
SNGX453	0.500	0.312	0.500	0.047	●				
SNGX454	0.500	0.312	0.500	0.063	●				
SNGX552	0.625	0.312	0.625	0.031	○				
SNGX553	0.625	0.312	0.625	0.047	●	●			
SNGX554	0.625	0.312	0.625	0.063	●	●			



<b>TNGA</b>					Triangular negative insert.				
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1
TNGA331	0.650	0.187	0.375	0.016				●	
TNGA332	0.650	0.187	0.375	0.031				●	
TNGA333	0.650	0.187	0.375	0.047				●	
TNGA334	0.650	0.187	0.375	0.063				○	



<b>TNGN</b>					Triangular negative insert.				
Reference	l	T	d	r	CX6	CX9	CC2	CC7	CW1
TNGN332	0.650	0.187	0.375	0.031			●		
TNGN333	0.650	0.187	0.375	0.047			●		
TNGN334	0.650	0.187	0.375	0.063			●		
TNGN352	0.650	0.312	0.375	0.031			●		
TNGN353	0.650	0.312	0.375	0.047			○		



## Ceramic inserts

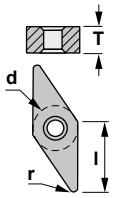
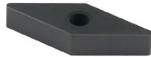
**i USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

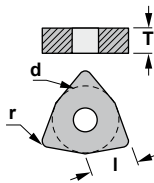
**i AVAILABILITY**

- Standard item
- Check availability

Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	CC2			
		CX6			
		CW1			
<b>S</b>	Heat-resistant alloys	CX9			
		CW1			
<b>H</b>	Hard materials	CC7			



<b>VNGA</b>		35° rhombic negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
VNGA331	0.650	0.187	0.375	0.016					●		
VNGA332	0.650	0.187	0.375	0.031					●		
VNGA333	0.650	0.187	0.375	0.047					●		



<b>WNGA</b>		80° trigon negative insert.									
Reference	l	T	d	r		CX6	CX9	CC2	CC7	CW1	
WNGA432	0.320	0.187	0.500	0.031		●			●		
WNGA433	0.320	0.187	0.500	0.047		●			●		





**CBN/PCD Inserts**

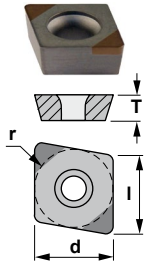
**USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

**AVAILABILITY**

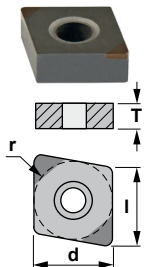
- Standard item
- Check availability

Material		Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b>	Cast iron	<b>CBN</b>			
<b>H</b>	Hard materials	<b>CBN</b>			
<b>N</b>	Non ferrous materials	<b>PCD</b>			



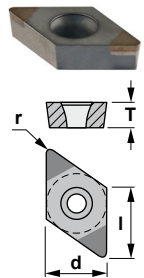
**CCMW** 80° rhombic positive insert.

Reference	l	T	d	r	CBN	PCD
CCMW21.50	0.255	0.094	0.250	0.008	○	
CCMW21.51	0.255	0.094	0.250	0.016	●	
CCMW32.51	0.381	0.156	0.375	0.016	●	
CCMW32.52	0.381	0.156	0.375	0.031	●	



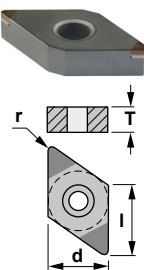
**CNGA** 80° rhombic negative insert.

Reference	l	T	d	r	CBN	PCD
CNGA431	0.508	0.187	0.500	0.016	●	
CNGA432	0.508	0.187	0.500	0.031	●	
CNGA433	0.508	0.187	0.500	0.047	○	



**DCMW** 55° rhombic positive insert.

Reference	l	T	d	r	CBN	PCD
DCMW21.50	0.307	0.094	0.250	0.008	○	
DCMW21.51	0.307	0.094	0.250	0.016	●	
DCMW32.50	0.457	0.156	0.375	0.008	○	
DCMW32.51	0.457	0.156	0.375	0.016	●	
DCMW32.52	0.457	0.156	0.375	0.031	●	



**DNGA** 55° rhombic negative insert.

Reference	l	T	d	r	CBN	PCD
DNGA431	0.610	0.187	0.500	0.016	●	
DNGA432	0.610	0.187	0.500	0.031	●	
DNGA433	0.610	0.187	0.500	0.047	○	



## CBN/PCD Inserts

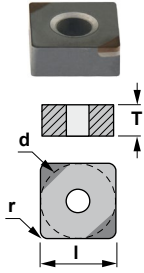
**USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

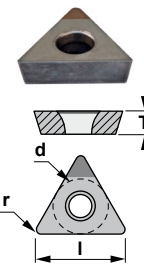
**AVAILABILITY**

- Standard item
- Check availability

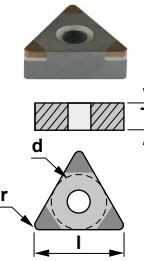
Material	Grade	● Continuous	◐ Slight interruption	⊕ Interruption
<b>K</b> Cast iron	<b>CBN</b>			
<b>H</b> Hard materials	<b>CBN</b>			
<b>N</b> Non ferrous materials	<b>PCD</b>			



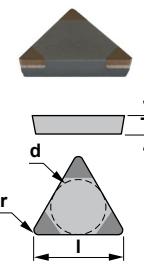
Reference	Square negative insert.				CBN	PCD
	l	T	d	r		
SNGA431	0.500	0.187	0.500	0.016	○	
SNGA432	0.500	0.187	0.500	0.031	○	
SNGA433	0.500	0.187	0.500	0.047	○	



Reference	Triangular positive insert.				CBN	PCD
	l	T	d	r		
TCMW21.51	0.433	0.094	0.250	0.016	●	
TCMW32.51	0.650	0.156	0.375	0.016	●	
TCMW32.52	0.650	0.156	0.375	0.031	●	



Reference	Triangular negative insert.				CBN	PCD
	l	T	d	r		
TNGA331	0.650	0.187	0.375	0.016	●	
TNGA332	0.650	0.187	0.375	0.031	●	
TNGA333	0.650	0.187	0.375	0.047	○	



Reference	Triangular positive insert.				CBN	PCD
	l	T	d	r		
TPMN221	0.433	0.125	0.250	0.016	●	
TPMN222	0.433	0.125	0.250	0.031	●	
TPMN321	0.650	0.125	0.375	0.016	●	
TPMN322	0.650	0.125	0.375	0.031	●	
TPMN323	0.650	0.125	0.375	0.047	●	

## Improve your productivity

The Flow-Master coolant system works by delivering the machine coolant with maximum efficiency. The volume and speed of coolant coming out direct to the insert cutting edge improves machining performance.

Flow-Master tooling is extremely effective removing heat from the cutting edge, cooling the chips rapidly and helping to break it faster. Chips with poor heat removal are malleable and flexible, not breaking properly and adding extra heat to the cutting edge.

*Performance improvement up to 50% with 70 bar pressure*

### ■ Main Benefits

- Increased speeds and feeds
- Extended tool life
- Improved surface finish
- Better chip control and evacuation
- Easy system without spare parts

