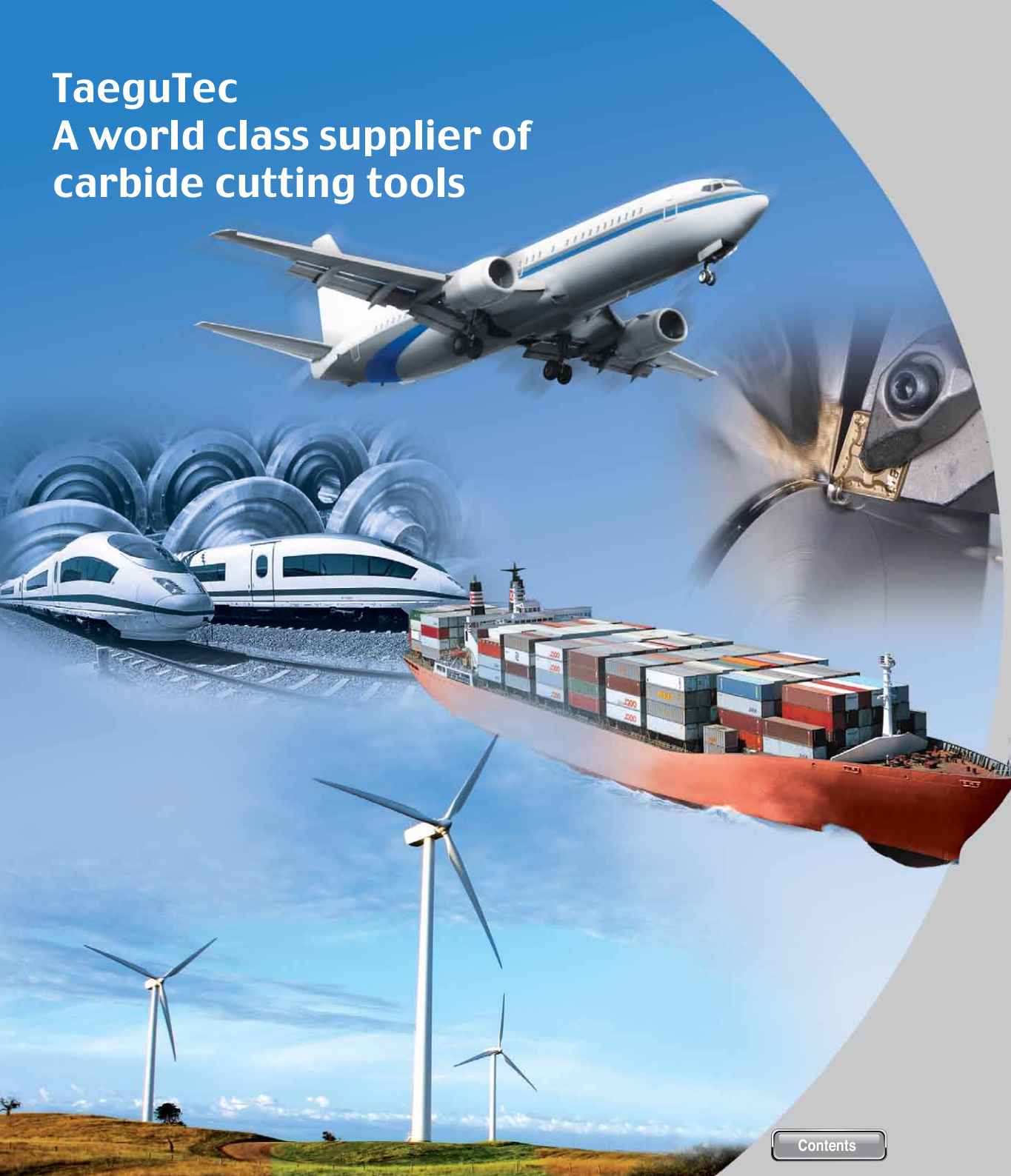


Turning Line **INSERT MASTER**



TaeguTec

A world class supplier of
carbide cutting tools



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GOLD RUSH



"New Cutting edge Technology" Better Quality, Longer Tool life

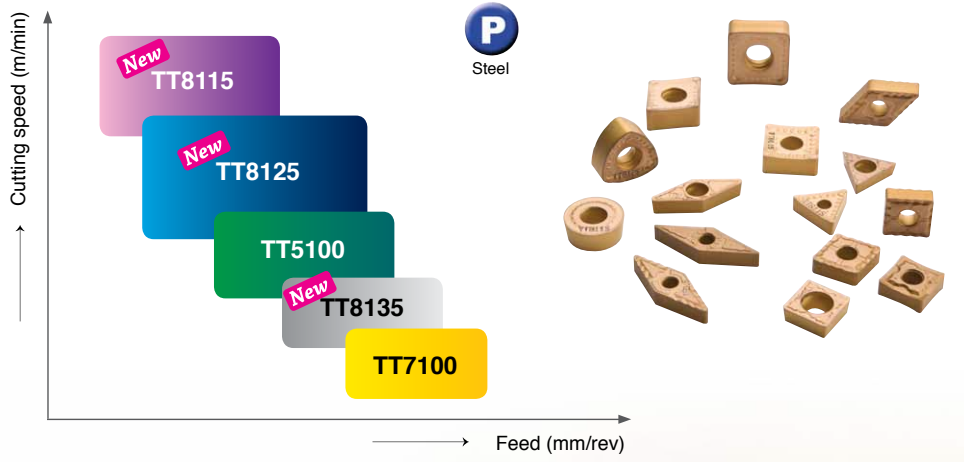
Features

- Excellent surface finish on the workpiece
- Improved adhesion and insert chipping resistance
- Stable and extended tool life in continuous and interrupted cutting operations
- Reduced cutting friction and minimized built-up edge on exotic materials

Benefit of new cutting edge technology

	Material: 0.2% Carbon Steel (HB145-160)	
	Insert: CNMG 120408 TT8115	
	Cutting Condition V=100m/min f=0.10mm/rev d=3.0mm Face Interrupted cut	

Gold Rush grades for steel applications



Gold Rush grades for stainless steels and high-temp alloy applications



New Grades
 Grades
 Chipbreakers
 Insert Geometry by Workpiece Shape
 Trouble Shooting
 TaeguTurn Workpiece Material Group
 Insert Selection by Workpiece Material
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BLACK•RUSH Grades for Cast iron



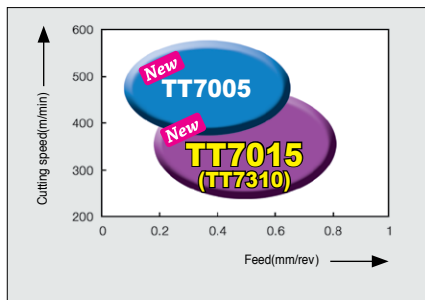
- New TT7005** : For high cutting speed in continuous cut on cast irons
- New TT7015** : For general machining in continuous cut and interrupted cut on cast iron

*The Best Choice,
The Best Solution!*

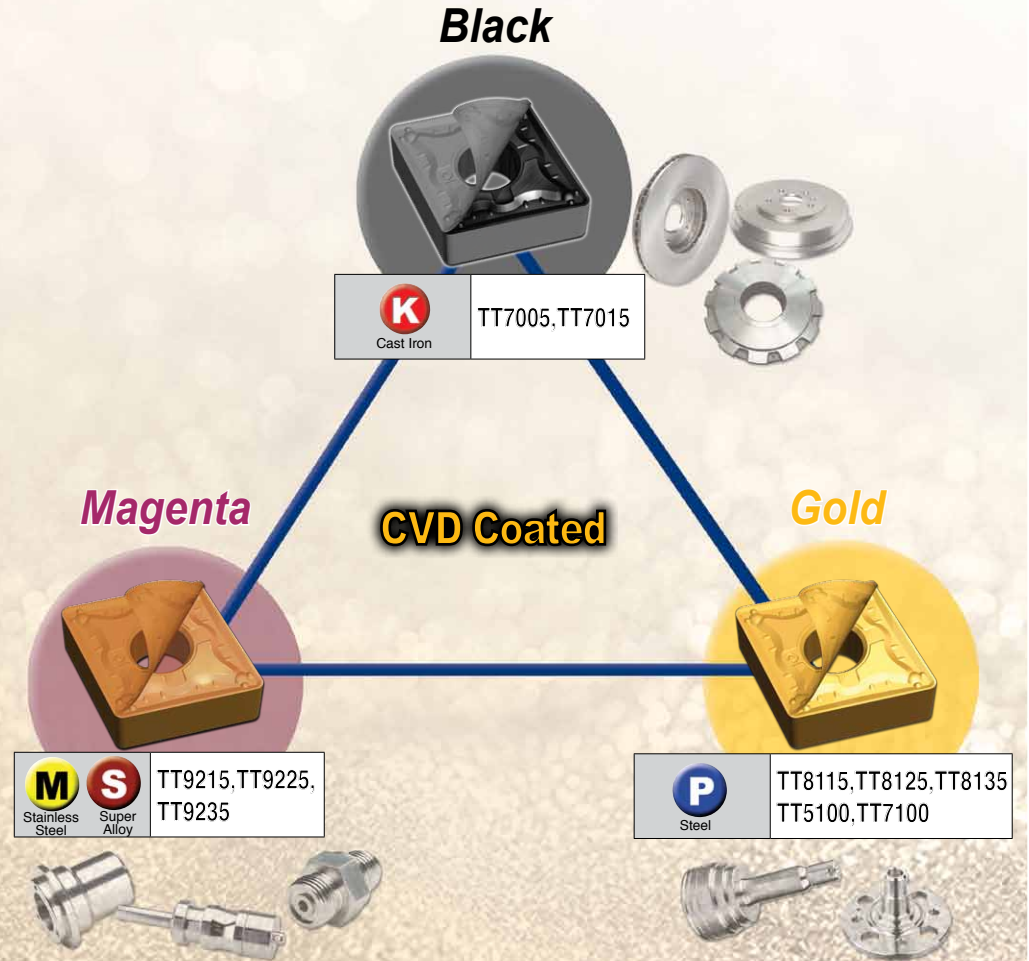
■ Features

- New grade dedicated to ductile cast iron machining
- Applied also for gray cast irons
- Excellent wear resistance and endurance to chipping

■ Application range



Easy to select insert color in CVD insert by workpiece material





T-CAST

The Best Solution for Cast Iron Machining

Satisfaction guaranteed with TaeguTec's T-CAST turning grades for cast iron machining

Ceramic
AW120, AB30, AS500, SC10, AS10
High Productivity

CBN
TB670, KB90A, TB730
Ultra High Cutting Speed and High Surface Finish, Longer Tool Life

T-CAST Grades

Cermet and PVD Coated
CT3000, PV3010
Improved Surface Finish

General Machining
CVD Carbide Coated
TT7005, TT7015(TT7310)

Insert Selection for Cast Iron Materials

Grade Selection by Workpiece Material

- Gray cast iron (HB180 - 220)
- Ductile cast iron (HB200 - 240)

Workpiece condition	Grades											
	TB670	KB90A	TB730	AW120	AB30	AS500	SC10	AS10	PV3010	CT3000	TT7005	TT7015
Scale and severe interruption	•	•	•			•		•				•
Scale and light interruption	•	•	•		•	•	•	•			•	•
No scale, continuous cut	•	•	•	•	•	•	•	•	•	•	•	•

Recommended Cutting Parameters

Materials	Grades											
	TB670	KB90A	TB730	AW120	AB30	AS500	SC10	AS10	PV3010	CT3000	TT7005	TT7015
	Cutting speed (m/min), Feed rate (mm/rev)											
Gray cast iron (HB180 - 220)		800 - 1200 0.1 - 0.5	800 - 1200 0.1 - 0.3	400 - 1000 0.07 - 0.2	300 - 800 0.1 - 0.25	400 - 1000 0.2 - 0.6	300 - 1000 0.2 - 0.6	300 - 800 0.2 - 0.6	100 - 350 0.1 - 0.25	100 - 300 0.1 - 0.25	150 - 450 0.1 - 0.7	100 - 300 0.1 - 0.7
Ductile cast iron (HB200 - 240)	200 - 500 0.05 - 0.2				250 - 500 0.05 - 0.2	200 - 600 0.1 - 0.5	250 - 600 0.2 - 0.6	250 - 500 0.2 - 0.6	100 - 300 0.1 - 0.25	100 - 250 0.1 - 0.25	120 - 350 0.1 - 0.5	100 - 250 0.1 - 0.5

Chipbreaker and Grade Selection by Workpiece Material

- Gray cast iron (HB180 - 220)

Workpiece condition	Depth of cut	Chipbreaker/Grade				
		Recommended cutting conditions (V,f)				
		RT/TT7005	RT/TT7015	RT/TT7015		
Roughing (Scale & severe interruption)	4.0 - 6.0	300, 0.4	240, 0.4			
	6.0 -	270, 0.4	220, 0.4			
Medium (Scale & light interruption)	1.0 - 2.5	- NMN/KB90A 760, 0.3	- NMN/KB90A 760, 0.3	- NGA/AS500 540, 0.35	MT/TT7005 360, 0.35	RT/TT7005 320, 0.4
	2.5 - 4.0	- NMN/KB90A 720, 0.35	- NGA/AS10 540, 0.35	RT/TT7005 300, 0.4		
Finishing (No scale & continuous cutting)	- 1.0	- NMN/KB90A 800, 0.2	- NGA/AW120 800, 0.2	NGA/AB30 700, 0.2	NGA/AS500 600, 0.25	MT/TT7005 400, 0.25

- Ductile cast iron (HB200 - 240)

Workpiece condition	Depth of cut	Chipbreaker/Grade				
		Recommended cutting conditions (V,f)				
		RT/TT7015				
Roughing (Scale & severe interruption)	4.0 - 6.0	225, 0.4				
	6.0 -	210, 0.4				
Medium (Scale & light interruption)	1.0 - 2.5	- NMA/TB670 500, 0.2	- NGA/AB30 470, 0.2	MT/TT7005 305, 0.3	RT/TT7005 270, 0.35	
	2.5 - 4.0	- NGA/AS10 440, 0.3	MT/TT7015 260, 0.35	RT/TT7015 235, 0.35		
Finishing (No scale & continuous cutting)	- 1.0	- NMA/TB670 550, 0.2	- NGA/AB30 520, 0.2	MT/TT7005 320, 0.2	MT/PV3010 320, 0.2	MT/CT3000 290, 0.2

■ Coated Carbide, Cermet and Carbide Grades

Grades	Coating	ISO	Characteristics & Applications
BLACK-RUSH TT7005 CVD Coated	TiN/TiCN/Al ₂ O ₃	K01 — K15	<ul style="list-style-type: none"> For high speed machining of gray and ductile cast iron Excellent wear resistant coated grade assures optimum performance in high speed continuous machining of cast iron
BLACK-RUSH TT7015 CVD Coated	TiN/TiCN/Al ₂ O ₃	K10 — K25	<ul style="list-style-type: none"> For general machining of gray and ductile cast iron For continuous and interrupted machining of gray and ductile cast iron
TT7310 CVD Coated	TiN/TiCN/Al ₂ O ₃	K10 — K25	<ul style="list-style-type: none"> For general machining of gray and ductile cast iron
TT8115 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	P05 — P20	<ul style="list-style-type: none"> For high speed turning continuous cutting on steels Excellent wear resistance and heat-resistance
TT9215 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	S05 — S20 M05 — M20	<ul style="list-style-type: none"> Excellent insert wear resistance For high cutting speed & continuous cutting on stainless steels
TT5080 PVD Coated	AlTiN/TiN	S05 — S25 M05 — M25	<ul style="list-style-type: none"> For a wide range of turning of high-temp alloys Very hard submicron substrate
TT8125 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	P15 — P30	<ul style="list-style-type: none"> For a wide range of turning on steels Very good combination of wear resistance and toughness For general use on steels
TT5100 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	P20 — P35	<ul style="list-style-type: none"> For a wide range of turning of mild steel, low carbon steel and low carbon alloy steel Excellent chipping resistance and sticking resistance
TT9225 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	S15 — S30 M15 — M30	<ul style="list-style-type: none"> Excellent combination of insert wear resistance & fracture resistance For general use on stainless steel For continuous and interrupted cutting on stainless steel
TT9020 PVD Coated	TiCN	P20 — P40 M20 — M40	<ul style="list-style-type: none"> Submicron substrate with PVD coating For stainless steel
TT9080 PVD Coated	AlTiN/TiN	M20 — M40 S20 — S40	<ul style="list-style-type: none"> Very hard submicron substrate with good fracture toughness For turning small components
TT8135 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	P25 — P40	<ul style="list-style-type: none"> Tough carbide substrate For a wide range of medium to roughing applications at low cutting speed on steels For heavy turning
TT7100 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	P30 — P45	<ul style="list-style-type: none"> Very tough carbide substrate base - with a CVD coating This combination provides both excellent toughness and chipping resistance For heavy turning
TT9235 CVD Coated	TiN/TiCN/Al ₂ O ₃ /TiN	S25 — S40 M25 — M40	<ul style="list-style-type: none"> Excellent combination of insert wear resistance & toughness For low cutting speed & interrupted cutting
TT8020 PVD Coated	TiCN	P30 — P50 M30 — M50 S30 — S50	<ul style="list-style-type: none"> For medium to low speed turning of stainless steel, exotic alloys and low carbon steel Toughest grade in turning grade For interrupted cut on stainless steel and exotic alloys
PV3010 PVD Coated Cermet	TiN	P05 — P20 M05 — M20 K05 — K20	<ul style="list-style-type: none"> For high surface finish turning of steel, stainless steel and cast iron Excellent wear resistance and low coefficient of friction Long tool life
CT3000 Uncoated Cermet		P10 — P20 M10 — M20 K10 — K20	<ul style="list-style-type: none"> Excellent surface finish turning on steel, stainless steel and cast iron Excellent wear resistance and low coefficient of friction
K10 Carbide		K05 — K15 N05 — N15 S05 — S15	<ul style="list-style-type: none"> General turning of cast iron, exotic alloy and non-ferrous materials including aluminum and copper alloy Excellent wear resistant grade

Recommended Cutting Speeds: V=m/min							
Materials							
Low Carbon Steel	Low Carbon Alloy Steel	Carbon Steel	Alloy Steel	Stainless Steel	High Temp. Alloy	Cast Iron	Aluminum Alloy
						150 - 450	
						120 - 420	
						120 - 420	
440-800	330-660	170-440	110-380				
				170-250	40-80		
				150-250	30-100		
250-600	150-500	100-350	80-300				
150-500	70-350	70-250	70-220				
					130-220	30-70	
					50-150		
					50-160	20-40	
100-400	70-320	70-250	70-220				
60-350	60-300	70-200	70-180				
					110-170	30-60	
70-300	70-250	70-150	70-130	50-150	20-30		
300-800	150-600	150-400	100-350	200-300		100-300	
250-700	150-550	150-350	100-320	200-270		100-350	
					20-50	80-180	60-1500

■ CBN, PCD and Ceramic Grades

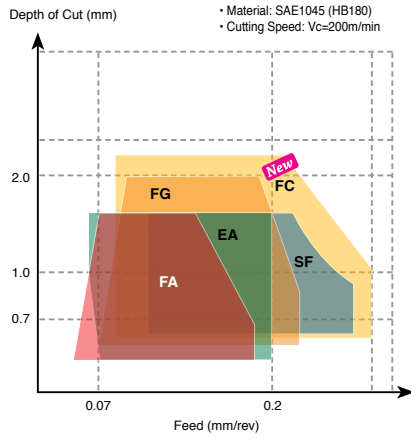
Grades	Composition	Characteristics & Applications
KP300 PCD	PCD + Binder	<ul style="list-style-type: none"> For general use on aluminum alloy Excellent combination of wear resistance and toughness
TB610 CBN	CBN + Binder	<ul style="list-style-type: none"> Excellent wear resistant grade with low CBN content Continuous cutting at high cutting speeds on hardened steels
TB650 CBN	CBN + Binder	<ul style="list-style-type: none"> High wear resistant grade with moderate fracture toughness Can be applied to light interrupted cutting applications
TB670 CBN	CBN + Binder	<ul style="list-style-type: none"> Excellent combination of wear resistance and toughness For general use on hardened steel For continuous and interrupted cutting
TB730 CBN	CBN + Binder	<ul style="list-style-type: none"> Excellent toughness with high CBN content For high speed machining of cast iron Can be applied to interrupted cutting on hardened steel and other materials
KB90A CBN	CBN + Binder	<ul style="list-style-type: none"> Solid CBN with excellent impact resistance For high speed machining of cast iron Can be applied to rough to medium machining of hardened steel
AW120 CERAMIC	Al ₂ O ₃ + ZrO ₂	<ul style="list-style-type: none"> Excellent wear resistant grade with chemical stability and temperature resistance For high speed continuous turning of cast iron For finishing applications on hard materials
AB2010 COATED CERAMIC	(Al ₂ O ₃ + TiCN) + TiN PVD Coating	<ul style="list-style-type: none"> Excellent wear resistance and tool life Very good combination with improved wear and fracture resistance Finishing operations on hardened steels and hardened cast irons
AB20 CERAMIC	Al ₂ O ₃ + TiCN	<ul style="list-style-type: none"> High wear resistant grade with excellent cutting edge stability For high speed continuous turning of hardened steel and other hard materials For finishing applications on cast iron.
AB30 CERAMIC	Al ₂ O ₃ + TiC	<ul style="list-style-type: none"> Mixed ceramic with good toughness and wear resistance For general use on hardened steel, cast iron and hard materials Can be applied to interrupted cutting conditions
TC430 CERAMIC	Whisker	<ul style="list-style-type: none"> SiC whisker reinforced ceramic grade General turning and milling For Ni-base superalloy, inconel, waspaloy and rene
AS500 CERAMIC	SiAlON	<ul style="list-style-type: none"> For roughing to finishing cast iron applications For higher cutting speeds compared to AS10 Wet and dry cutting
SC10 COATED CERAMIC	AS10 + CVD	<ul style="list-style-type: none"> Wear resistant grade with excellent toughness and thermal shock resistance For high speed turning of cast iron Wet and dry cutting
AS10 CERAMIC	Si ₃ N ₄	<ul style="list-style-type: none"> High wear resistant grade with excellent toughness and thermal shock resistance For general use on cast iron Wet and dry cutting
AS20 CERAMIC	Si ₃ N ₄	<ul style="list-style-type: none"> Very tough Si₃N₄ ceramic grade with high cutting edge stability For roughing to finishing applications with high temperature nickel based alloys Wet and dry cutting

Recommended Cutting Conditions: V=m/min, f=mm/rev							
Materials							
Grey cast iron (HB180-220)	Ductile cast iron (HB200-240)	Chilled cast iron (HB400-700)	H.S.S. Roll	Sintered metal	Hardened steel (HRC46-65)	Aluminum Alloy	Ni-Based super alloy
						600-3000 0.05-0.3	
					100-250 0.05-0.2		
		80-150 0.1-0.2	50-100 0.2-0.6	100-300 0.05-0.2	80-200 0.05-0.2		
		80-150 0.1-0.25	30-80 0.2-0.6	100-300 0.1-0.3	80-180 0.1-0.3		
500-1000 0.1-0.3	300-800 0.1-0.3	80-150 0.1-0.3		80-250 0.1-0.25	60-150 0.1-0.3		
500-1000 0.1-0.3	300-700 0.1-0.3	80-150 0.1-0.3					
400-1000 0.1-0.5	300-600 0.1-0.2						
		50-200 0.05-0.2			80-300 0.05-0.2		
300-800 0.1-0.3		50-200 0.05-0.2	50-100 0.2-0.5		50-250 0.05-0.2		
300-800 0.1-0.5	250-500 0.1-0.3	50-150 0.05-0.2	50-80 0.2-0.5		50-200 0.1-0.25		
			50-100 0.2-0.7				150-400 0.1-0.3
400-1000 0.2-0.6	200-600 0.1-0.5		20-60 0.2-0.7				
300-1000 0.2-0.8	250-600 0.2-0.6						
400-800 0.2-0.8	200-500 0.2-0.6						
							100-300 0.1-0.3

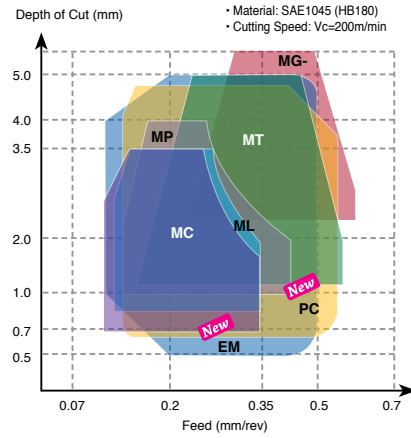
T-TURN Chipbreakers

Negative Inserts

For Finishing Applications



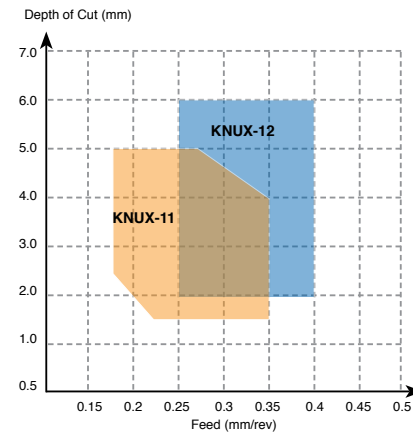
For Medium Applications



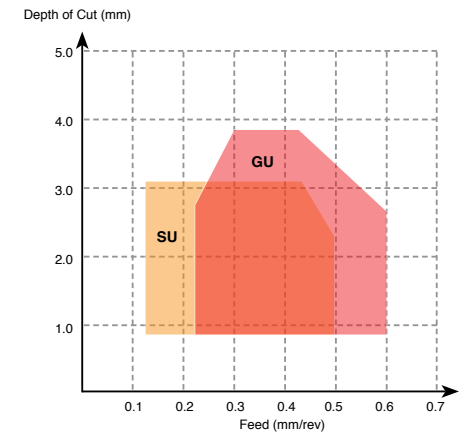
T-TURN Chipbreakers

Negative Inserts

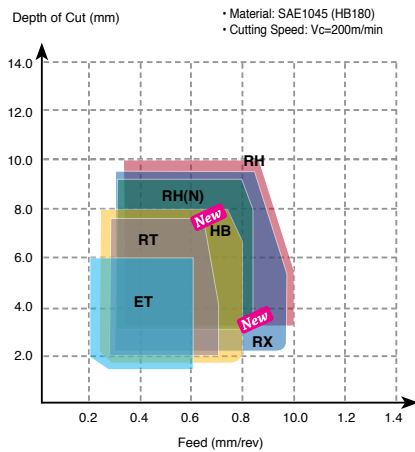
KNUX Type



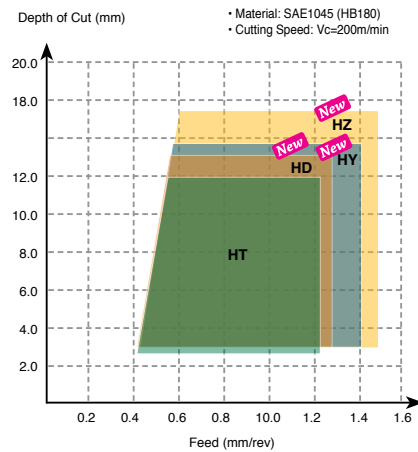
HNMG Type



For Roughing Applications

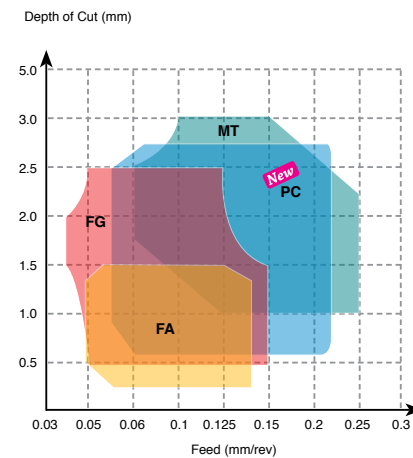


For Heavy Machining

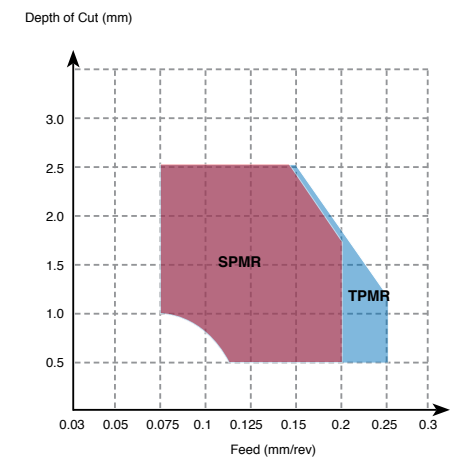


Positive Inserts

For Finish to Medium Applications

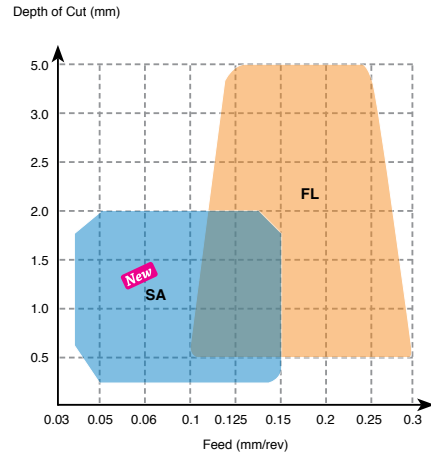


For Medium Applications

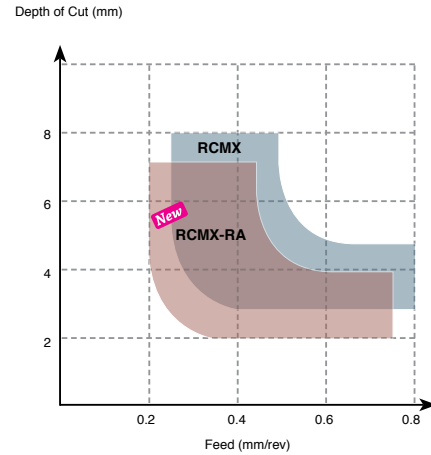


■ Positive Inserts

Ground Insert for Finishing Applications

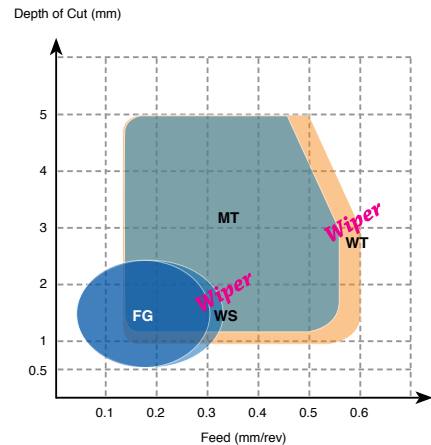


Round Insert for Roughing Applications

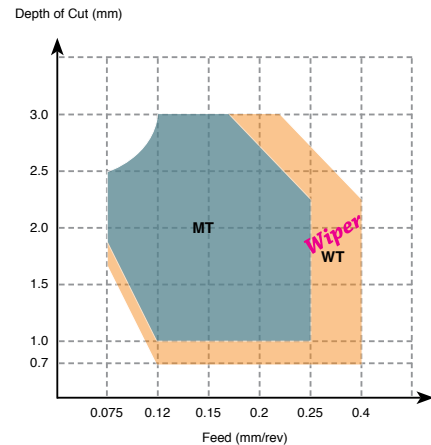


‘WS’ and ‘WT’ Wiper Inserts for High Feed Turning

■ Negative Inserts



■ Positive Inserts


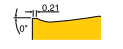
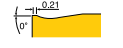

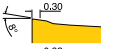


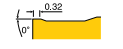
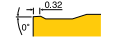





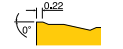




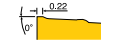
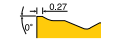

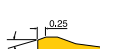

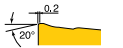
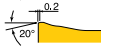

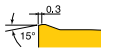
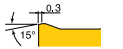

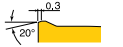
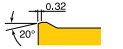

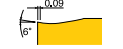
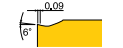
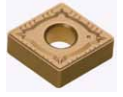




■ Negative Inserts

Chipbreaker Name and Geometry		Applications and Features	
FA	CNMG 1204 A: 15° B: 15°	A	<ul style="list-style-type: none"> For super finish applications Steel, stainless steel and heat resistant alloy machining
EA	CNMG 1204 A: 15° B: 15°	A	<ul style="list-style-type: none"> For finishing applications Exotic materials Excellent chip control at low feeds and depths of cut
FG	WNMG 0804 A: 15° B: 15°	A	<ul style="list-style-type: none"> For finish and semi finish applications Steel, stainless steel and cast iron machining Low cutting forces
SF	CNMG 1204 A: 15° B: 15° 0.15	A	<ul style="list-style-type: none"> For finishing applications Stainless steel and heat resistant alloy machining Low cutting forces
New FC	CNMG 1204 A: 4° B: 2°	A	<ul style="list-style-type: none"> Ideal for finishing applications Low carbon steel & low carbon alloy steel Effective chip breaking in both turning and facing operations
MC	CNMG 1204 A: 10° B: 10° 0.11 0.2	A	<ul style="list-style-type: none"> For medium applications Steel and cast iron machining Strong rake geometry Excellent chip control on medium turning applications
New PC	CNMG 1204 A: 10° B: 10° 0.22 0.27	A	<ul style="list-style-type: none"> For medium to semi-finishing applications Steel & Automotive component Positive geometry Excellent chip control on medium applications
VF	DNMG 1504 A: 15° B: 15°	A	<ul style="list-style-type: none"> For slender workpiece applications Vibration free Steel and stainless steel machining High positive rake geometry to minimize cutting forces
ML	CNMG 1204 A: 15° B: 15°	A	<ul style="list-style-type: none"> For medium light applications Stainless steel, steel and aluminum Very high positive rake geometry to minimize built-up-edge and cutting forces
New EM	CNMG 1204 A: 12° B: 9°	A	<ul style="list-style-type: none"> For medium applications Stainless steel machining Sharp land design for low cutting force
MP	CNMG 1204 A: 15° B: 15° 0.28 0.28	A	<ul style="list-style-type: none"> For medium machining applications Steel and stainless steel High positive rake geometry to optimize machining and provide stable machining conditions
MT	WNMG 0804 A: 15° B: 15°	A	<ul style="list-style-type: none"> For medium rough applications Steel, cast iron and stainless steel Tough rake angle for general use


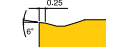
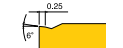
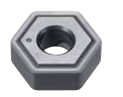


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Chipbreaker Name and Geometry		Applications and Features	
MG-	 CNMG 1204  A  B	<ul style="list-style-type: none"> For medium rough applications Steel and cast iron machining Strong rake geometry Suitable for manual lathes 	
ET	 CNMG 1204  A  B	<ul style="list-style-type: none"> For roughing applications on exotic materials Low cutting force Wide chip control range when roughing 	
RT	 CNMG 1906  A  B	<ul style="list-style-type: none"> For roughing applications Steel and cast iron machining Very strong rake geometry 	
New HB	 CNMX 1607  A  B	<ul style="list-style-type: none"> For semi heavy roughing applications Steel and alloy steel machining Double sided semi-heavy turn insert Stable contact surface with special seat 	
RH(N)	 CNMM 1906  A  B	<ul style="list-style-type: none"> For high feed roughing applications Steel, cast iron and stainless steel machining Very strong rake geometry 	
New RX	 CNMM 1906  A  B	<ul style="list-style-type: none"> For semi heavy roughing applications Steel, stainless steel and cast iron machining Strong cutting edge with flat land Low cutting force 	
RH	 CNMM 1906  A  B	<ul style="list-style-type: none"> For roughing applications Steel, stainless steel and cast iron machining Very strong rake geometry 	
HT	 SNMM 1906  A	<ul style="list-style-type: none"> For heavy roughing applications Low cutting force for low horse power machines Excellent chip control due to changeable land and a flexible chip breaker 	
New HD	 CNMD 2509  A  B	<ul style="list-style-type: none"> For heavy roughing applications For all kinds of shafts, connecting-rods and ship building components Flexible chip breaker offers excellent chip evacuation 	
New HY	 CNMM 2509  A  B	<ul style="list-style-type: none"> For heavy roughing applications For large depth of cut and high feed Strong cutting edge credit to a wide land and large land angle 	
New HZ	 CNMM 2509  A  B	<ul style="list-style-type: none"> For heavy roughing applications For large depth of cut and high feed Extremely strong cutting edge credit to a wide land and large land angle Suitable for high cutting conditions 	
Wiper WS	 CNMG 1204  A  B	<ul style="list-style-type: none"> For super finish applications Steel, cast iron and stainless steel machining Excellent chip control and low cutting forces 	
Wiper WT	 CNMG 1204  A  B	<ul style="list-style-type: none"> For medium to rough machining applications Steel, cast iron and stainless steel machining Stable cutting and low cutting forces at high feed rates 	




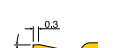
HNMG Type Inserts



Chipbreaker Name and Geometry		Applications and Features	
GU	 HNMG  A  B	<ul style="list-style-type: none"> For medium applications For general turning of steels and cast irons Strong rake geometry 	
SU	 HNMG  A  B	<ul style="list-style-type: none"> For exotic materials Stainless steels, super alloys, low carbon steels, low carbon alloy steel machining Sharp geometry to minimize built-up edge 	















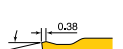

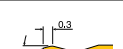
KNUX Type Inserts






Chipbreaker Name and Geometry		Applications and Features	
11	 KNUX 1604  A	<ul style="list-style-type: none"> For medium light to medium applications Steel and stainless steel machining Positive rake geometry to minimize cutting forces Excellent chip control 	
12	 KNUX 1604  A	<ul style="list-style-type: none"> For medium to medium rough applications Steel and stainless steel Strong rake geometry Wide chip control range 	







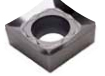

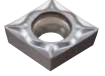
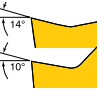
Positive Inserts-Pressed



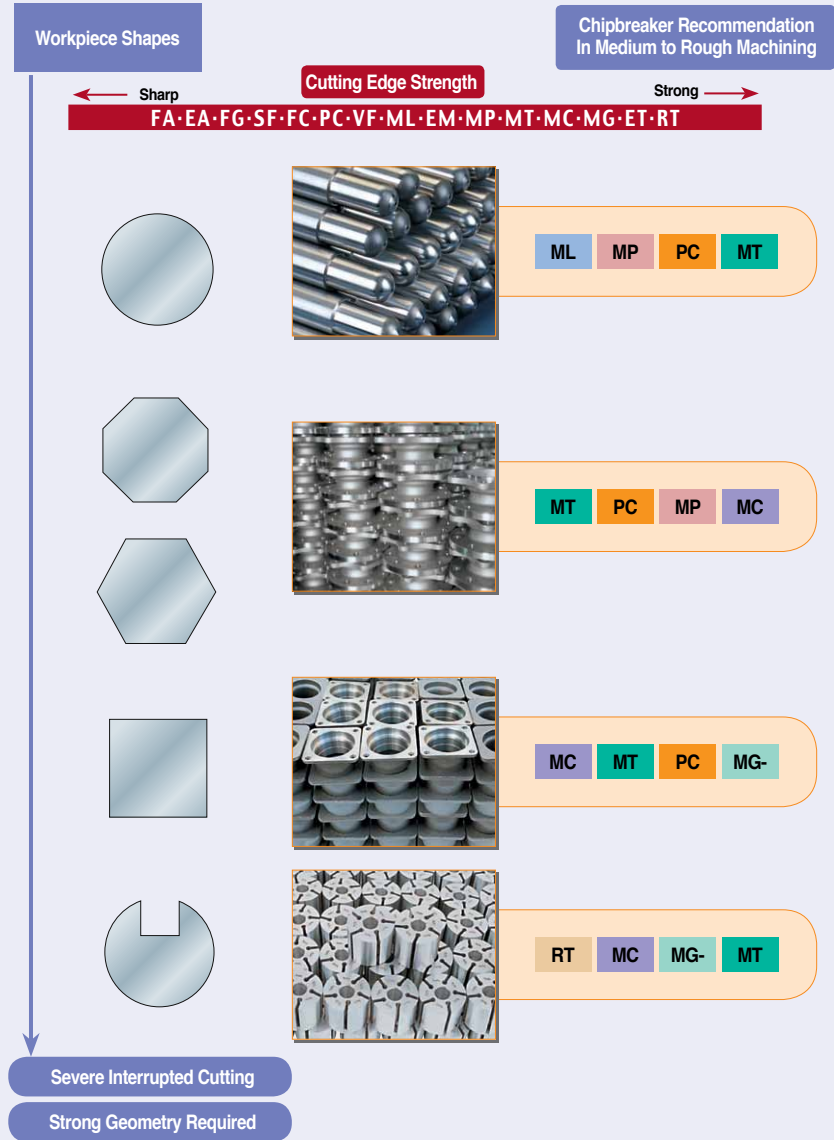
Chipbreaker Name and Geometry		Applications and Features	
FA	 DCMT 11T3  A  B	<ul style="list-style-type: none"> For super finish applications Very tight chipbreaker Excellent chip control 	
FG	 CCMT 09T3  A  B	<ul style="list-style-type: none"> For finish to medium light applications Steel and stainless steel machining Low cutting forces Excellent chip control 	
New PC	 CCMT 09T3  A  B	<ul style="list-style-type: none"> For medium applications Suitable for a wide variety of materials Low cutting force 	
MT	 CCMT 09T3  A	<ul style="list-style-type: none"> For medium to medium rough applications Steel, stainless steel and cast iron machining Negative rake geometry for general use 	
PMR-	 TPMT 1103  A	<ul style="list-style-type: none"> For medium to medium rough applications Steel, stainless steel and cast iron Positive rake geometry 	
New RA	 RCMX 3209  A	<ul style="list-style-type: none"> For heavy and interrupted machining applications Steel, stainless steel and cast iron machining Optimized chip groove geometry 	
CMX-	 RCMX 1204  A	<ul style="list-style-type: none"> For high feed roughing applications Steel, stainless steel and cast iron machining Strong rake geometry 	

Wiper WT		CCMT 09T3		A	<ul style="list-style-type: none"> • For medium to rough machining applications • Steel, cast iron and stainless steel machining • Stable cutting and low cutting forces at high feed rates
				B	

Positive Inserts-Ground

Chipbreaker Name and Geometry		Applications and Features	
FF		CCGT 0901 	A <ul style="list-style-type: none"> • For finish to medium applications • For small component machining • Excellent surface finish
GF		CCET 0602 	A <ul style="list-style-type: none"> • For super finish applications • Steel, stainless steel and alloy steel machining
GW		CCET 0602 	A <ul style="list-style-type: none"> • For super finish applications • Wiper geometry for good surface finish • Steel, stainless steel and alloy steel machining
FL		CCGT 1204 	A <ul style="list-style-type: none"> • For finish to medium applications • Aluminum machining • Very high positive rake geometry to minimize built-up-edge
SA		CCGT 09T3 	A <ul style="list-style-type: none"> • For finish to medium applications B <ul style="list-style-type: none"> • Steel, stainless steel, super alloy machining • Low cutting force

Insert Geometry by Workpiece Shape



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Insert Failure Trouble Shooting

Cause	
Crater Wear	 <ul style="list-style-type: none"> Excessive cutting speed or feed rate (alloy steel and over 0.3% carbon steel) Workpiece material contains high hardness chemical elements (tool steel, die steel)
Flank Wear	 <ul style="list-style-type: none"> Excessive cutting speed (alloy steel and over 0.3% carbon steel) Workpiece material contains high hardness chemical elements (tool steel, die steel) Increase cutting speed if abnormal flank wear is caused by a very slow cutting speed
Deformation	 <ul style="list-style-type: none"> Excessive cutting speed or feed rate
Chipping	 <ul style="list-style-type: none"> Excessive feed rate Interrupted cutting
Notching	 <ul style="list-style-type: none"> Machining scale part From machining work hardened materials
Built-Up-Edge	 <ul style="list-style-type: none"> Slow cutting speed Sticky materials
Mechanical Fracture	 <ul style="list-style-type: none"> Excessive feed rates when interrupted cutting
Thermal Cracking	 <ul style="list-style-type: none"> Repeated thermal shock (interrupted cutting)

Solution	
<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant Use more positive rake geometry 	<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant
<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant Use more positive rake geometry 	<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant
<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant Use stronger insert geometry 	<ul style="list-style-type: none"> Reduce cutting speed or feed rate or use more wear resistant grade Use coolant
<ul style="list-style-type: none"> Reduce feed rate Use tougher grade Use stronger insert geometry Remove coolant completely or apply coolant correctly 	<p>Change Grade</p> <p>← Harder</p> <p>PV3010 > CT3000</p> <p>TT7005 > TT7310 > TT7015 > TT8115 > TT9215 > TT5080 > TT8125 > TT5100 > TT9225 > TT9080 > TT9020 > TT8135 > TT7100 > TT9235 > TT8020</p>
<ul style="list-style-type: none"> Use tougher grade Use stronger insert geometry Increase lead angle Use tougher grade Use more positive rake geometry Increase lead angle 	<p>Change Chipbreaker</p> <p>← Less B.U.E* Less Heat</p> <p>SF FA FG ML EM MP ET PC MT WT MC MG- RT RH HD FC VF HB RX HT WS HY EA HZ</p>
<ul style="list-style-type: none"> Increase cutting speed Use more positive rake geometry 	<p>Chip Control</p> <p>Tight → Open</p> <p>FC HD SF HT FA FG MC PC VF ML EM MP MT MG- ET RT RH HY WS WT HB RX HZ EA</p>
<ul style="list-style-type: none"> Use tougher grade Use stronger insert geometry Reduce feed rate Remove coolant completely or apply coolant correctly Increase cutting speed 	<ul style="list-style-type: none"> Use tougher grade Use stronger insert geometry Reduce feed rate Remove coolant completely or apply coolant correctly
<ul style="list-style-type: none"> Use tougher grade Use stronger insert geometry Reduce feed rate Remove coolant completely or apply coolant correctly 	<ul style="list-style-type: none"> Use tougher grade Use stronger insert geometry Reduce feed rate Remove coolant completely or apply coolant correctly

*B.U.E: Built-Up-Edge

TaeguTurn Workpiece Material Groups

Group No.	Material	See Pages	Chemical composition
A1-1	Low carbon steel	27p	- 0.26% C
A1-2	Medium carbon steel	34p	0.27 - 0.54% C
A1-3	High carbon steel	36p	0.51 - 0.95% C
A2-1	Low carbon alloy steel	30p	0.12 - 0.23% C + alloying elements < 5%
A2-2	Medium & High carbon alloy steel	38-43p	0.27 - 1.50% C + alloying elements < 5%
A3-1	Carbon tool steel	44p	0.60 - 1.50% C
A3-2	Alloy tool steel	45p	0.45 - 1.50% C + alloying elements < 5%
A3-3	High speed steel	46p	0.75 - 0.85% C + alloying elements > 5%
A3-4	Cold working die steel	48p	0.30 - 2.00% C + alloying elements > 5%
A4-1	Ferritic & Martensitic stainless steel	49p	11 - 18%Cr
A4-2	Austenitic stainless steel	50p	16 - 28% Cr + 3.5 - 22% Ni
A5	Ni based super alloy	61p	Ni base, Fe base, Co base
A6	Titanium alloy	63p	Ti-6Al -4V
A7-1	Grey cast iron	56p	1.7 - 6.67% C
A7-2	Ductile cast iron	59p	3.2 - 4.2% C + 0.04 - 0.08% Mg
A8-1	Low Si aluminium alloy	65p	12.2% < Si
A8-2	High Si aluminium alloy	67p	12.2% ≥ Si
A9	Copper alloy High hardness material	69p	Cu...
A10	High hardness material	54p	High W, C, Cr, Co...

Characteristics	General Insert Selection
Soft and Gummy. Difficult chip control. Watch for built-up-edge and burrs.	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Harder and stronger. Easy chip control. Watch for insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Harder and stronger. Abrasive. Watch for insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Soft and Gummy. Thicker chip. Difficult chip control. Watch for built-up-edge.	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Harder and stronger. More abrasive. Watch for insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Harder. Abrasive. Watch for insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Harder. More abrasive. Watch for rapid insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Harder and sticky. Watch for built-up-edge.	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Harder. Highly abrasive. Watch for rapid insert wear.	Use stronger rake geometry. Use good wear resistant grade.
Gummy. Thicker chip. Workhardens. Watch for built-up-edge and notching.	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Gummy. Abrasive. Thicker chip. Workhardens. Watch for built-up-edge, notching and rapid wear	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Workhardens. More abrasive. Sticky. Watch for built-up-edge, notching and rapid wear	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Workhardens. More abrasive. Sticky. Watch for built-up-edge, notching and rapid wear	Use high positive rake geometry. Use tougher and good chipping resistant grade.
Abrasive. Discontinuous chip.	Use stronger rake geometry. Use good Al2O3 coated grade.
More abrasive. Discontinuous chip.	Use stronger rake geometry. Use good Al2O3 coated grade.
Very soft and gummy.	Use very high positive rake geometry. Use good wear resistant grade such as PCD and K10.
Very abrasive. Watch for rapid wear and built-up-edge.	Use positive rake geometry. Use good wear resistant grade such as PCD and K10.
Soft and gummy. Watch for built-up-edge.	Use high positive rake geometry. Use good chipping resistant grade.
Harder and abrasive. Watch for rapid wear.	Use stronger rake geometry. Use Ceramic, PCD & CBN.

Insert Selection by Workpiece Material

Check and follow these steps



1 Material to be machined

Check material to be machined and select corresponding page by material group classification

2 Select required cutting surface speed(m/min)

Select the appropriate grade to suit the application cutting speed

3 Select the required feed rate

4 Select the required depth of cut

Select the appropriate chipbreaker based on feed and depth of cut

FG : blue color indicates feed rate range
: yellow color indicates depth of cut range

The range of **FG** chipbreaker is CNMG 090304 size
All other negative inserts with CNMG(M)120408 size
Positive inserts is CCMT 09T304 size

5 Consideration should also be given to the material shape as detailed on page 21

6 Select insert style and insert corner radius to suit application

7 Use the Application Charts!!!

Use recommended cutting parameters to start machining if there are no cutting parameters, or if existing parameters are not suitable for tool life or productivity.

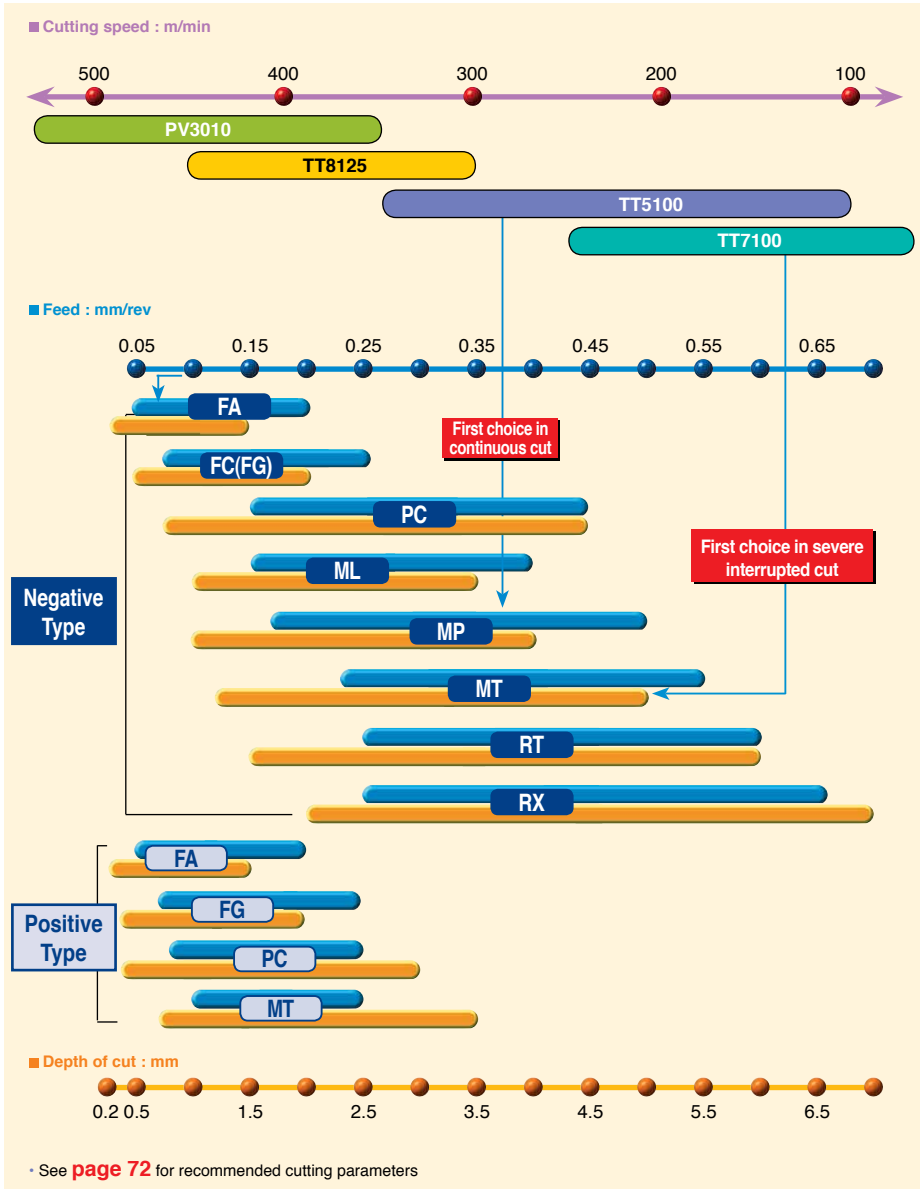
Turning Formulas

Cutting speed (m/min) : $V = 3.14 \times D \times N / 1000$	Surface roughness of workpiece (mm) : $R_{max} = f^2 / 8r$
Revolutions per minute : $N = 1000 \times V / 3.14 \times D$	Rate of metal removal (cubic cm/min) : $Q = V \times f \times ap$
Feed rate (mm/min) : $F = f \times N$	Horsepower required at spindle : $Ws(Kw) = Q \times ks / 60 \times 102 \times n$ $Hps(HP) = W \times 0.75$
Cutting time (min) : $T = L / F$	Horsepower required at motor : $Hpm = Hps / E$

- D = Diameter of workpiece(mm) • f = Feed rate(mm/rev) • L = Length(mm) • r = Corner radius(mm) • ap = Depth of cut(mm)
- n = Efficiency of machine (typically 0.7-0.85) • E = Efficiency of spindle drive (typically 0.45)
- P = Unit power factor, Horsepower per cubic inch per minute

P 0.15% Carbon Steel (HB=150)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
XC12	1.0401	C15C16	S15C	F.111	1350	080M15	1015	SM15C



Examples

Ex. 1

Component description : Pulley, low carbon (0.1% C) steel
Insert type : CNMG 120408
Cutting parameters : V=500~440m/min, f=0.2-0.3mm/rev, ap=0.7mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 MC TT8125

Ex. 5

Component description : Retainer, very low carbon steel
Insert type : SNMG 120412
Cutting parameters : V=537m/min, f=0.45mm/rev, ap=0.5mm
 Wet cutting,
 External turning, severe interrupted cut
Recommended insert : SNMG 120412 MT TT7100

Ex. 2

Component description : Pump, very low carbon steel
Insert type : CNMG 120412
Cutting parameters : V=100m/min, f=0.55mm/rev, ap=2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120412 MT TT7100

Ex. 6

Component description : Impeller, very low carbon steel
Insert type : CNMG 120404
Cutting parameters : V=245m/min, f=0.20mm/rev, ap=0.5mm
 Dry cutting,
 Internal turning, continuous cut
Recommended insert : CNMG 120404 SF TT5100

Ex. 3

Component description : Pulley, low carbon(0.2% C) steel
Insert type : CNMG 120408
Cutting parameters : V=300m/min, f=0.24mm/rev, ap=0.5-0.7mm
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : CNMG 120408 SF TT5100

Ex. 7

Component description : T-con assy, very low carbon steel
Insert type : DNMG 150408
Cutting parameters : V=110m/min, f=0.20mm/rev, ap=1.0mm
 Dry cutting,
 Internal turning, continuous cut
Recommended insert : DNMG 150408 FG TT5100

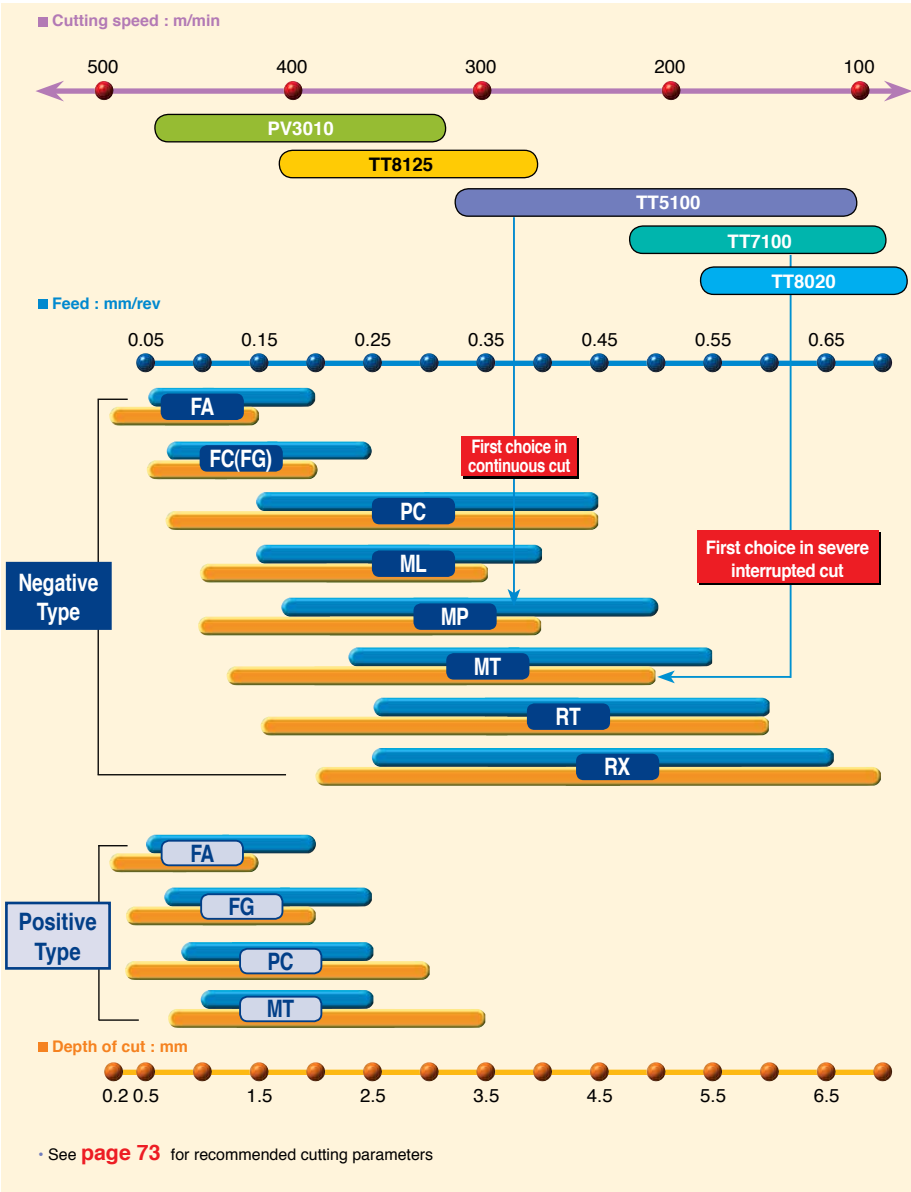
Ex. 4

Component description : Case, low carbon steel (0.25%C)
Insert type : CNMG 120408
Cutting parameters : V=280m/min, f=0.2mm/rev, ap=0.5-1.0mm
 Wet cutting,
 Face turning, continuous cut
Recommended insert : CNMG 120408 MP TT5100



P Low Carbon (C=0.13-0.22%) Alloy Steel(HB150-180)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
12C3	1.7015	16MnCr5	SCR415	F16MnCr5	2511	523M15	5115	SCR415



Examples

Ex. 1

Component description : Pinion drive, low carbon(0.2% C) Cr-Mo alloy steel
Insert type : DNMG 150608
Cutting parameters : V=250m/min, f=0.30mm/rev, ap=1.0-2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : DNMG 150608 PC TT8125

Ex. 2

Component description : Gear, low carbon(0.2% C) Cr-Mo alloy steel
Insert type : CNMG 120408
Cutting parameters : V=384m/min, f=0.40mm/rev, ap=1.0mm
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : CNMG 120408 MT TT8125

Ex. 3

Component description : Engine gear, low carborn(0.2% C) Cr-Mo alloy steel
Insert type : CNMG 120408
Cutting parameters : V=300m/min, f=0.25mm/rev, ap=1.3mm
 Wet cutting,
 Face & External turning, continuous cut
Recommended insert : CNMG 120408 ML TT5100

Ex. 4

Component description : Idler gear, low carborn(0.2% C) Cr-Mo alloy steel
Insert type : DNMG 150608
Cutting parameters : V=150-230m/min, f=0.15mm/rev, ap=1.0-1.5mm
 Wet cutting,
 External turning, interrupted & continuous cut
Recommended insert : DNMG 150608 ML TT8020

Ex. 5

Component description : Pivot, low carbon(0.2% C) Cr-Mo alloy steel
Insert type : CNMG 120408
Cutting parameters : V=80-100m/min, f=0.15mm/rev, ap=1.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 ML TT8020

Ex. 9

Component description : Tripod housing, low carbon(0.2% C) Cr-Mo alloy steel
Insert type : DNMG 150608
Cutting parameters : V=300m/min, f=0.22-0.25mm/rev, ap=0.5mm
 Wet cutting,
 External turning, light interrupted cut
Recommended insert : DNMG 150608 FC TT8115

Ex. 6

Component description : C/V joint outer race, low carbon(0.2% C) Ni-Cr-Mo alloy steel
Insert type : VNMG 130408
Cutting parameters : V=240m/min, f=0.15-0.22mm/rev, ap=0.3mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : VNMG 130408 FG TT5100

Ex. 10

Component description : Tripod housing, low carbon(0.2% C) Cr-Mo alloy steel
Insert type : CNMG 120412
Cutting parameters : V=280m/min, f=0.30mm/rev, ap=2.5mm
 Wet cutting,
 External turning, severe interrupted cut
Recommended insert : CNMG 120412 MT TT7100

Ex. 7

Component description : C/V joint outer race, low carbon(0.2% C) Ni-Cr-Mo alloy steel
Insert type : TNMG 160408
Cutting parameters : V=100-220m/min, f=0.22mm/rev, ap=0.3mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : TNMG 160408 SF TT5100

Ex. 8

Component description : Bevel gear shaft, low carbon(0.2% C) Cr alloy steel
Insert type : DNMG 150608
Cutting parameters : V=250m/min, f=0.28mm/rev, ap=0.5mm
 Wet cutting,
 External & face turning, continuous cut
Recommended insert : DNMG 150608 FG TT5100



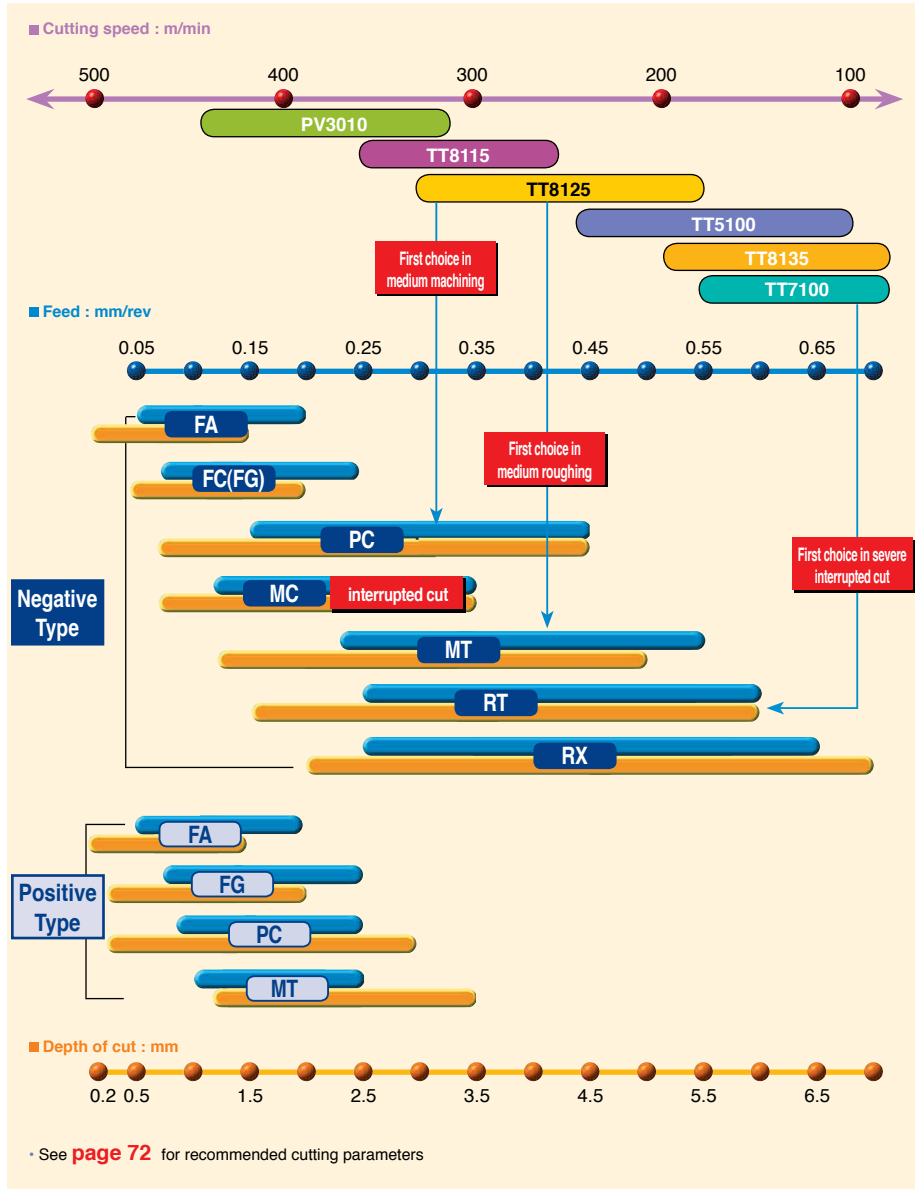
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P 0.45% Carbon Steel (HB180-200)

Medium Carbon Steel : TaeguTurn Material Group **No.A1-2**

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
CC45	1.0503	C45	S45C	F.114	1650	080M46	1045	SM45C



Examples

Ex. 1

Component description : Front Hub, 0.43% carbon steel
Insert type : CNMG 120408
Cutting parameters : V=250m/min, f=0.2-0.25mm/rev, ap=1.0-1.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 MC TT8115

Ex. 2

Component description : Diff drive gear, 0.38% carbon steel
Insert type : DNMG 150608
Cutting parameters : V=454m/min, f=0.35mm/rev, ap=1.0mm,
 Wet cutting,
 External turning, continuous cut
Recommended insert : DNMG 150608 PC TT8115

Ex. 3

Component description : Flat gear, 0.45% carbon steel
Insert type : CNMG 120408
Cutting parameters : V=280m/min, f=0.2mm/rev, ap=2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 PC TT8125

Ex. 4

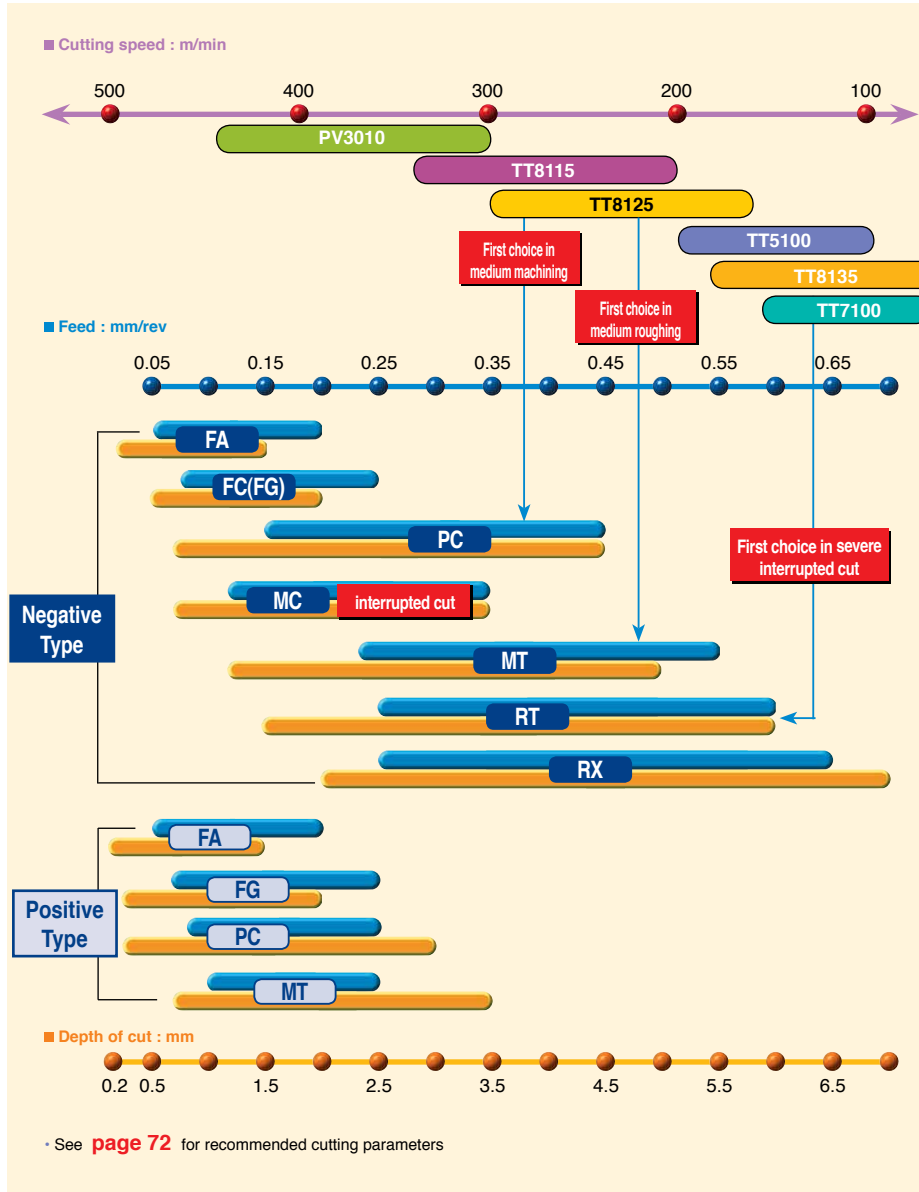
Component description : Compassion harge, 0.45% carbon steel
Insert type : CNMG 120408
Cutting parameters : V=345m/min, f=0.30mm/rev, ap=3.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 MT TT8125

Ex. 5

Component description : Nipple, 0.45% carbon steel
Insert type : CNMG 120408
Cutting parameters : V=211m/min, f=0.20mm/rev, ap=1.5-2.0mm
 Wet cutting,
 External turning, interrupted cut
Recommended insert : CNMG 120408 MC TT8125

P 0.55% Carbon Steel (HB200-220)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
XC55	1.0535	C55	S55C	C55K	1655	070M55	1055	SM55C



Examples

Ex. 1

Component description : CV Joint, 0.55% carbon steel
Insert type : CNMG 120408
Cutting parameters : V=345~125m/min, f=0.25mm/rev, ap=1.0-2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 MC TT8115

Ex. 2

Component description : Hub, 0.55% carbon steel
Insert type : WNMG 080408
Cutting parameters : V=280m/min, f=0.35mm/rev, ap=2.0mm,
 Wet cutting
 External turning, continuous cut
Recommended insert : WNMG 080408 MT TT8115

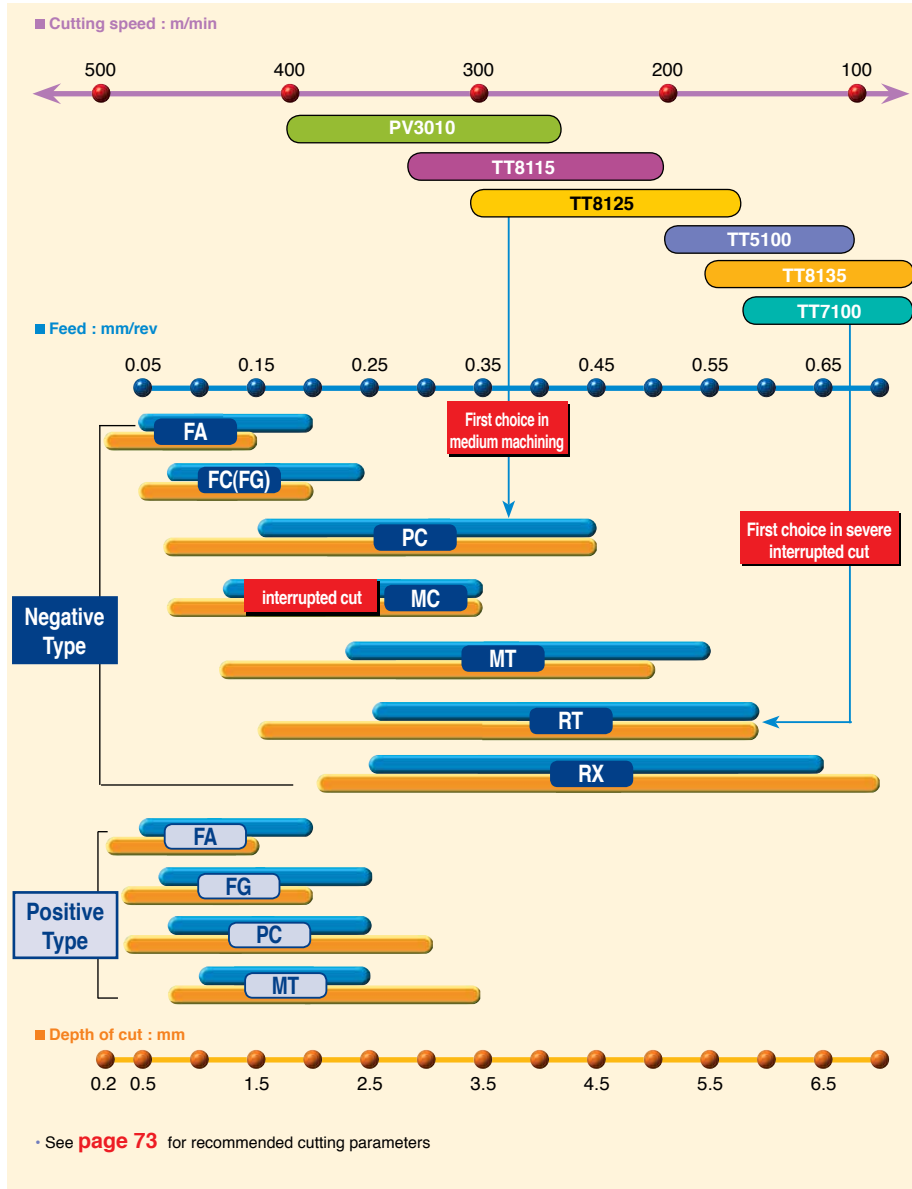
Ex. 3

Component description : Outer Race, 0.55% carbon steel
Insert type : WNMG 080408
Cutting parameters : V=200m/min, f=0.40mm/rev, ap=2.0mm
 Wet cutting,
 External turning, interrupted cut
Recommended insert : WNMG 080408 RT TT5100



P Cr-Mo Alloy Steel (HB200-220)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
42CD4	1.7225	42CrMo4	SCM440	42CrMo4	2244	708M40	4140	SCM440



Examples

Ex. 1

Component description : Body Valve, Cr-Mo alloy steel
Insert type : DNMG 150608
Cutting parameters : V=230m/min, f=0.3mm/rev, ap=1.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : DNMG 150608 MC TT8125

Ex. 2

Component description : Pin, Cr-Mo alloy steel
Insert type : WNMG 080408
Cutting parameters : V=160m/min, f=0.3mm/rev, ap=3.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : WNMG 080408 PC TT8125

Ex. 3

Component description : Gear Shaft, Cr-Mo alloy steel
Insert type : TNMG 160408
Cutting parameters : V=220m/min, f=0.33mm/rev, ap=2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : TNMG 160408 PC TT8125

Ex. 4

Component description : Shaft, Cr-Mo alloy steel
Insert type : CNMG 120412
Cutting parameters : V=160m/min, f=0.40mm/rev, ap=3.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120412 PC TT8125



P Ni-Cr-Mo Alloy Steel (HB200-220)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
	1.6511		SNCM439				4340	SNCM439

Ex. 5

Component description : Front Hub, Cr alloy steel
Insert type : WNMG 080412
Cutting parameters : V=260-164m/min, f=0.38mm/rev, ap=1.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : WNMG 080412 MT TT8115

Ex. 6

Component description : Shaft, Cr-Mo alloy steel(240-270BHN)
Insert type : DCMT 11T304
Cutting parameters : V=366m/min, f=0.15mm/rev, ap=0.25mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : DCMT 11T304 FG PV3010

Ex. 7

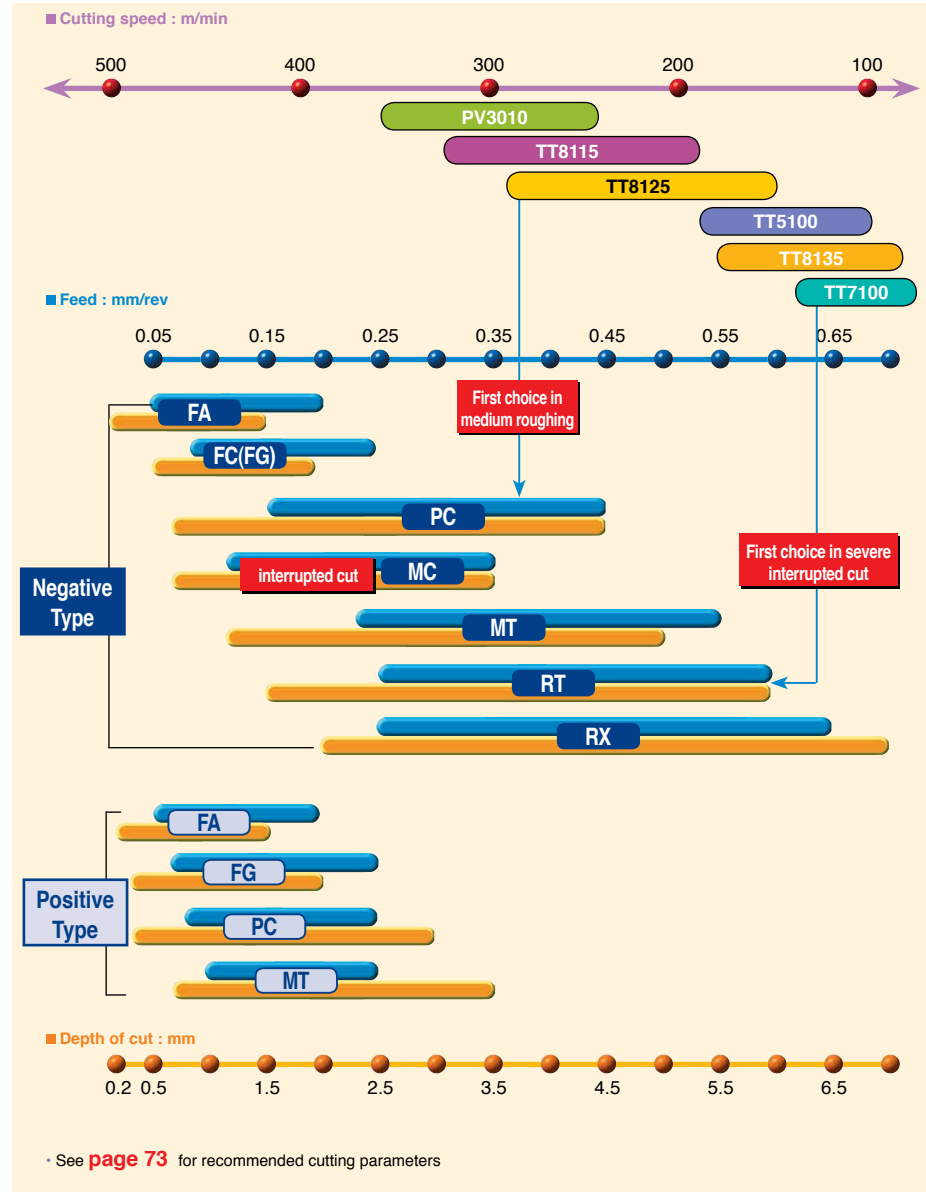
Component description : Roller, Cr-Mo alloy steel
Insert type : CNMG 120408
Cutting parameters : V=330m/min, f=0.25mm/rev, ap=2.0-2.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 PC TT8115

Ex. 8

Component description : Tie Rod, Cr-Mo alloy steel
Insert type : CCMT 09T308
Cutting parameters : V=180m/min, f=0.17-0.20mm/rev, ap=1.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CCMT 09T308 PC TT8125

Ex. 9

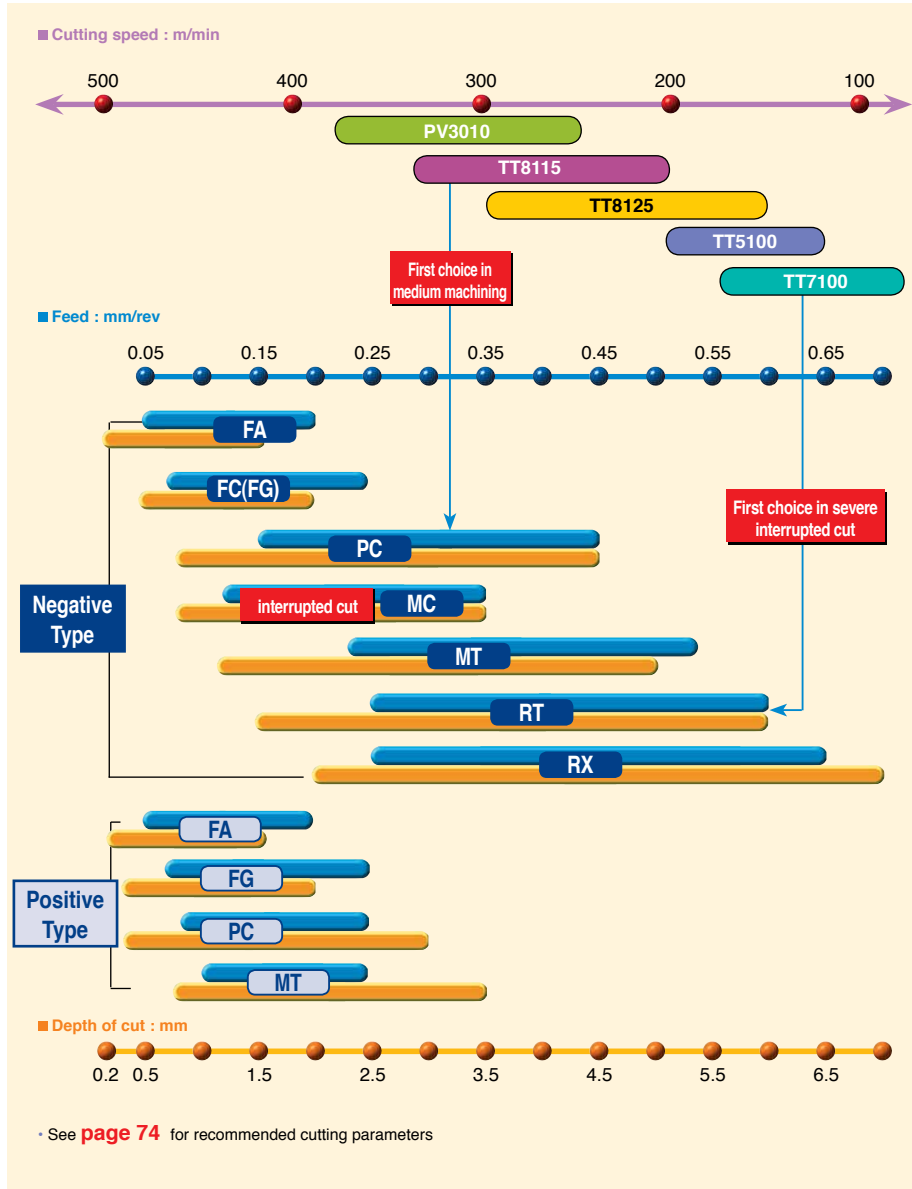
Component description : Bushing, Cr-Mo alloy steel
Insert type : TNMG 160408
Cutting parameters : V=200m/min, f=0.25mm/rev, ap=2.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : TNMG 160408 PC TT8125



P Bearing Steel (HB200-220)

Medium & High Carbon Alloy Steel : TaeguTurn Material Group **No.A2-2**

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
	1.2067		SUJ2				52100	STB2



Examples

Ex. 1

Component description : Bearing, bearing steel
Insert type : DNMG 150608
Cutting parameters : $V=220-280\text{m/min}$, $f=0.1\sim 0.2\text{mm/rev}$, $a_p=0.5-1.0\text{mm}$
 Wet cutting,
 External turning, continuous cut
Recommended insert : DNMG 150608 FG TT8115

Ex. 2

Component description : Inner ball bearing, bearing steel
Insert type : CNMG 120408
Cutting parameters : $V=290\text{m/min}$, $f=0.3\text{mm/rev}$, $a_p=2.0\text{mm}$
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : CNMG 120408 PC TT8115

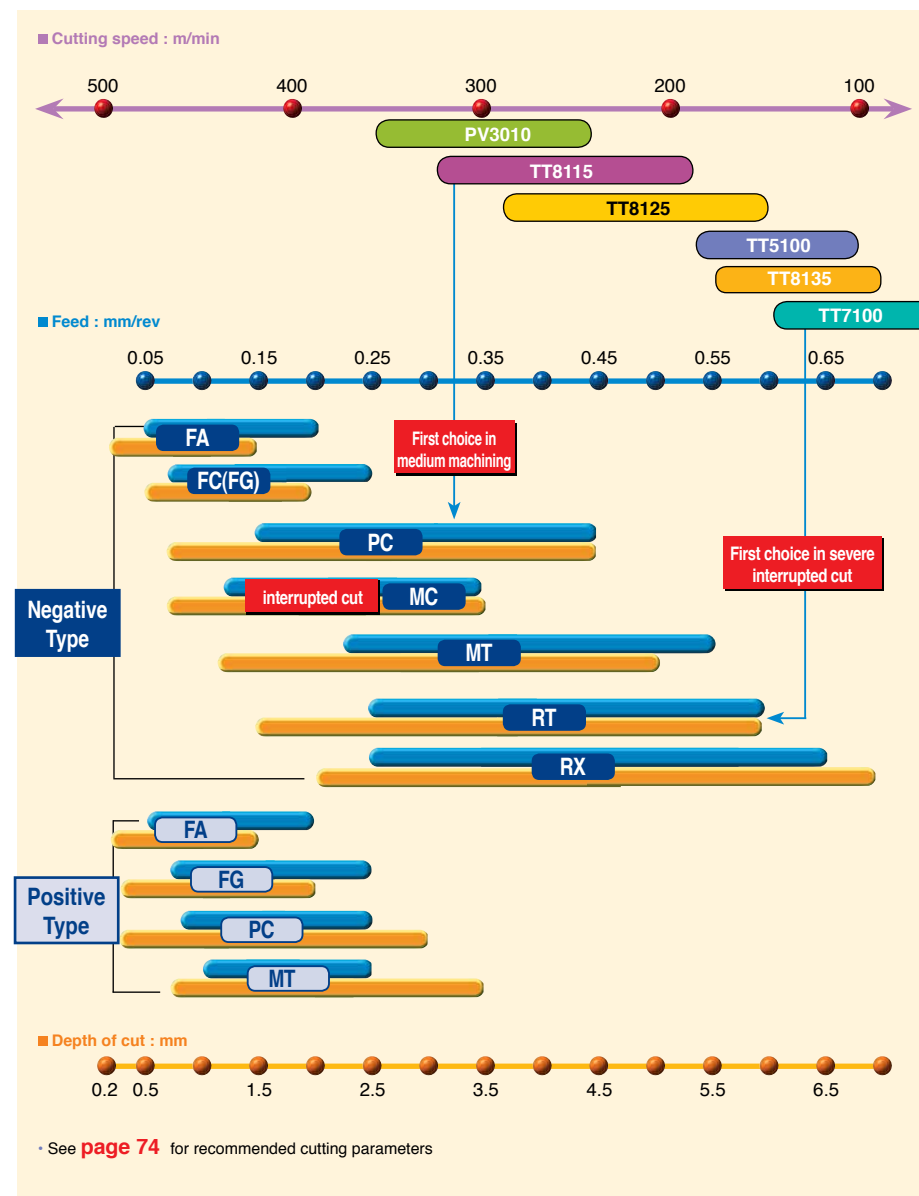
Ex. 3

Component description : Bearing, bearing steel
Insert type : DNMG 150608
Cutting parameters : $V=390\text{m/min}$, $f=0.18\text{mm/rev}$, $a_p=0.4\text{mm}$
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : DNMG 150608 FA TT8115



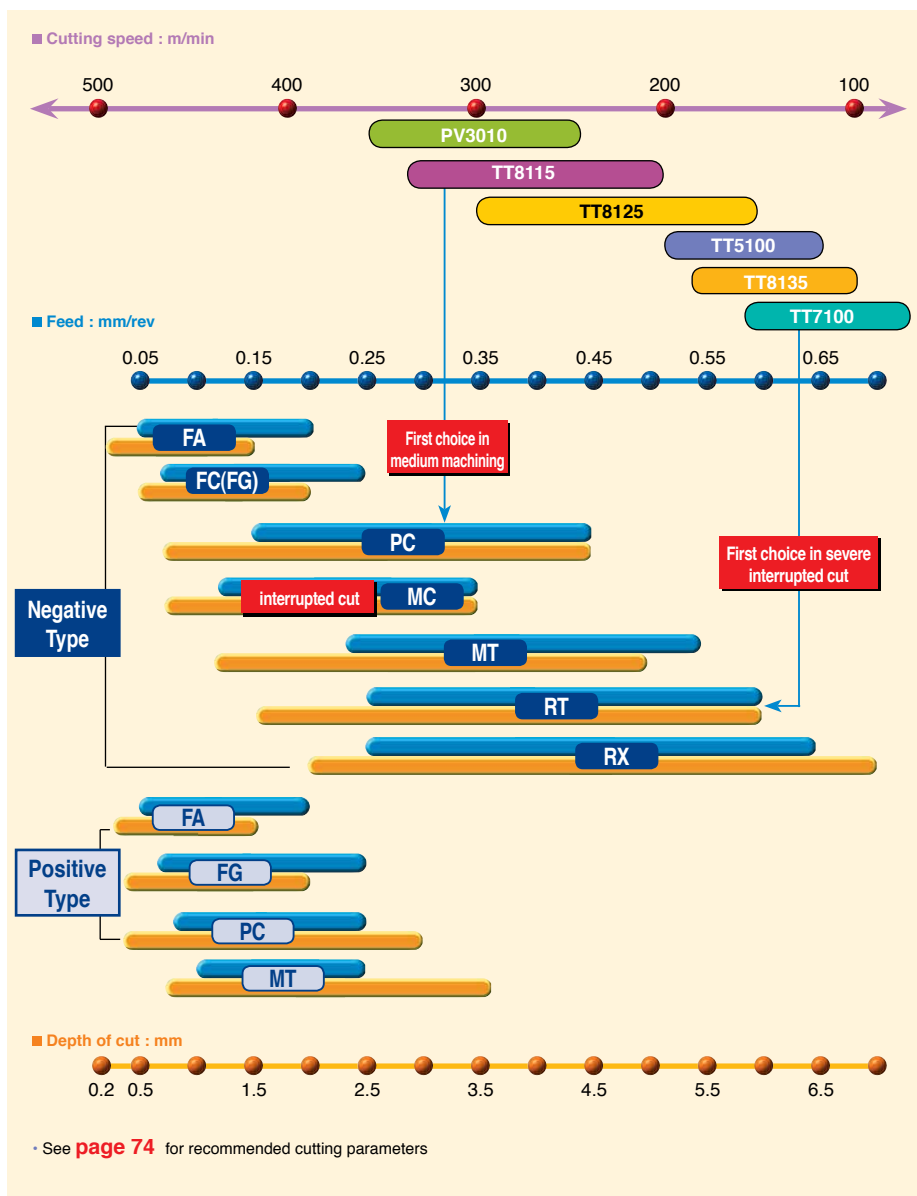
P Alloy Tool Steel (HB200-220)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
Y105V	1.2833		SKS43			BW2	W2	STS3



P Carbon Tool Steel : C= 1.0-1.1% (HB200-220)

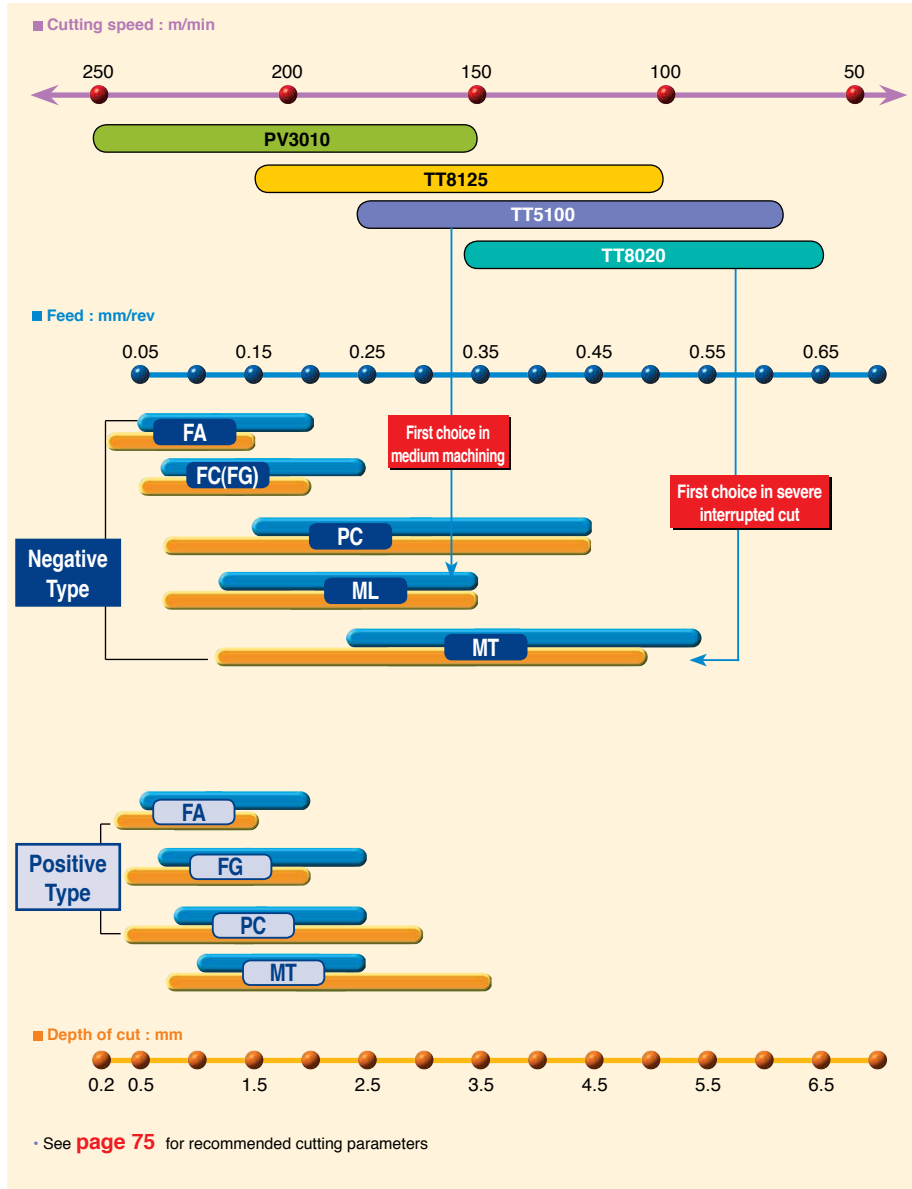
France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
	1.1274		SK3				WI-10	STC3



P High Speed Steel (HB220-260)

High Speed Steel : TaeguTurn Material Group No.A3-3

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
Z80WKC	1.3255	X78WC01805KU	SKH3	HS18-1-1-5		BT4	T4	SKH3



Examples

Ex. 1

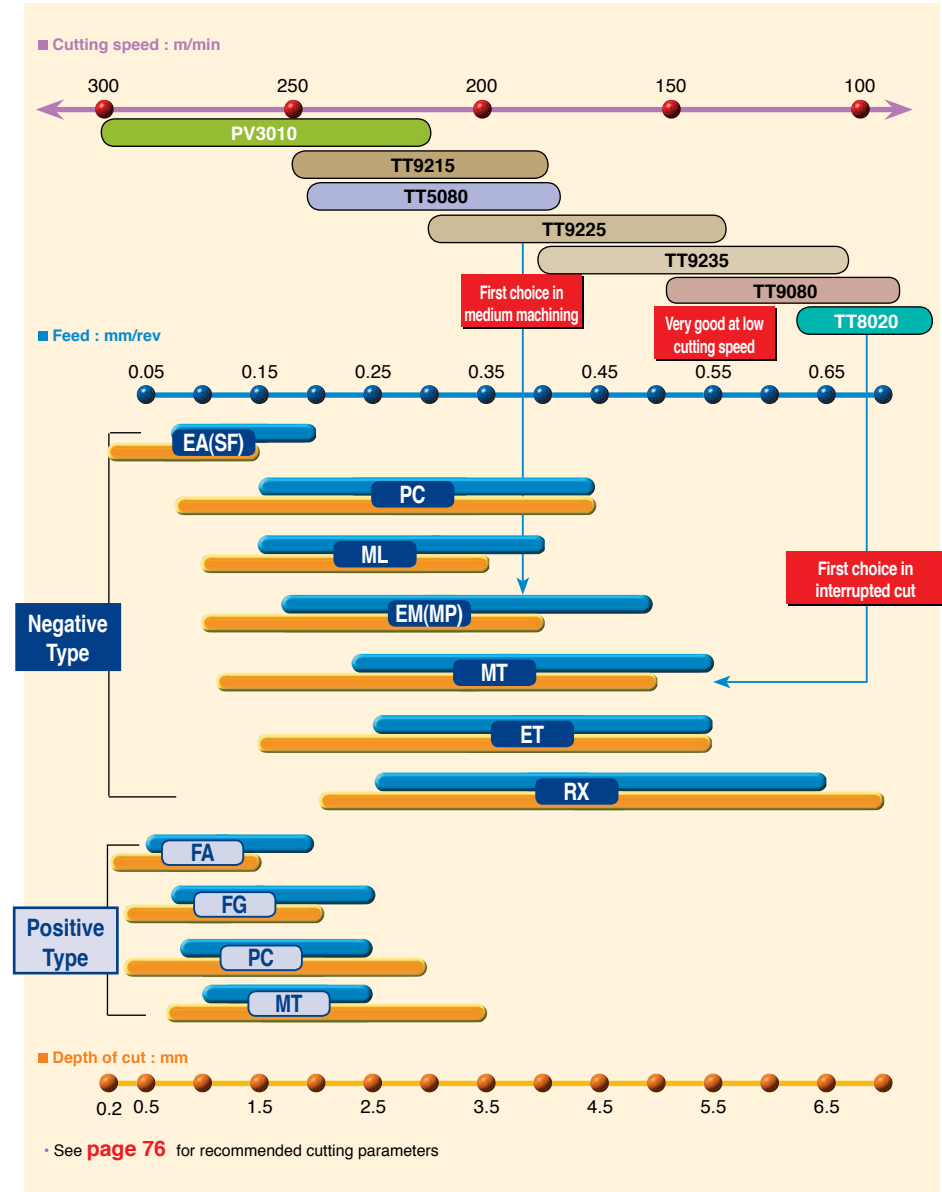
Component description : Tap, 8% cobalt high speed steel
Insert type : DNMG 150608
Cutting parameters : V=170m/min, f=0.15mm/rev, ap=0.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : DNMG 150608 ML TT5110

Ex. 2

Component description : Endmill, High speed steel
Insert type : TNMG 160404
Cutting parameters : V=50m/min, f=0.06mm/rev, ap=1.70mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : TNMG 160404 R-FS TT5110

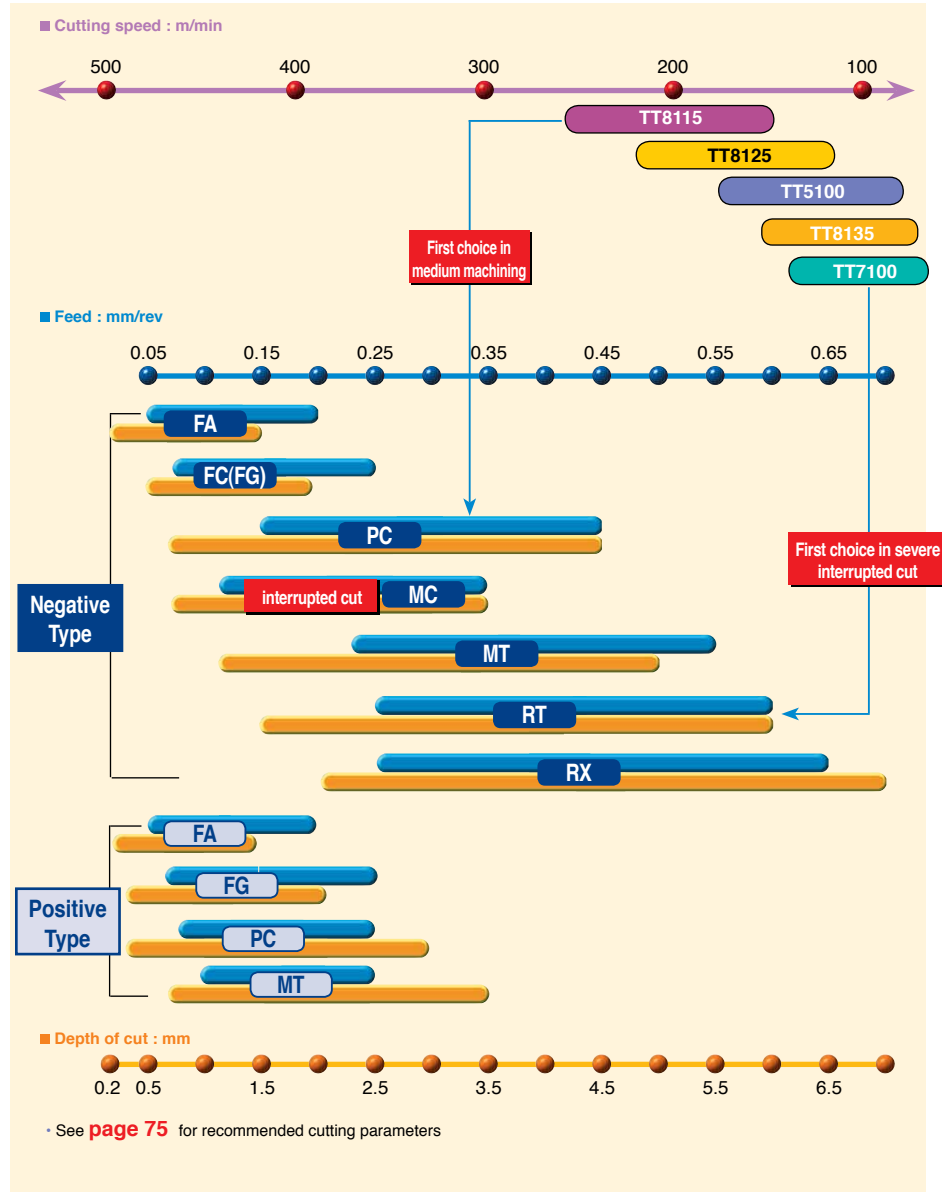
M Martensitic/Ferritic Stainless Steel (HB180-200)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
Z8C17	1.4016	X6Cr17	SUS430	F.3113	2320	430S15	430	STS430



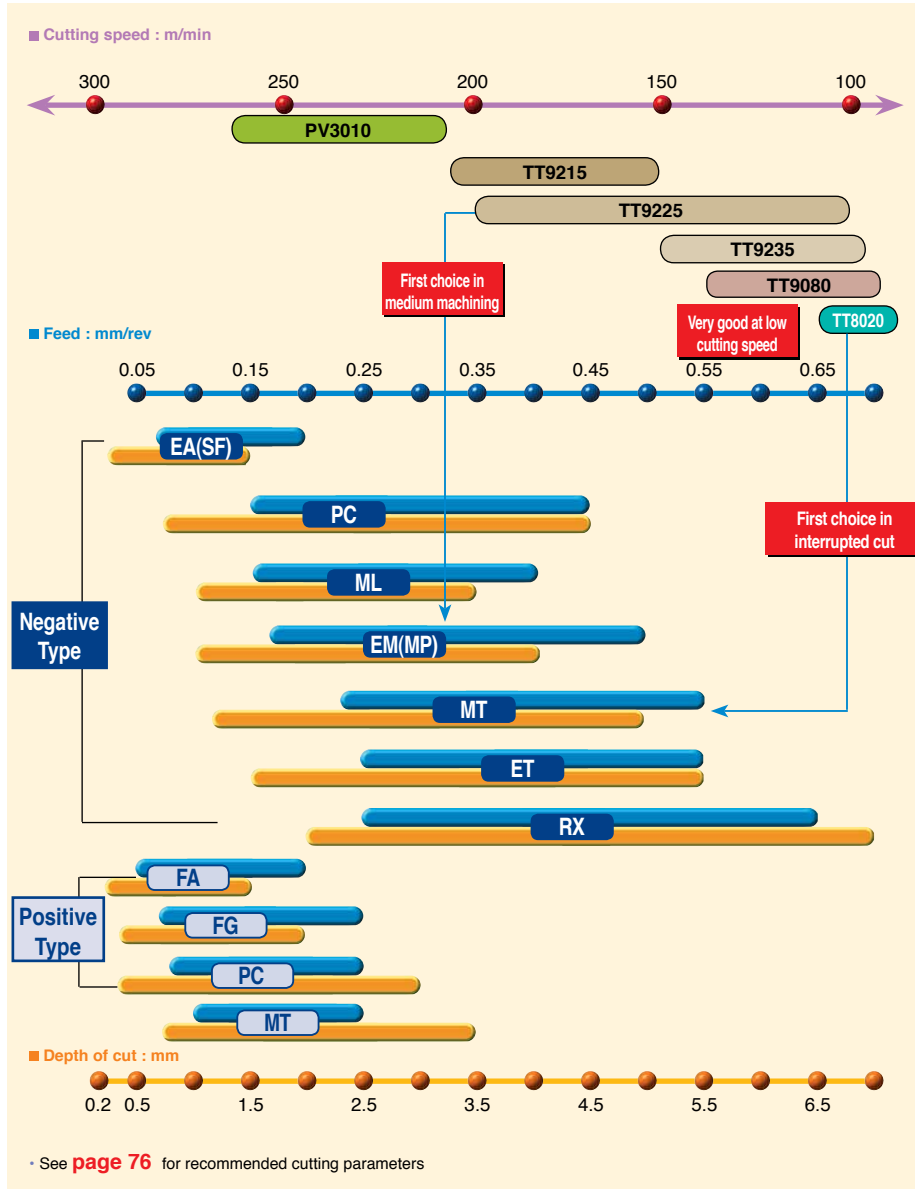
P Cold working die Steel (HB220-260)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
Z40CDV5	1.2344	X35CrMoV05KU	STD61	X40CrMoV5	2242	BH13	H13	STD61



M Austenitic Stainless Steel (HB180-200)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
Z6CND17.11	1.4401	X5CrNiMo17-12	SUS316	F.3543	2347	316S16	316	STS316



• See page 76 for recommended cutting parameters

Examples

Ex. 1

Component description : Bearing housing, cast 316 stainless steel(43-44HRC)
Insert type : CNMG 190608
Cutting parameters : V=83-228m/min, f=0.14mm/rev, ap=1.0-4.0mm
 Dry cutting,
 Face turning, interrupted cut
Recommended insert : CNMG 190608 MT TT8020

Ex. 2

Component description : Axle, 316L stainless steel
Insert type : CNMG 190612
Cutting parameters : V=80m/min, f=0.4mm/rev, ap=4mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 190612 ET TT9225

Ex. 3

Component description : Nut, 304 stainless steel
Insert type : CNMG 120408
Cutting parameters : V=190m/min, f=0.15mm/rev, ap=1.0-2.0mm
 Wet cutting,
 External facing, light interrupted cut
Recommended insert : CNMG 120408 PC TT9225

Ex. 4

Component description : Valve, 316L stainless steel
Insert type : CNMG 120408
Cutting parameters : V=150m/min, f=0.2mm/rev, ap=1.0mm
 Wet cutting,
 External facing, light interrupted cut
Recommended insert : CNMG 120408 RT TT9225

Ex. 5

Component description : Plug, duplex stainless steel
Insert type : CNMG 120408
Cutting parameters : V=160m/min, f=0.2mm/rev, ap=2.0mm
 Wet cutting,
 External facing
Recommended insert : CNMG 120408 EM TT9225

Examples

Ex.6

Component description : Gasket Ring, 316 stainless steel
Insert type : CNMG 120408
Cutting parameters : V=180m/min, f=0.1mm/rev, ap=0.3mm
 Wet cutting
 External facing
Recommended insert : CNMG 120408 FC TT9225

Ex.7

Component description : Sleeve, 304 stainless steel
Insert type : TNMG 160408
Cutting parameters : V=130m/min, f=0.15mm/rev, ap=0.8mm
 Wet cutting,
 External and facing
Recommended insert : TNMG 160408 EM TT9225

Ex.8

Component description : Impeller, 316 stainless steel
Insert type : CNMG 120408
Cutting parameters : V=100m/min, f=0.12mm/rev, ap=0.7mm
 Wet cutting,
 External interrupted cut
Recommended insert : CNMG 120408 MP TT9235

Ex.9

Component description : Shaft, 304 stainless steel
Insert type : CNMG 120412
Cutting parameters : V=150m/min, f=0.35mm/rev, ap=2.5mm
 Wet cutting,
 External continuous cut
Recommended insert : CNMG 120412 ET TT9235

Ex.10

Component description : Flange, 316 stainless steel
Insert type : CNMG 120412
Cutting parameters : V=150m/min, f=0.35mm/rev, ap=2.0mm
 Wet cutting,
 External continuous cut
Recommended insert : CNMG 120412 RT TT9235

Ex.11

Component description : Ball Valve, 316 stainless steel
Insert type : CNMG 120408
Cutting parameters : V=200m/min, f=0.14mm/rev, ap=2.0mm
 Wet cutting
 Internal continuous cut
Recommended insert : CNMG 120408 EM TT9080

Ex.12

Component description : Ball Body, 316 stainless steel
Insert type : CNMG 120408
Cutting parameters : V=200m/min, f=0.14mm/rev, ap=2.0mm
 Wet cutting,
 Face interrupted cut
Recommended insert : CNMG 120408 PC TT9080

Ex.13

Component description : Flange, 316F stainless steel
Insert type : WNMG 080412
Cutting parameters : V=130m/min, f=0.2mm/rev, ap=1.0mm
 Wet cutting,
 Face turning
Recommended insert : WNMG 080412 PC TT9080

Ex.14

Component description : Flange, 304L stainless steel
Insert type : CNMG 120408
Cutting parameters : V=170m/min, f=0.23mm/rev, ap=3.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 EM TT9225



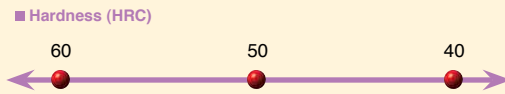
Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Stocked Standard Inserts | Insert Selection by Workpiece Material | TaeguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Stocked Standard Inserts | Insert Selection by Workpiece Material | TaeguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

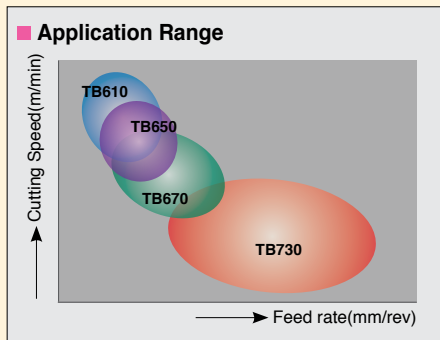
H High Hardness Material (40HRC)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS

Hardened Die Steel , Hardened Alloy Steel, Chilled Cast Iron, Stellite etc



CBN	TB610	For finishing(No interrupted cut required)
	TB650	Stable for both continuous cut and light interrupted cut
	TB670	First choice in finishing to roughing machining For General use
	TB730	For severe interrupted cut



CERAMIC	AB2010	For finishing(No interrupted cut)
	AB20	For finishing(No interrupted cut): HRC > 50
	AB30	For roughing and interrupted cut: HRC 40-50

• See **page 75** for recommended cutting parameters

Examples

CBN

Ex. 1

Component description : Annulus gear, hardened steel(58-60HRC)
Insert type : CNMA 120408
Cutting parameters : **V=120m/min**, f=0.15mm/rev, ap=0.2mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : **CNMA 120408 LN TB670**

Ex. 2

Component description : Sleeve, hardened steel(45-50HRC)
Insert type : CCMW 09T308
Cutting parameters : **V=138m/min**, f=0.10mm/rev, ap=0.10mm
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : **CCGW 09T308 LS TB650**

Ex. 3

Component description : Seal ring, chilled casting hardened steel(59-62HRC)
Insert type : CNMA 120408
Cutting parameters : **V=125m/min**, f=0.09mm/rev, ap=0.6-0.8mm
 Dry cutting
 External turning, continuous cut
Recommended insert : **CNMA 120408 LN TB670**

Ceramic

Ex. 1

Component description : Roller, hardened steel(45-55HRC)
Insert type : TPGN 090208
Cutting parameters : **V=180m/min**, f=0.23mm/rev, ap=0.8mm
 Dry cutting
 External turning, continuous cut
Recommended insert : **TPGN 090208 AB20**

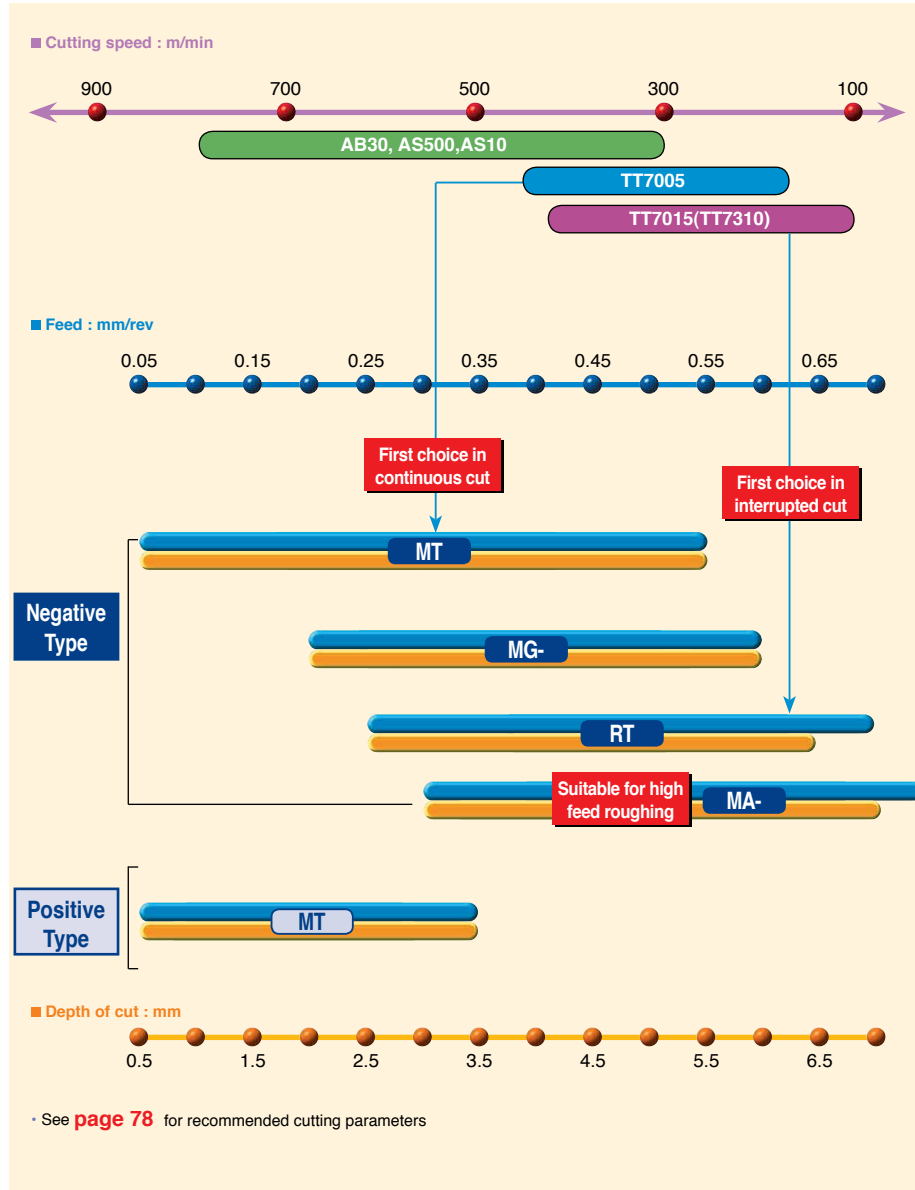
Ex. 2

Component description : Pinion, hardened steel(60HRC)
Insert type : TNGA 160408
Cutting parameters : **V=150m/min**, f=0.06mm/rev, ap=0.3mm
 Dry cutting
 External turning, continuous cut
Recommended insert : **TNGA 160408 AB2010**

K Gray Cast Iron (HB180-220)

Gray Cast Iron : TaeguTurn Material Group **No.A7-1**

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
FT30D	0.6030	G30	FC300		0130	Grade 300	N045B	GC300



Examples

Coated Carbide

Ex. 1

Component description : Top Plange, gray cast iron
Insert type : CNMG 120412
Cutting parameters : V=365m/min, f=0.30-0.5mm/rev, ap=1.5mm
 Wet cutting
 Internal turning, light interrupted cut
Recommended insert : CNMG 120412 RT TT7005

Ex. 2

Component description : Drum, gray cast iron
Insert type : CNMG 120412
Cutting parameters : V=360-415m/min, f=0.25mm/rev, ap=3mm
 Wet cutting
 External turning, continuous cut
Recommended insert : CNMG 120412 RT TT7005

Ex. 3

Component description : Break disc, gray cast iron
Insert type : CNMG 120412
Cutting parameters : V=600m/min, f=0.3mm/rev, ap=2mm
 Wet cutting
 External turning, continuous cut
Recommended insert : CNMG 120412 RT TT7005

Ex. 4

Component description : Clutch, gray cast iron
Insert type : CNMG 120412
Cutting parameters : V=285-525m/min, f=0.23mm/rev, ap=3mm
 Wet cutting
 External Face turning, continuous cut
Recommended insert : CNMG 120412 RT TT7005

Ex. 5

Component description : Brake disc, gray cast iron
Insert type : CNMG 120412
Cutting parameters : V=350m/min, f=0.3mm/rev, ap=2mm
 Wet cutting
 External turning, continuous cut
Recommended insert : CNMG 120412 RT TT7005



Ceramic

Ex. 1

Component description : Brake drum, gray cast iron(180-230HB)
Insert type : CNGN 120716
Cutting parameters : V=550m/min, f=0.45mm/rev, ap=3.0-4.0mm
 Wet cutting
 External & face turning, continuous cut
Recommended insert : CNGX 120716 CH AS10

Ex. 2-1

Component description : Brake disc
Insert type : CNGN 120712
Cutting parameters : V=600m/min, f=0.45mm/rev, ap=2.5mm
 Wet cutting
 External turning, continuous cut
Recommended insert : CNGX 120712 CH AS500

Ex. 2-2

Component description : Brake disc
Insert type : CNGN 120712
Cutting parameters : V=600m/min, f=0.45mm/rev, ap=2.5mm
 Wet cutting
 External turning, continuous cut
Recommended insert : CNGX 120712 CH AS500

Ex. 3

Component description : Brake disc
Insert type : SNGN 150616
Cutting parameters : V=600m/min, f=0.65mm/rev, ap=2.5mm
 Wet cutting
 External face turning, continuous cut
Recommended insert : SNGX 150716 AS500

Ex. 4

Component description : Cylinder jam, gray cast iron(180-230HB)
Insert type : TNGN 160408
Cutting parameters : V=800m/min, f=0.35mm/rev, ap=0.5mm
 Wet cutting
 External turning, continuous cut
Recommended insert : TNGN 160408 AB30

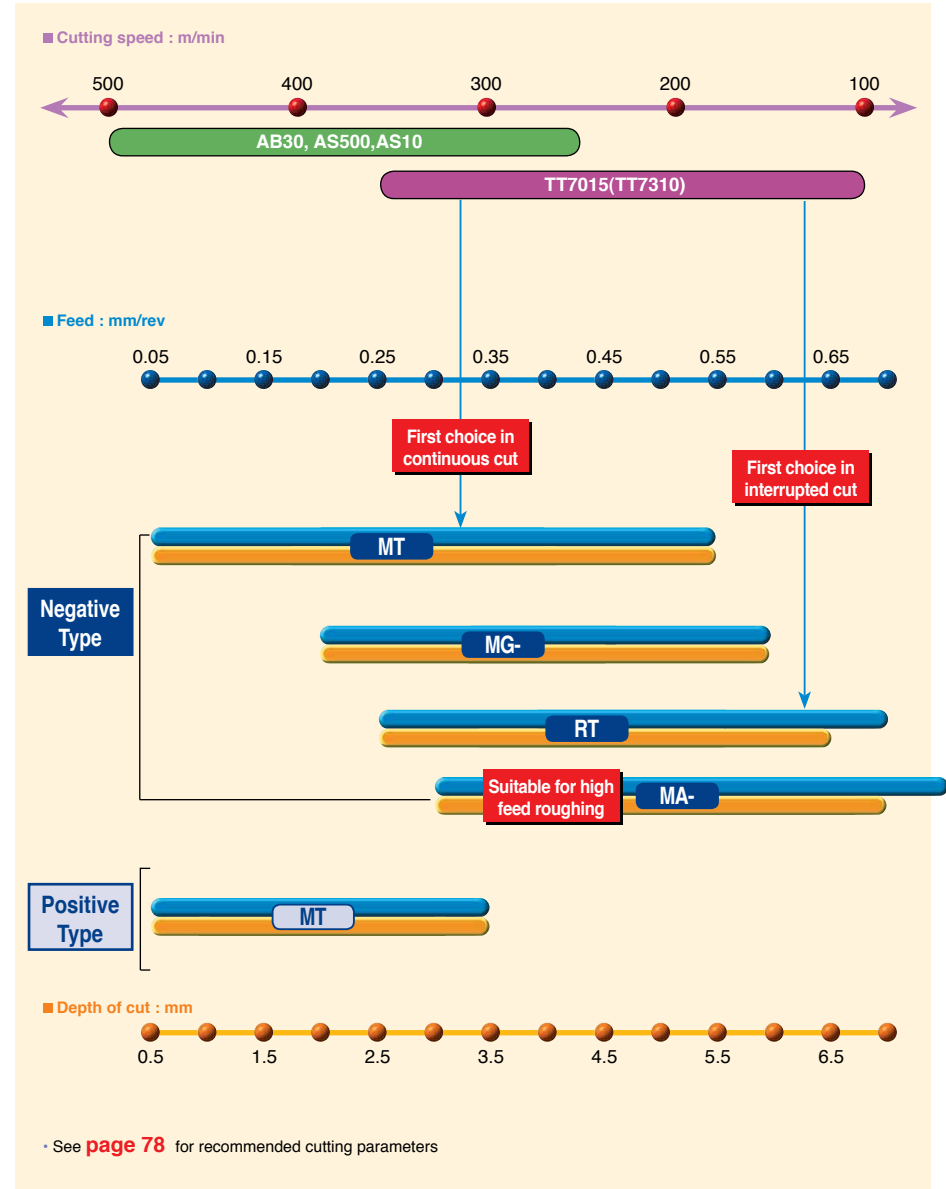
Ex. 5

Component description : Brake disk, gray cast iron(180-230HB)
Insert type : SNGN 120716
Cutting parameters : V=925m/min, f=0.40mm/rev, ap=0.5mm
 Wet cutting
 External turning, continuous cut
Recommended insert : SNGN 120716 AW120



K Ductile Cast Iron (HB180-220)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
FGS400-12	0.7040	GS400-12	FCD400		07 17-02	SNG 420/12	60-40-18	GCD400



Examples

Coated Carbide

Ex. 1

Component description : Pump cover, ductile cast iron
Insert type : WNMA 080408
Cutting parameters : V=220m/min, f=0.30mm/rev, ap=2-3mm
 Wet cutting,
 External & face turning, continuous cut
Recommended insert : WNMA 080408 TT7015

Ex. 2

Component description : Pressure plate, ductile cast iron
Insert type : CNMG 120408
Cutting parameters : V=270m/min, f=0.2~0.48mm/rev, ap=0.5mm
 Wet cutting,
 Face turning, continuous & severe interrupted cut
Recommended insert : CNMG 120412 RT TT7015

Ex. 3

Component description : Hub, ductile cast iron
Insert type : CNMG 120412
Cutting parameters : V=200m/min, f=0.17-0.3mm/rev, ap=2.5mm
 Wet cutting,
 Face turning, continuous & interrupted cut
Recommended insert : CNMG 120412 RT TT7015

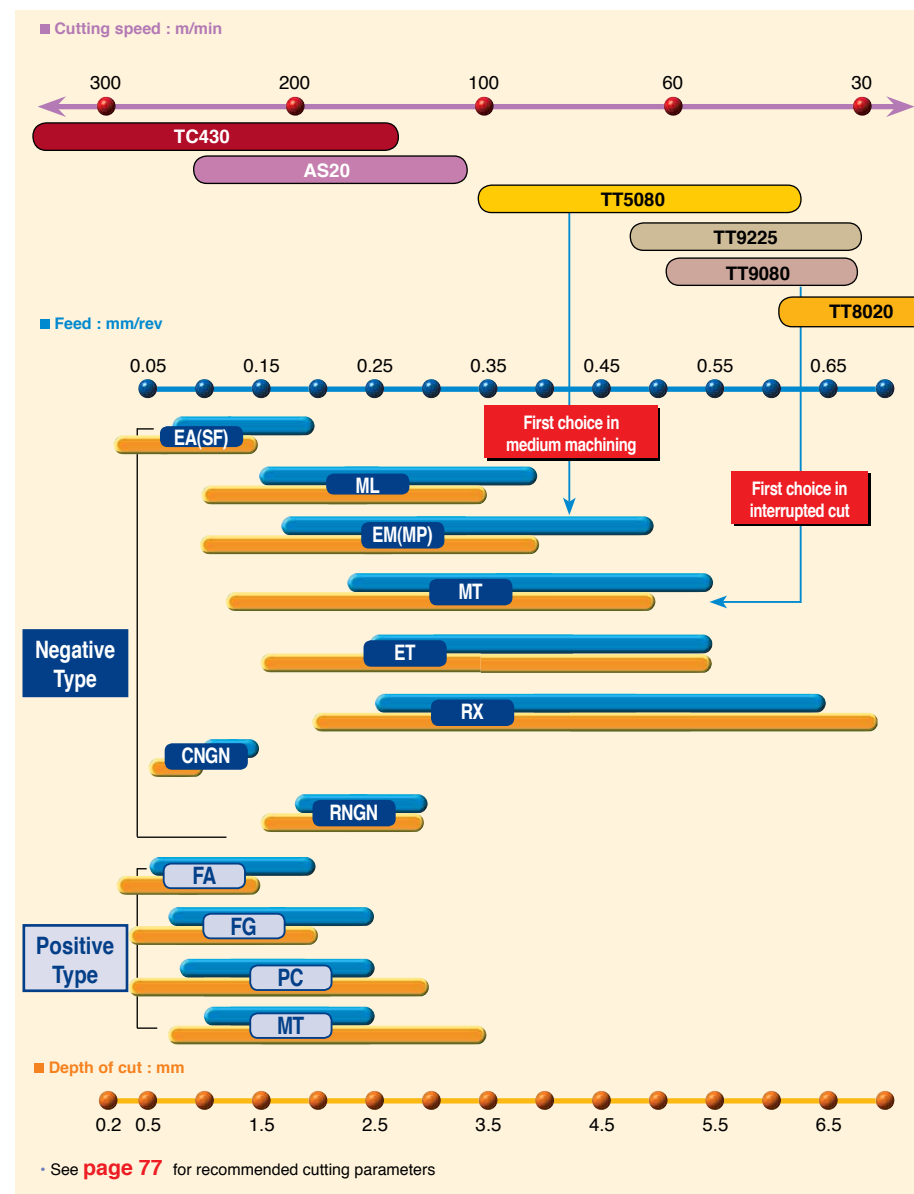
Ex. 4

Component description : Axle housing, ductile cast iron
Insert type : CNMG 120412
Cutting parameters : V=260m/min, f=0.23mm/rev, ap=5mm
 Wet cutting,
 External turning, continuous & interrupted cut
Recommended insert : CNMG 120412 RT TT7015

Ceramic

Ex. 1

Component description : Fly wheel, ductile cast iron
Insert type : CNGN 120712
Cutting parameters : V=800m/min, f=0.4mm/rev, ap=2.5mm
 Wet cutting
 External & face turning, continuous cut
Recommended insert : CNGX 120712 CH AS500



Examples



Coated Carbide

Ex. 1

Component description : Ball, Inconel 625
Insert type : CNMG 120408
Cutting parameters : V=40m/min, f=0.2mm/rev, ap=0.5mm
 Wet cutting,
 Internal turning, continuous cut
Recommended insert : CNMG 120408 ML TT5080

Ex. 2

Component description : Long shaft, Inconel 718
Insert type : CNMG 120408
Cutting parameters : V=60m/min, f=0.18mm/rev, ap=0.8mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 EM TT5080

Ex. 3

Component description : Long shaft, Inconel 718
Insert type : CNMG 120408
Cutting parameters : V=60m/min, f=0.18mm/rev, ap=0.8mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 EM TT5080

Ex. 4

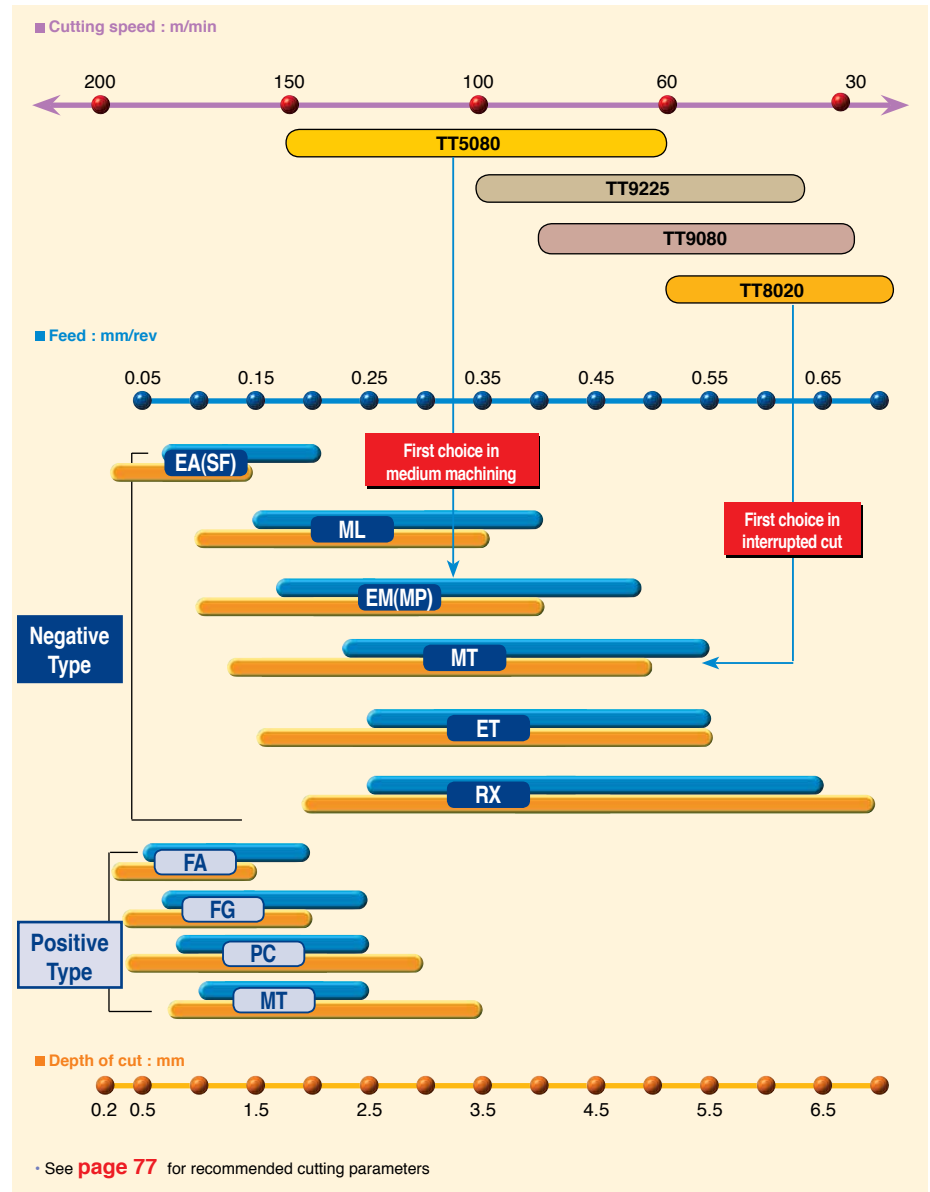
Component description : Turbine disk, Inconel 718
Insert type : CNMG 120408
Cutting parameters : V=25m/min, f=0.25mm/rev, ap=1.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 EM TT9080

Ceramic

Ex. 1

Component description : Sleeve, Inconel 718
Insert type : RNGN 120700
Cutting parameters : V=180m/min, f=0.20mm/rev, ap=2.5mm
 Wet cutting
 External turning, continuous cut
Recommended insert : RNGN 120700 T7 TC430

Titanium Alloy



Examples

Ex. 1

Component description : Sleeve, Titanium alloy
Insert type : CNMG 120408
Cutting parameters : V=85m/min, f=0.30mm/rev, ap=2.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 MP TT5080

Ex. 2

Component description : Pin, Titanium alloy
Insert type : CNMG 120408
Cutting parameters : V=60m/min, f=0.30mm/rev, ap=2.0mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CNMG 120408 EM TT5080

Ex. 3

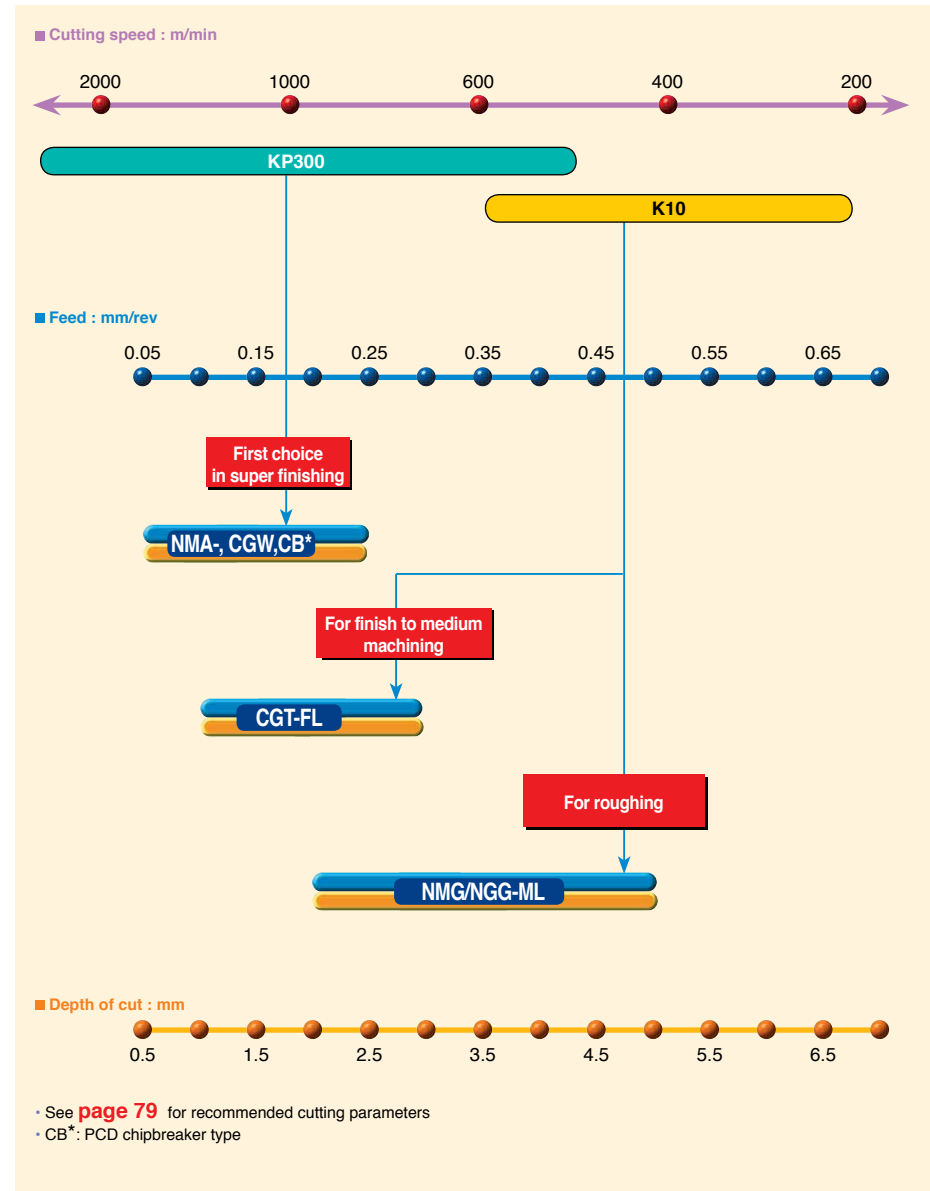
Component description : Valve spindle, Titanium alloy
Insert type : CCMT 09T304
Cutting parameters : V=40m/min, f=0.12mm/rev, ap=0.5mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : CCMT 09T304 PC TT9225

Ex. 4

Component description : Pin
Insert type : WNMG 080408
Cutting parameters : V=50m/min, f=0.12mm/rev, ap=0.3mm
 Wet cutting,
 External turning, continuous cut
Recommended insert : WNMG 080408 EA TT9080

Low Si Aluminium Alloy (12.2%<Si)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
	3.2982		ADC1		4247	LM20	A413.0	



Examples

Ex. 1

Component description : Aluminium wheel, Aluminium alloy with 7% Si

Roughing;

Insert type : DCGT 11T308

Cutting parameters : V=1500m/min, f=0.30mm/rev, ap=2.0mm

Wet cutting

internal turning, continuous cut

Recommended insert : DCGT 11T308 FL K10

Finishing;

Insert type : VCGT 160408

Cutting parameters : V=2000m/min, f=0.15mm/rev, ap=0.2mm

Wet cutting

internal turning, continuous cut

Recommended insert : VCGW 160408 LN-7 KP300

Ex. 2

Component description : Pump case, Aluminium alloy with 8% Si

Insert type : TCGT 16T308

Cutting parameters : V=400m/min, f=0.10mm/rev, ap=1.75mm

Wet cutting,

Internal turning, continuous cut

Recommended insert : TCGT 16T308 FL K10

Ex. 3

Component description : Cylinder head, aluminum alloy with 12% Si

Insert type : TCGT 110204

Cutting parameters : V=500m/min, f=0.24mm/rev, ap=1.5mm

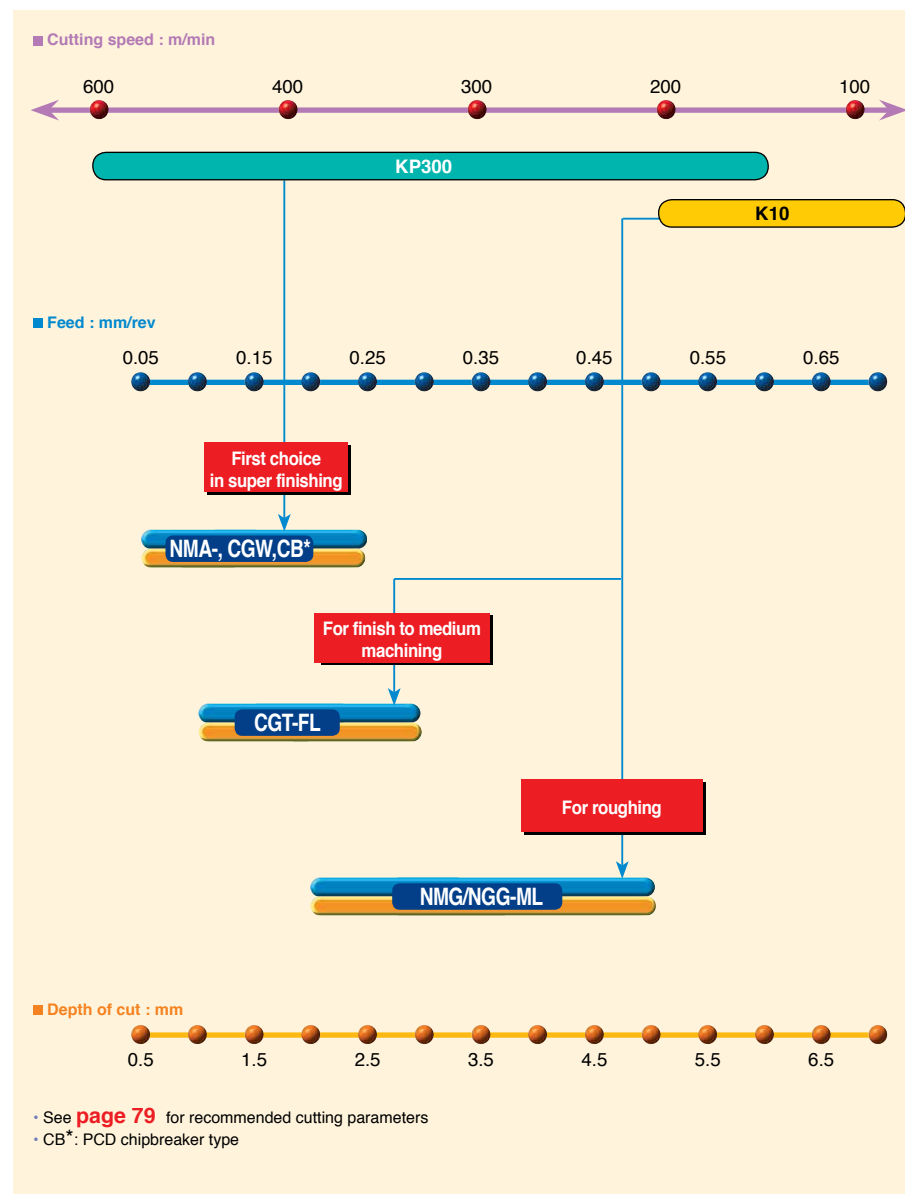
Wet cutting,

External turning, continuous cut

Recommended insert : TCGT 110204 CB KP300

N High Si Aluminium Alloy (12.2% ≥ Si)

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS
			AC4D		4247	LM16	B55.0	



Examples

Ex. 1

Component description : Piston for diesel engine, Aluminium alloy with 18% Si

Roughing;

Insert type : SCGT 120408

Cutting parameters : $V=180\text{m/min}$, $f=0.33\text{mm/rev}$, $a_p=1.0\text{mm}$

Wet cutting

External turning, continuous cut

Recommended insert : SCGT 120408 FL K10

Finishing;

Insert type : CCGT 09T308

Cutting parameters : $V=300\text{m/min}$, $f=0.15\text{mm/rev}$, $a_p=0.2\text{mm}$

Wet cutting

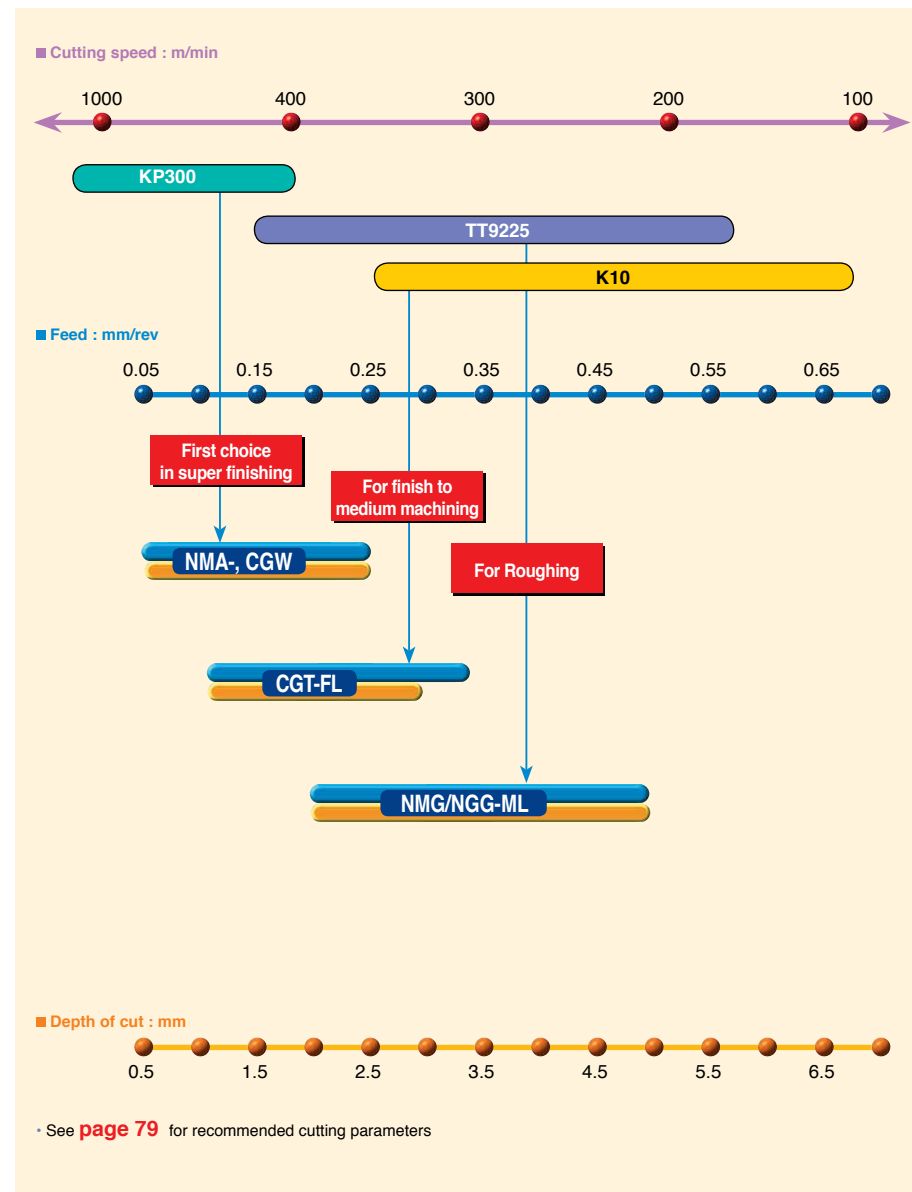
External turning, continuous cut

Recommended insert : CCGW 09T308 LN-7 KP300



N Copper Alloy

France	Germany	Italy	Japan	Spain	Sweden	U.K	USA	Korea
AFNOR	DIN	UNI	JIS	UNF	SS	BS	AISI/SAE	KS



Examples

Ex. 1

Component description : Ring, Brass
Insert type : TCGT 16T308
Cutting parameters : $V=70\text{m/min}$, $f=0.15\text{mm/rev}$, $a_p=0.6\text{mm}$
Wet cutting
External turning, continuous cut
Recommended insert : TCGT 16T308 FL K10

Ex. 2

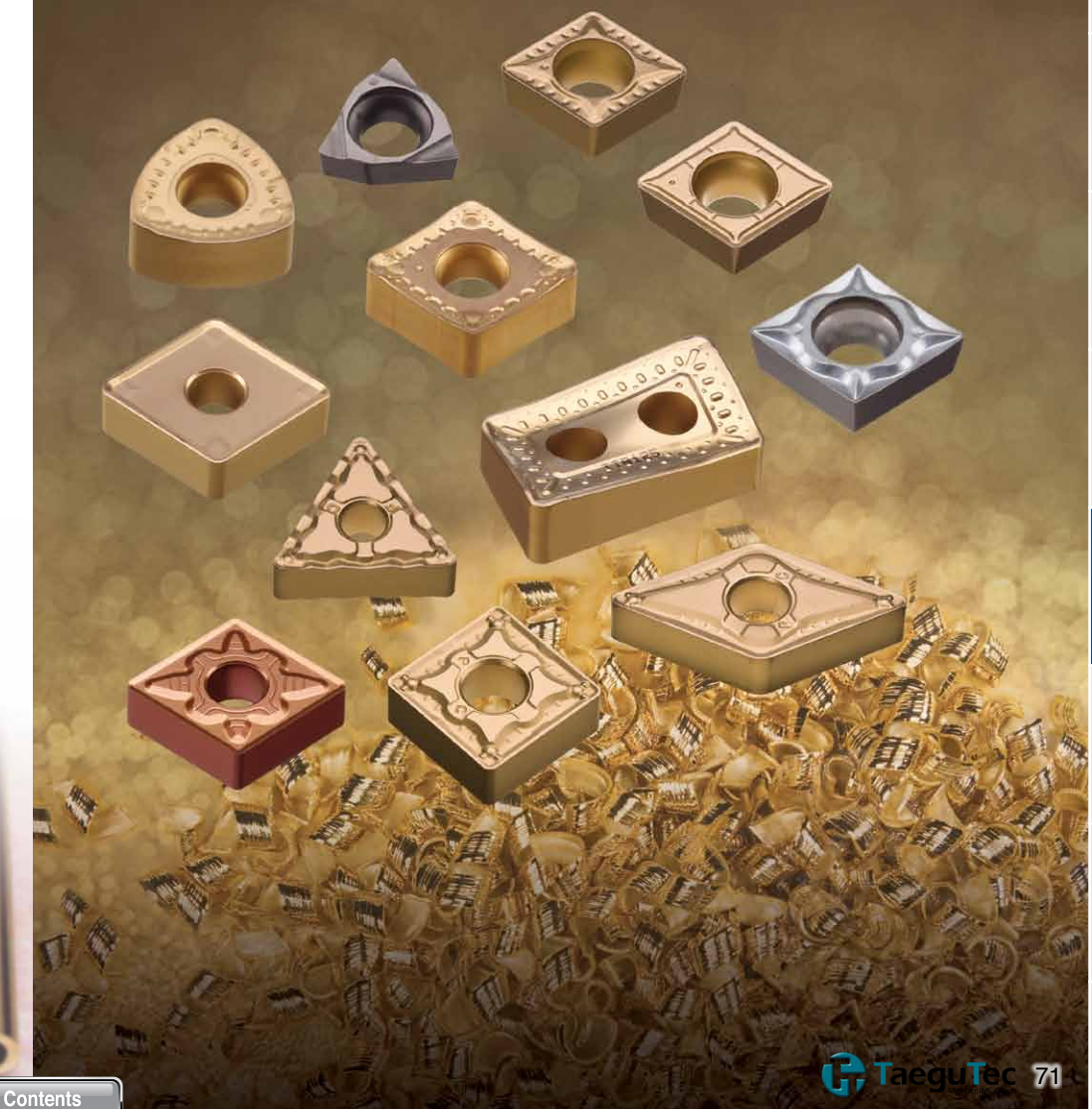
Component description : Pipe, Brass
Insert type : SNMG 190612
Cutting parameters : $V=250\text{m/min}$, $f=0.45\text{mm/rev}$, $a_p=3.0\text{-}4.0\text{mm}$
Wet cutting
External turning, continuous cut
Recommended insert : SNMG 190612 MT TT9225

Ex. 3

Component description : Guide ring, Brass
Insert type : DCGT 11T304
Cutting parameters : $V=390\text{m/min}$, $f=0.12\text{mm/rev}$, $a_p=1.5\text{mm}$
Dry cutting
Internal turning, continuous & interrupted cut
Recommended insert : DCGT 11T304 FL K10



Insert Selection by Workpiece Material



■ Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material												
				0.15% Carbon Steel (HB ≈ 150)				0.45% Carbon Steel (HB180 - 200)				0.55% Carbon Steel (HB200 - 220)				
N	F	-1.0	Best	1	PV3010	FC	475	0.12	PV3010	FG	355	0.15	PV3010	FG	330	0.15
				2	CT3000	FC	430	0.12	TT8115	FG	340	0.15	TT8115	FG	315	0.15
		1.0 - 2.5	Best	1	TT5100	ML	330	0.20	TT8115	MP	330	0.30	TT8115	MP	305	0.30
				2	TT8125	ML	420	0.20	TT8125	MP	300	0.30	TT8125	MP	280	0.30
			Normal	1	TT5100	MP	315	0.24	TT8115	PC	310	0.30	TT8115	PC	290	0.30
				2	TT8125	MP	400	0.24	TT8125	PC	280	0.30	TT8125	PC	260	0.30
	Poor	1	TT8020	MT	235	0.24	TT8135	RT	190	0.32	TT8135	RT	180	0.32		
		2														
	M	2.5 - 4.0	Best	1	TT5100	PC	300	0.28	TT8115	PC	310	0.35	TT8115	MP	290	0.35
				2	TT8125	PC	385	0.28	TT8125	PC	280	0.35	TT8125	PC	260	0.35
		Normal	1	TT5100	MT	285	0.28	TT8125	PC	280	0.35	TT8125	MT	260	0.35	
			2	TT8125	MT	370	0.28	TT8125	MT	265	0.40	TT8125	MG-	245	0.40	
Poor		1	TT8020	MT	215	0.24	TT8135	RT	180	0.36	TT8135	RT	180	0.36		
		2														
R	4.0 - 7.0	Normal	1	TT5100	RT	230	0.45	TT8125	RT	260	0.56	TT8125	RT	240	0.56	
			2	TT8125	RT	320	0.45	TT8115	RT	290	0.56	TT8135	RT	270	0.56	
	Poor	1	TT8020	RT	180	0.36	TT8135	RT	180	0.45	TT8135	RT	160	0.45		
		2														
	7.0 -	Normal	1	TT5100	RH	210	0.57	TT8125	RH	245	0.71	TT8125	RH	225	0.71	
			2													
Poor	1	TT8020	RH	165	0.46	TT8135	RH	165	0.57	TT8135	RH	150	0.57			
	2															
P	F	-1.0	Best	1	PV3010	FG	475	0.12	PV3010	FG	355	0.15	PV3010	FG	330	0.15
				2	CT3000	FG	420	0.12	CT3000	FG	315	0.15	CT3000	FG	295	0.15
		1.0 - 3.5	Best	1	TT5100	MT	285	0.17	TT8115	MT	310	0.20	TT8115	MT	285	0.20
				2	TT8125	MT	370	0.17	TT8125	MT	280	0.20	TT8125	MT	255	0.20
			Normal	1	TT5100	MT	275	0.17	TT8125	MT	280	0.20	TT8125	MT	255	0.20
				2	TT8125	MT	350	0.17	TT5100	MT	215	0.20	TT5100	MT	195	0.20
	Poor	1	TT8020	MT	220	0.17	TT8135	MT	190	0.20	TT8135	MT	180	0.20		
		2														

■ Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material												
				Low Carbon (0.13 - 0.22%) Alloy Steel (HB150 - 180)				Cr-Mo Alloy Steel (HB200 - 220)				Ni-Cr-Mo Alloy Steel (HB200 - 220)				
N	F	-1.0	Best	1	PV3010	FC	420	0.12	PV3010	FG	330	0.15	PV3010	FG	320	0.15
				2	CT3000	FC	380	0.12	TT8115	FG	315	0.15	TT8115	FG	305	0.15
		1.0 - 2.5	Best	1	TT5100	ML	295	0.20	TT8115	MP	305	0.30	TT8115	MP	295	0.30
				2	TT8125	ML	375	0.20	TT8125	MP	280	0.30	TT8125	MP	270	0.30
			Normal	1	TT5100	PC	285	0.24	TT8115	PC	290	0.30	TT8115	PC	280	0.30
				2	TT8125	PC	365	0.24	TT8125	MC	260	0.30	TT8125	PC	250	0.30
	Poor	1	TT8020	MT	205	0.24	TT8135	RT	180	0.32	TT8135	RT	170	0.32		
		2														
	M	2.5 - 4.0	Best	1	TT5100	PC	265	0.28	TT8115	PC	290	0.35	TT8115	PC	280	0.35
				2	TT8125	PC	340	0.28	TT8125	PC	260	0.35	TT8125	PC	250	0.35
		Normal	1	TT5100	MT	255	0.28	TT8125	MT	260	0.35	TT8125	MT	250	0.35	
			2	TT8125	MT	315	0.28	TT8125	MG-	245	0.40	TT8125	MG-	240	0.40	
Poor		1	TT8020	MT	190	0.24	TT8135	RT	180	0.36	TT8135	RT	170	0.36		
		2														
R	4.0 - 7.0	Normal	1	TT5100	RT	205	0.45	TT8125	RT	240	0.56	TT8125	RT	235	0.56	
			2	TT8125	RT	250	0.45	TT8115	RT	270	0.56	TT8115	RT	260	0.56	
	Poor	1	TT8020	RT	160	0.36	TT8135	RT	160	0.45	TT8135	RT	160	0.45		
		2														
	7.0 -	Normal	1	TT5100	RH	185	0.57	TT8125	RH	225	0.71	TT8125	RH	220	0.71	
			2					RT	225	0.64	TT8125	RT	220	0.64		
Poor	1	TT8020	RH	150	0.46	TT7100	RH	140	0.57	TT8135	RH	150	0.57			
	2															
P	F	-1.0	Best	1	PV3010	FG	420	0.12	PV3010	FG	330	0.15	PV3010	FG	320	0.15
				2	CT3000	FG	380	0.12	CT3000	FG	295	0.15	CT3000	FG	285	0.15
		1.0 - 3.5	Best	1	TT5100	MT	265	0.17	TT8115	MT	285	0.20	TT8115	MT	275	0.20
				2	TT8125	MT	345	0.17	TT8125	MT	255	0.20	TT8125	MT	250	0.20
			Normal	1	TT5100	MT	255	0.17	TT8125	MT	255	0.20	TT8125	MT	250	0.20
				2	TT8125	MT	330	0.17	TT5100	MT	195	0.20	TT5100	MT	190	0.20
	Poor	1	TT8020	MT	205	0.17	TT8135	MT	180	0.20	TT8135	MT	170	0.20		
		2														

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

Application	Depth of cut (mm)	Workpiece, stability and machine condition	Workpiece Material													
			Bearing Steel (HB200 - 220)				Carbon Tool Steel (HB200 - 220)				Alloy Tool Steel (HB200 - 220)					
N	F -1.0	Best	1	PV3010	FG	330	0.15	PV3010	FG	330	0.15	PV3010	FG	320	0.15	
			2	TT8115	FG	315	0.15	TT8115	FG	315	0.15	TT8115	FG	305	0.15	
		1.0 - 2.5	Best	1	TT8115	MP	305	0.30	TT8115	MP	305	0.30	TT8115	MP	295	0.30
				2	TT8125	MP	280	0.30	TT8125	MP	280	0.30	TT8125	MP	250	0.30
			Normal	1	TT8115	PC	290	0.30	TT8115	PC	290	0.30	TT8115	PC	280	0.30
				2	TT8125	PC	260	0.30	TT8125	PC	260	0.30	TT8125	PC	250	0.30
	Poor	1	TT8135	RT	180	0.32	TT8135	RT	180	0.32	TT8135	RT	170	0.32		
		2														
	2.5 - 4.0	Best	1	TT8115	PC	290	0.35	TT8115	MT	290	0.35	TT8115	PC	280	0.35	
			2	TT8125	PC	260	0.35	TT8125	MT	260	0.35	TT8125	PC	250	0.35	
		Normal	1	TT8125	MT	260	0.35	TT8125	MT	260	0.35	TT8125	MT	250	0.35	
			2	TT8125	MG-	245	0.40	TT8125	MG-	245	0.40	TT8125	MG-	240	0.40	
Poor		1	TT8135	RT	180	0.36	TT8135	RT	180	0.36	TT8135	RT	170	0.36		
		2														
4.0 - 7.0	Normal	1	TT8125	RT	240	0.56	TT8125	RT	240	0.56	TT8125	RT	235	0.56		
		2	TT8115	RT	270	0.56	TT8115	RT	270	0.56	TT8115	RT	260	0.56		
	Poor	1	TT8135	RT	160	0.45	TT8135	RT	160	0.45	TT8135	RT	140	0.45		
		2														
	7.0 -	Normal	1	TT8125	RH	225	0.71	TT8125	RH	225	0.71	TT8115	RH	220	0.71	
			2													
Poor		1	TT8135	RH	150	0.57	TT8135	RH	150	0.57	TT8135	RH	140	0.57		
		2														
P	F -1.0	Best	1	PV3010	FG	330	0.15	PV3010	FG	330	0.15	PV3010	FG	320	0.15	
			2	CT3000	FG	295	0.15	CT3000	FG	295	0.15	CT3000	FG	285	0.15	
		1.0 - 3.5	Best	1	TT8115	MT	285	0.20	TT8115	MT	285	0.20	TT8115	MT	275	0.20
				2	TT8125	MT	255	0.20	TT8125	MT	255	0.20	TT8125	MT	250	0.20
			Normal	1	TT8125	MT	255	0.20	TT8125	MT	255	0.20	TT8125	MT	250	0.20
				2	TT5100	MT	195	0.20	TT5100	MT	195	0.20	TT5100	MT	190	0.20
	Poor	1	TT8135	MT	180	0.20	TT8135	MT	180	0.20	TT8135	MT	170	0.20		
		2														

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

Application	Depth of cut (mm)	Workpiece, stability and machine condition	Workpiece Material													
			High Speed Steel (HB220 - 260)				Cold Working Die Steel (HB220 - 260)				High Hardness Material (40 ≤ HRC)					
N	F -1.0	Best	1	PV3010	FG	230	0.10	TT8115	FG	240	0.14	AB2010		120	0.10	
			2	CT3000	FG	210	0.10	TT8125	FG	210	0.14	TB610		120	0.10	
		1.0 - 2.5	Best	1	TT5080	ML	180	0.15	TT8115	MP	230	0.28	AB2010		120	0.15
				2	TT5100	ML	160	0.15	TT8125	MP	210	0.28	TB670		120	0.15
			Normal	1	TT5080	MP	170	0.20	TT8115	PC	215	0.28	AB20		100	0.15
				2	TT5100	MP	150	0.20	TT8125	PC	195	0.28	TB730		100	0.15
	Poor	1	TT5100	MT	135	0.25	TT8135	RT	130	0.29	AB30		80	0.10		
		2									KB90A		80	0.10		
	2.5 - 4.0	Best	1	TT5080	MP	170	0.20	TT8115	PC	215	0.32	AB20		100	0.15	
			2	TT5100	MP	145	0.20	TT8125	PC	195	0.32	KB90A		100	0.15	
		Normal	1	TT5080	MT	160	0.25	TT8125	MT	175	0.32	AB20		100	0.15	
			2	TT5100	MT	135	0.25	TT8125	MG-	185	0.37	KB90A		100	0.15	
Poor		1	TT8135	RT	140	0.25	TT8135	RT	130	0.33	AB30		80	0.10		
		2									KB90A		80	0.10		
4.0 - 7.0	Normal	1					TT8125	RT	180	0.52						
		2					TT8115	RT	205	0.52						
	Poor	1					TT8135	RT	125	0.41						
		2														
	7.0 -	Normal	1					TT8125	RH	170	0.65					
			2													
Poor		1					TT8135	RH	115	0.52						
		2														
P	F -1.0	Best	1	PV3010	FG	230	0.10	PV3010	FG	250	0.14	TB670		150	0.10	
			2	CT3000	FG	210	0.10	CT3000	FG	225	0.14	AB20		120	0.10	
		1.0 - 3.5	Best	1	TT5080	MT	165	0.15	TT8115	MT	215	0.18	TB670		150	0.12
				2	TT5100	MT	145	0.15	TT8125	MT	195	0.18	AB20		120	0.12
			Normal	1	TT5080	MT	160	0.15	TT8125	MT	215	0.18	AB20		100	0.12
				2	TT5100	MT	140	0.15	TT5100	MT	195	0.18	TB670		100	0.12
	Poor	1	TT8135	MT	135	0.15	TT8135	MT	160	0.18	AB30		80	0.08		
		2									KB90A		80	0.08		

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material										
				Martensitic/Ferritic Stainless Steel (HB180 - 200)					Austenitic Stainless Steel (HB180 - 200)					
Application	Depth of cut (mm)	Workpiece, stability and machine condition	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)
N	F	-1.0	Best	1	PV3010	SF	330	0.12	PV3010	SF	265	0.12		
				2	TT9215	EA	260	0.12	TT9215	EA	210	0.12		
	M	1.0 - 2.5	Best	1	TT9215	EM	230	0.20	TT9215	EM	200	0.20		
				2										
		Normal	1	TT9225	EM	210	0.24	TT9225	EM	185	0.24			
			2	TT9235	MP	180	0.24	TT9235	MP	145	0.24			
	Poor	1	TT9080	MT	170	0.24	TT9080	MT	135	0.24				
		2												
R	2.5 - 4.0	Best	1	TT9225	EM	200	0.24	TT9225	EM	160	0.24			
			2											
	Normal	1	TT9225	MP	190	0.28	TT9225	MP	150	0.28				
		2	TT9235	MT	165	0.28	TT9235	MT	135	0.28				
Poor	1	TT9080	MT	165	0.24	TT9080	MT	125	0.24					
	2													
F	4.0 - 7.0	Normal	1	TT9225	ET	170	0.45	TT9225	ET	130	0.45			
			2											
	Poor	1	TT9080	ET	150	0.36	TT9080	ET	110	0.36				
		2												
P	7.0 -	Normal	1	TT9225	RX	160	0.64	TT9225	RX	120	0.64			
			2											
	Poor	1	TT9080	RX	135	0.55	TT9080	RX	100	0.55				
		2												
F	-1.0	Best	1	PV3010	FG	330	0.12	PV3010	FG	265	0.12			
			2	TT9215	FG	270	0.12	TT9215	FG	220	0.12			
	Normal	1	TT9225	PC	195	0.17	TT9225	PC	160	0.17				
		2												
Poor	1	TT9225	PC	185	0.17	TT9225	PC	150	0.17					
	2	TT9235	MT	160	0.17	TT9235	MT	130	0.17					
M	1.0 - 3.5	Best	1	TT9225	PC	185	0.17	TT9225	PC	150	0.17			
			2	TT9235	MT	160	0.17	TT9235	MT	130	0.17			
	Normal	1	TT9225	PC	185	0.17	TT9225	PC	150	0.17				
		2	TT9235	MT	160	0.17	TT9235	MT	130	0.17				
Poor	1	TT9080	MT	150	0.17	TT9080	MT	120	0.17					
	2													

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material										
				Ni Based Super Alloy					Titanium Alloy					
Application	Depth of cut (mm)	Workpiece, stability and machine condition	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)	Grade	Chipbreaker	Cutting Speed (m/min)	Feed Rate (mm/rev)
N	F	-1.0	Best	1	TC430		250	0.15	TT5080	EA	100	0.15		
				2	TT5080	EA	60	0.15						
	M	1.0 - 2.5	Best	1	TC430		250	0.15	TT5080	EM	90	0.20		
				2	TT5080	EM	60	0.20						
		Normal	1	TT5080	MP	50	0.20	TT5080	MP	80	0.20			
			2											
	Poor	1	TT9080	MT	35	0.20	TT8020	MT	50	0.20				
		2												
R	2.5 - 4.0	Best	1	TT5080	EM	50	0.20	TT5080	EM	80	0.20			
			2											
	Normal	1	TT5080	MP	45	0.20	TT5080	MP	70	0.20				
		2												
Poor	1	TT9080	MT	30	0.20	TT8020	MT	45	0.20					
	2													
F	4.0 - 7.0	Normal	1	TT5080	ET	40	0.20	TT5080	ET	60	0.20			
			2											
	Poor	1	TT9080	ET	25	0.20	TT8020	ET	40	0.20				
		2												
P	7.0 -	Normal	1											
			2											
	Poor	1												
		2												
F	-1.0	Best	1	TT5080	FG	60	0.10	TT5080	FG	100	0.10			
			2											
	Normal	1	TT5080	PC	50	0.15	TT5080	PC	80	0.15				
		2												
Poor	1	TT5080	PC	45	0.15	TT5080	PC	75	0.15					
	2													
M	1.0 - 3.5	Best	1	TT5080	PC	45	0.15	TT5080	PC	75	0.15			
			2											
	Normal	1	TT5080	PC	45	0.15	TT5080	PC	75	0.15				
		2												
Poor	1	TT9080	MT	30	0.15	TT8020	MT	50	0.15					
	2													

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material								
		Gray Cast Iron (HB180 - 220)			Ductile Cast Iron (HB200 - 240)							
N	F	-1.0	Best	1	AS500		600	0.25	AS500		440	0.20
				2	TT7005	MT	400	0.25	TT7005	MT	320	0.20
		1.0 - 2.5	Best	1	AS500		570	0.35	AS500		420	0.30
	2			TT7005	MT	380	0.35	TT7005	MT	305	0.30	
	Normal		1	AS10		540	0.35	AS10		400	0.30	
			2	TT7005	MT	360	0.35	TT7005	MT	290	0.30	
	Poor		1	TT7005	RT	320	0.40	TT7015	RT	250	0.35	
			2	TT7015	RT	270	0.40					
	2.5 - 4.0	Best	1	AS10		540	0.35	AS10		400	0.30	
			2	TT7005	MT	360	0.35	TT7005	MT	275	0.30	
		Normal	1	AS10		510	0.35	AS10		380	0.30	
			2	TT7005	RT	320	0.40	TT7015	MT	260	0.35	
Poor		1	TT7005	RT	300	0.40	TT7015	RT	235	0.35		
		2	TT7015	RT	255	0.40						
4.0 - 7.0	Normal	1	TT7005	RT	300	0.60	TT7015	RT	240	0.52		
		2										
	Poor	1	TT7015	RT	240	0.60	TT7015	RT	225	0.52		
		2										
	Normal	1	TT7005	RT	270	0.80	TT7015	RT	210	0.70		
		2										
Poor	1	TT7015	RT	220	0.80	TT7015	RT	200	0.70			
	2											
P	F	-1.0	Best	1	TT7005	MT	400	0.18	TT7005	MT	320	0.15
				2	TB730		700	0.15				
	1.0 - 3.5	Best	1	TT7005	MT	380	0.25	TT7005	MT	305	0.20	
			2									
		Normal	1	TT7005	MT	360	0.25	TT7005	MT	290	0.20	
			2	TT7015	MT	305	0.25	TT7015	MT	250	0.20	
Poor	1	TT7015	MT	290	0.25	TT7015	MT	235	0.20			
	2											

Recommended cutting parameters to start machining

Insert style **N** : Negative inserts **P** : Positive inserts
 Application **F** : Finishing **M** : Medium **R** : Roughing
 Depth of cut (mm)
 Workpiece, stability and machine condition
 -Best: no scale, no interruption, good rigidity
 -Normal: a little scale, a little interruption, good rigidity
 -Poor: heavy scale, severe interruptions, poor rigidity
 First and second choice grade, chipbreaker, cutting speed(m/min) & feed rate(mm/rev)

				Workpiece Material												
				Low Si Aluminum Alloy (12.2% < Si)				High Si Aluminum Alloy (12.2% ≥ Si)				Copper Alloy				
N	F	-1.0	Best	1	KP300	-	1300	0.10	KP300	-	600	0.10	KP300	-	1100	0.10
				2	K10	ML	500	0.15	K10	ML	150	0.15	TT5100	ML	500	0.15
		1.0 - 2.5	Best	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15
				2	K10	ML	500	0.35	K10	ML	150	0.30	TT5100	ML	400	0.25
			Normal	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15
				2	K10	ML	500	0.35	K10	ML	150	0.30	TT5100	ML	400	0.25
	Poor	1	KP300	-	1000	0.15	KP300	-	600	0.15	KP300	-	900	0.15		
		2	K10	ML	400	0.35	K10	ML	120	0.30	TT5100	MP	320	0.25		
	2.5 - 4.0	Best	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15	
			2	K10	ML	500	0.35	K10	ML	150	0.30	TT5100	MP	400	0.30	
		Normal	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15	
			2	K10	ML	500	0.35	K10	ML	150	0.30	TT5100	MP	400	0.30	
Poor		1	KP300	-	1000	0.15	KP300	-	600	0.15	KP300	-	900	0.15		
		2	K10	ML	400	0.35	K10	ML	120	0.30	TT5100	MT	320	0.30		
P	F	-1.0	Best	1	KP300	-	1300	0.10	KP300	-	600	0.10	KP300	-	1100	0.10
				2	K10	FL	500	0.15	K10	FL	150	0.13	TT5100	FG	400	0.15
	1.0 - 3.5	Best	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15	
			2	K10	FL	500	0.25	K10	FL	150	0.22	TT5100	FG	400	0.20	
		Normal	1	KP300	-	1300	0.15	KP300	-	600	0.15	KP300	-	1100	0.15	
			2	K10	FL	500	0.25	K10	FL	150	0.22	TT5100	FG	400	0.20	
Poor	1	KP300	-	1000	0.15	KP300	-	500	0.15	KP300	-	900	0.15			
	2	K10	FL	400	0.25	K10	FL	120	0.25	TT5100	MT	320	0.20			

Insert Designation System

1 Shape

C	D	E
H	K	R
S	T	V
W		

2 Clearance Angle

N	B
C	P

4 Type

A	G	M
R	B, W	T, H
Special Z, X		

6 Thickness

01 = 1.59mm
T1 = 1.98mm
02 = 2.38mm
T2 = 2.78mm
03 = 3.18mm
T3 = 3.97mm
04 = 4.76mm
05 = 5.56mm
06 = 6.35mm
07 = 7.94mm
09 = 9.52mm

7 Corner Radius

01 = 0.1mm
02 = 0.2mm
04 = 0.4mm
05 = 0.5mm
08 = 0.8mm
12 = 1.2mm
16 = 1.6mm
20 = 2.0mm
24 = 2.4mm
32 = 3.2mm

8 Hand of Insert

R: Right hand
L: Left hand

9 Chipbreaker

For chipbreakers, see page 14 - 20 page

C

N

M

G

1

2

3

4

12

04

08

(R)

MP

5

6

7

8

9

3 Tolerance

Diameter of IC	Tolerance			
	On m		On d	
	Class M	Class U	Class M	Class U
6.35	±0.08	±0.13	±0.05	±0.08
9.52	±0.08	±0.13	±0.05	±0.08
12.70	±0.13	±0.20	±0.08	±0.13
15.88	±0.15	±0.27	±0.10	±0.18
19.05	±0.15	±0.27	±0.10	±0.18
25.40	±0.18	±0.38	±0.13	±0.25
31.75	±0.18	±0.38	±0.13	±0.25

Class	m	t	d
A	±0.005	±0.025	±0.025
F	±0.005	±0.025	±0.013
C	±0.013	±0.025	±0.025
H	±0.013	±0.025	±0.013
E	±0.025	±0.025	±0.025
G	±0.025	±0.13	±0.025
M	±0.08 - ±0.18	±0.13	±0.05 - ±0.13
U	±0.13 - ±0.38	±0.13	±0.08 - ±0.25

5 Cutting Edge Length

I.C(mm)	C	D	E	R	S	T	V	W	K	H
3.97	03	04			03	06		02		
4.76	04	05			04	08	08			
5.56	05	06			05	09	09	03		
6.35	06	07			06	11	11	04		
7.94	08	09			07	13	13	05		
8.0				08						
9.52	09	11		09	09	16	16	06	16	
10.0				10						
12.0				12						
12.7	12	15	13		12	22	22	08		05
15.88	16	19		15	15	27	27	10		
16.0				16						
19.05	19	23		19	19	33	33	13		10
20.0				20						
25.0				25						
25.4	25	31		25	25	44	44	17		
31.75	32	38			31	54	54	21		
32.0				32						



CNMG Negative 80° Rhombic inserts

Insert	Designation	Recommended Machining Conditions		Grade														
		feed (mm/rev)	ap (mm)	Ct3000	CVD Coated								PVD Coated					
					TT7005	TT7015	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT5080	TT9080			
	CNMA 090408	0.15 - 0.60	1.00 - 4.00		•	•												
	CNMA 090412	0.15 - 0.70	1.00 - 4.00		•	•												
	CNMG 090404	0.10 - 0.45	0.50 - 4.00		•	•												
	CNMG 090408	0.10 - 0.50	0.50 - 4.00		•	•												
	CNMG 090412	0.10 - 0.55	0.50 - 4.00		•	•												
	CNMG 090404 EA	0.05 - 0.30	0.13 - 1.50							•	•	•			•	•		
	CNMG 090408 EA	0.07 - 0.40	0.15 - 1.50							•	•	•			•	•		
	CNMG 090408 EM	0.13 - 0.40	0.50 - 4.00							•	•	•			•	•		
	CNMG 090412 EM	0.15 - 0.40	0.70 - 4.00							•	•	•			•	•		
	CNMG 090404 FG	0.07 - 0.30	0.20 - 2.00				•	•										
	CNMG 090408 FG	0.10 - 0.35	0.50 - 2.00				•	•										
	CNMG 090412 FG	0.15 - 0.40	0.50 - 2.00				•	•										
	CNMG 090404 FM	0.07 - 0.30	0.25 - 2.00	•			•	•							•	•		
	CNMG 090408 FM	0.10 - 0.35	0.30 - 2.00	•			•	•	•						•	•		
	CNMG 090412 FM	0.15 - 0.40	0.35 - 2.00	•			•	•	•						•	•		
	CNMG 090404 FT	0.07 - 0.30	0.40 - 3.50				•	•	•									
	CNMG 090408 FT	0.10 - 0.40	0.50 - 3.50				•	•	•									
	CNMG 090412 FT	0.15 - 0.50	0.60 - 3.50				•	•	•									
	CNMG 090404 MM	0.15 - 0.45	0.40 - 4.00				•	•	•	•	•	•						
	CNMG 090408 MM	0.20 - 0.50	0.50 - 4.00				•	•	•	•	•	•						
	CNMG 090412 MM	0.23 - 0.50	0.70 - 4.00				•	•	•	•	•	•						
	CNMG 090404 MT	0.10 - 0.35	0.80 - 4.50				•	•	•									
	CNMG 090408 MT	0.15 - 0.45	1.00 - 4.50				•	•	•									
	CNMG 090412 MT	0.20 - 0.55	1.20 - 4.50				•	•	•									
	CNMG 090404 PC	0.10 - 0.30	0.40 - 4.00				•	•	•									
	CNMG 090408 PC	0.15 - 0.40	0.50 - 4.00				•	•	•									
	CNMG 090412 PC	0.18 - 0.50	0.60 - 4.00				•	•	•									

• Marked: Standard Items

DNMG Negative 55° Rhombic inserts

Insert	Designation	Recommended Machining Conditions		Grade														
		feed (mm/rev)	ap (mm)	Ct3000	CVD Coated								PVD Coated					
					TT7005	TT7015	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT5080	TT9080			
	DNMG 130504	0.10 - 0.45	0.50 - 4.00		•	•												
	DNMG 130508	0.10 - 0.50	0.50 - 4.00		•	•												
	DNMG 130512	0.10 - 0.55	0.50 - 4.00		•	•												
	DNMG 130504 EA	0.05 - 0.30	0.13 - 1.50							•	•	•		•	•			
	DNMG 130508 EA	0.07 - 0.40	0.15 - 1.50							•	•	•		•	•			
	DNMG 130508 EM	0.13 - 0.40	0.50 - 4.00							•	•	•		•	•			
	DNMG 130512 EM	0.15 - 0.40	0.70 - 4.00							•	•	•		•	•			
	DNMG 130504 FG	0.07 - 0.30	0.20 - 2.00										•	•			•	
	DNMG 130508 FG	0.10 - 0.35	0.50 - 2.00										•	•			•	
	DNMG 130512 FG	0.15 - 0.40	0.50 - 2.00										•	•			•	
	DNMG 130504 FM	0.07 - 0.30	0.25 - 2.00	•			•	•	•						•	•		
	DNMG 130508 FM	0.10 - 0.35	0.30 - 2.00	•			•	•	•						•	•		
	DNMG 130512 FM	0.15 - 0.40	0.35 - 2.00	•			•	•	•						•	•		
	DNMG 130504 FT	0.07 - 0.30	0.25 - 3.50				•	•	•									
	DNMG 130508 FT	0.10 - 0.40	0.30 - 3.50				•	•	•									
	DNMG 130512 FT	0.15 - 0.50	0.35 - 3.00				•	•	•									
	DNMG 130504 MM	0.15 - 0.45	0.40 - 4.50				•	•	•	•	•	•		•	•			
	DNMG 130508 MM	0.20 - 0.50	0.50 - 4.50				•	•	•	•	•	•		•	•			
	DNMG 130512 MM	0.23 - 0.50	0.70 - 4.50				•	•	•	•	•	•		•	•			
	DNMG 130504 MT	0.10 - 0.35	0.80 - 4.50				•	•	•									
	DNMG 130508 MT	0.15 - 0.45	1.00 - 4.50				•	•	•									
	DNMG 130512 MT	0.20 - 0.55	1.20 - 4.50				•	•	•									
	DNMG 130504 PC	0.10 - 0.30	0.40 - 4.00				•	•	•									
	DNMG 130508 PC	0.15 - 0.40	0.50 - 4.00				•	•	•									
	DNMG 130512 PC	0.18 - 0.50	0.60 - 4.00				•	•	•									

• Marked: Standard Items





SNMG Negative 90° Square inserts

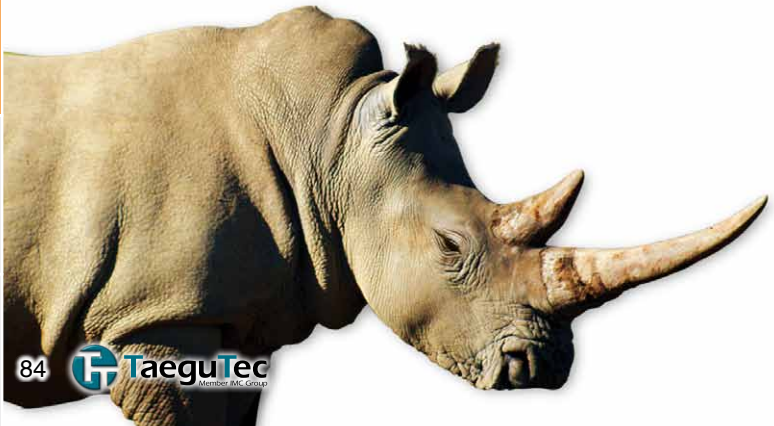
TNMG Negative 60° Triangular inserts

Insert	Designation	Recommended Machining Conditions		Grade															
		feed (mm/rev)	ap (mm)	Ct3000	CVD Coated								PVD Coated						
					TT7005	TT7015	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT5080	TT9080				
	SNMG 090404	0.10 - 0.45	0.50 - 4.00																
	SNMG 090408	0.10 - 0.50	0.50 - 4.00		•	•													
	SNMG 090412	0.10 - 0.55	0.50 - 4.00		•	•													
	SNMG 090404 EA	0.05 - 0.30	0.13 - 1.50							•	•	•			•	•			
	SNMG 090408 EA	0.07 - 0.40	0.15 - 1.50							•	•	•			•	•			
	SNMG 090408 EM	0.13 - 0.40	0.50 - 4.00							•	•	•			•	•			
	SNMG 090412 EM	0.15 - 0.40	0.70 - 4.00							•	•	•			•	•			
	SNMG 090404 FG	0.07 - 0.30	0.20 - 2.00				•	•						•					
	SNMG 090408 FG	0.10 - 0.35	0.50 - 2.00				•	•						•					
	SNMG 090412 FG	0.15 - 0.40	0.50 - 2.00				•	•						•					
	SNMG 090404 FM	0.07 - 0.30	0.25 - 2.00	•			•	•	•					•					
	SNMG 090408 FM	0.10 - 0.35	0.30 - 2.00	•			•	•	•					•					
	SNMG 090412 FM	0.15 - 0.40	0.35 - 2.00	•			•	•	•					•					
	SNMG 090404 MM	0.15 - 0.45	0.40 - 4.00				•	•	•	•	•	•	•	•	•	•	•	•	
	SNMG 090408 MM	0.20 - 0.50	0.50 - 4.00				•	•	•	•	•	•	•	•	•	•	•	•	
	SNMG 090412 MM	0.23 - 0.50	0.70 - 4.00				•	•	•	•	•	•	•	•	•	•	•	•	
	SNMG 090404 MT	0.10 - 0.35	0.80 - 4.00				•	•	•					•					
	SNMG 090408 MT	0.15 - 0.45	1.00 - 4.00				•	•	•					•					
	SNMG 090412 MT	0.20 - 0.55	1.20 - 4.00				•	•	•					•					
	SNMG 090404 PC	0.10 - 0.30	0.40 - 3.50				•	•	•					•					
	SNMG 090408 PC	0.15 - 0.40	0.50 - 3.50				•	•	•					•					
	SNMG 090412 PC	0.18 - 0.50	0.60 - 3.50				•	•	•					•					

Insert	Designation	Recommended Machining Conditions		Grade														
		feed (mm/rev)	ap (mm)	Ct3000	CVD Coated								PVD Coated					
					TT7005	TT7015	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT5080	TT9080			
	TNMG 130404	0.10 - 0.45	0.50 - 4.00															
	TNMG 130408	0.10 - 0.50	0.50 - 4.00		•	•												
	TNMG 130412	0.10 - 0.55	0.50 - 4.00		•	•												
	TNMG 130404 EA	0.05 - 0.30	0.13 - 1.50							•	•	•			•	•		
	TNMG 130408 EA	0.07 - 0.40	0.15 - 1.50							•	•	•			•	•		
	TNMG 130408 EM	0.13 - 0.40	0.50 - 4.00							•	•	•			•	•		
	TNMG 130412 EM	0.15 - 0.40	0.70 - 4.00							•	•	•			•	•		
	TNMG 130404 FG	0.07 - 0.30	0.25 - 1.50				•	•						•				
	TNMG 130408 FG	0.10 - 0.35	0.30 - 1.50				•	•						•				
	TNMG 130412 FG	0.15 - 0.40	0.35 - 1.50				•	•						•				
	TNMG 130404 FM	0.07 - 0.30	0.25 - 1.50	•			•	•	•					•				
	TNMG 130408 FM	0.10 - 0.35	0.30 - 1.50	•			•	•	•					•				
	TNMG 130412 FM	0.15 - 0.40	0.35 - 1.50	•			•	•	•					•				
	TNMG 130404 FT	0.07 - 0.30	0.25 - 2.50				•	•	•					•				
	TNMG 130408 FT	0.10 - 0.40	0.30 - 2.50				•	•	•					•				
	TNMG 130412 FT	0.15 - 0.50	0.35 - 2.50				•	•	•					•				
	TNMG 130404 MM	0.15 - 0.45	0.40 - 3.50				•	•	•	•	•	•	•	•	•	•	•	•
	TNMG 130408 MM	0.20 - 0.50	0.50 - 3.50				•	•	•	•	•	•	•	•	•	•	•	•
	TNMG 130412 MM	0.23 - 0.50	0.70 - 3.50				•	•	•	•	•	•	•	•	•	•	•	•
	TNMG 130404 MT	0.10 - 0.35	0.80 - 3.50				•	•	•					•				
	TNMG 130408 MT	0.15 - 0.45	1.00 - 3.50				•	•	•					•				
	TNMG 130412 MT	0.20 - 0.55	1.20 - 3.50				•	•	•					•				
	TNMG 130404 PC	0.10 - 0.30	0.40 - 3.00				•	•	•					•				
	TNMG 130408 PC	0.15 - 0.40	0.50 - 3.00				•	•	•					•				
	TNMG 130412 PC	0.18 - 0.50	0.60 - 3.00				•	•	•					•				
	TNMG 130404 R/L	0.12 - 0.30	1.00 - 3.50	•														
	TNMG 130408 R/L	0.15 - 0.35	1.30 - 3.50	•														

● Marked: Standard Items






● Marked: Standard Items



New Grades
Grades
Chipbreakers
Insert Geometry by Workpiece Shape
Trouble Shooting
Teagum Workpiece Material Group
Insert Selection by Workpiece Material
Insert Item List
Grade & Chipbreaker Comparison Table
Material & Hardness Conversion Table






New Grades
Grades
Chipbreakers
Insert Geometry by Workpiece Shape
Trouble Shooting
Teagum Workpiece Material Group
Insert Selection by Workpiece Material
Insert Item List
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Negative 80° Rhombic Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermert				CVD Coated						PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT15100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
 For Medium	CNMG 090308 PC	0.10 - 0.25	0.6 - 2.0						●	●													
	120404 PC	0.10 - 0.40	0.4 - 5.0						●	●													
	120408 PC	0.15 - 0.50	0.5 - 5.0						●	●	●								●				
	120412 PC	0.17 - 0.55	0.6 - 5.0						●	●	●	●							●				
	120416 PC	0.20 - 0.60	0.8 - 5.0						●	●	●	●	●										
	160608 PC	0.20 - 0.55	2.0 - 6.5						●	●	●	●	●	●									
	160612 PC	0.25 - 0.55	2.0 - 6.5						●	●	●	●	●	●									
	160616 PC	0.30 - 0.55	2.0 - 6.5						●	●	●	●	●	●									
	190608 PC	0.23 - 0.55	3.0 - 8.0						●	●	●	●	●	●									
	190612 PC	0.25 - 0.55	3.0 - 8.0						●	●	●	●	●	●									
190616 PC	0.30 - 0.55	3.0 - 8.0						●	●	●	●	●	●										
 For Roughing	CNMG 120408 RT	0.25 - 0.70	2.5 - 6.0			●	●	○	●	●	●	●	●	●	●	●							
	120412 RT	0.25 - 0.70	2.5 - 6.0			●	●	○	●	●	●	●	●	●	●	●							
	120416 RT	0.30 - 0.70	2.5 - 6.0			●	●	○	●	●	●	●	●	●	●	●							
	160612 RT	0.25 - 0.70	3.0 - 7.0			●			●	●	●	●	●	●	●								
	160616 RT	0.30 - 0.85	3.0 - 7.0						●	●	●	●	●	●	●								
	190608 RT	0.25 - 0.70	3.0 - 9.0						●	●	●	●	●	●	●								
	190612 RT	0.25 - 0.70	3.0 - 9.0			●	●	○	●	●	●	●	●	●	●								
190616 RT	0.30 - 0.85	3.0 - 9.0			●	●	○	●	●	●	●	●	●	●									
250924 RT	0.45 - 1.00	5.0 - 12.0						●	●	●	●	●	●	●									
 For Finishing	CNMG 120404 SF	0.08 - 0.25	0.5 - 1.5												●	●							
	120408 SF	0.10 - 0.30	0.7 - 1.5			●			●	●					●	●							
 For Finishing	CNMG 120404 WS	0.05 - 0.35	0.5 - 2.0			●			●	●													
 For Medium	CNMG 120408 WT	0.15 - 0.60	1.0 - 5.0			●	●		●	●				●									
	120412 WT	0.20 - 0.80	1.0 - 5.0						●	●				●									

● Marked: Standard Items
○ Marked: Semi Standard Items





Negative 80° Rhombic Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermert				CVD Coated						PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT15100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
 For Heavy	CNMM 190612 HT	0.35 - 0.9	4.0 - 9.0							●	●	●							●				
	190616 HT	0.45 - 1.0	4.0 - 9.0							●	●	●											
	190624 HT	0.55 - 1.2	4.0 - 9.0							●	●	●											
	250724 HT	0.55 - 1.3	5.0 - 12.0							●	●	●	●										
	250924 HT	0.55 - 1.3	5.0 - 12.0							●	●	●	●										
250932 HT	0.65 - 1.3	5.0 - 13.0							●	●	●	●											
 For Heavy	CNMM 190624 HY	0.50 - 1.10	4.0 - 12.0							●	●												
	250924 HY	0.55 - 1.50	4.0 - 15.0							●	●												
 For Heavy	CNMM 250924 HZ	0.55 - 1.50	4.0 - 15.0							●	●												
 For Roughing	CNMM 120408 RH	0.30 - 0.70	2.5 - 6.0							●	●								●				
	120408 RH(N)	0.25 - 0.60	2.0 - 5.0							●	●								●				
	120412 RH	0.30 - 0.80	2.5 - 6.0							●	●								●				
	160608 RH	0.30 - 0.70	3.0 - 8.0							●	●												
	160612 RH	0.30 - 0.80	3.0 - 8.0							●	●												
	160616 RH	0.45 - 1.00	4.0 - 8.0							●	●												
	190608 RH	0.30 - 0.70	3.0 - 9.0							●	●												
	190612 RH	0.35 - 0.80	4.0 - 9.0							●	●	●							●				
	190616 RH(N)	0.30 - 0.70	3.0 - 8.0							●	●												
	190616 RH	0.45 - 1.00	4.0 - 9.0							●	●								●	●	●		
190616 RH(N)	0.45 - 0.90	3.0 - 8.0							●	●													
190624 RH	0.55 - 1.20	4.0 - 9.0							●	●	●							●	●	●			
250724 RH	0.55 - 1.20	5.0 - 12.0							●	●	●												
250924 RH	0.55 - 1.20	5.0 - 12.0							●	●	●							●					
 For Roughing	CNMM 120408 RX	0.20 - 0.55	0.7 - 7.0							●	●	●											
	120412 RX	0.25 - 0.70	1.0 - 7.0							●	●	●											
	160612 RX	0.25 - 0.70	1.0 - 9.0							●	●	●											
	160616 RX	0.30 - 0.90	1.5 - 9.0							●	●	●											
	160624 RX	0.35 - 1.20	2.0 - 9.0							●	●	●											
	190608 RX	0.20 - 0.55	0.7 - 10.0							●	●	●											
	190612 RX	0.25 - 0.70	1.0 - 10.0							●	●	●											
	190616 RX	0.30 - 0.90	1.5 - 10.0							●	●	●											
	190624 RX	0.35 - 1.10	2.0 - 10.0							●	●	●											
	250724 RX	0.35 - 1.20	2.0 - 12.0							●	●	●											
250924 RX	0.35 - 1.20	2.0 - 12.0							●	●	●												

* Marked: Chipbreaker shape is not the same as shown in the catalogue.




● Marked: Standard Items

Positive 7° Clearance 55° Rhombic Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermet		CVD Coated								PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
 For Finishing	DCMT 070202 FA	0.05 - 0.15	0.1 - 1.5	•	•										•	•							
	11T302 FA	0.05 - 0.15	0.1 - 1.5	•	•										•	•							
 For Finishing	DCMT 070204 FG	0.07 - 0.20	0.4 - 1.5	•	•				•	•					•	•							
	070208 FG	0.07 - 0.20	0.4 - 2.0	•	•				•	•					•	•							
	11T304 FG	0.10 - 0.25	0.6 - 1.5	•	•				•	•					•	•							
	11T308 FG	0.10 - 0.25	0.6 - 2.0	•	•				•	•					•	•							
 For Medium	DCMT 11T304 MT	0.10 - 0.25	0.7 - 3.0	•	•	•	○	•	•	•				•	•								
	11T308 MT	0.13 - 0.30	1.0 - 3.0	•	•	•	○	•	•	•				•	•								•
	11T312 MT	0.17 - 0.35	1.5 - 3.0		•									•									
 For Semi Finishing	DCMT 070204 PC	0.06 - 0.18	0.3 - 2.0	•					•	•										•			
	070208 PC	0.08 - 0.25	0.4 - 2.0	•					•	•										•			
	11T304 PC	0.08 - 0.25	0.35 - 3.0	•					•	•										•			
	11T308 PC	0.10 - 0.28	0.5 - 3.0	•					•	•										•			
	11T312 PC	0.12 - 0.32	0.5 - 3.0	•					•	•										•			





• Marked: Standard Items
○ Marked: Semi Standard Items

Positive 7° Clearance Square Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermet		CVD Coated								PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
 For Finishing	SCMT 09T304 FG	0.08 - 0.25	0.60 - 2.0																				
	09T308 FG	0.10 - 0.25	0.60 - 2.0																				
 For Medium	SCMT 09T304 MT	0.10 - 0.25	0.70 - 3.5	•	•	•	○	•	•	•				•	•								
	09T308 MT	0.13 - 0.30	1.00 - 3.5	•	•	•	○	•	•	•				•	•								
	120404 MT	0.10 - 0.25	1.00 - 5.0	•	•	•			•	•					•	•							
	120408 MT	0.13 - 0.30	1.00 - 5.0	•	•	•	○	•	•	•					•	•							
 For Semi Finishing	SCMT 09T304 PC	0.08 - 0.25	0.35 - 3.0	•					•	•											•		
	09T308 PC	0.10 - 0.28	0.50 - 3.0	•					•	•											•		
	120404 PC	0.08 - 0.25	0.40 - 4.0	•					•	•											•		
	120408 PC	0.10 - 0.30	0.70 - 4.0	•					•	•											•		
	120412 PC	0.12 - 0.35	1.00 - 4.0	•					•	•											•		




• Marked: Standard Items
○ Marked: Semi Standard Items

Positive 7° Clearance Round Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermet		CVD Coated								PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
 For Medium	RCMT 10T300 MT	0.20 - 0.50	1.0 - 4.0			•			•	•													
	120400 MT	0.30 - 0.60	2.0 - 5.0			•			•	•													
	160600 MT	0.40 - 0.80	3.0 - 7.0						•	•													
 For Semi Finishing	RCMT 120400 PC	0.2 - 0.6	1.3 - 4.5						•	•					•								
 For Roughing	RCMX 100300	0.25 - 0.50	1.5 - 4.0			•	•	○	•	•					•								
	120400	0.30 - 0.60	2.5 - 5.0			•	•	○	•	•					•								
	160600	0.40 - 0.75	3.0 - 7.0			•	•	○	•	•					•								
	200600	0.48 - 0.90	3.5 - 9.0			•	•	○	•	•					•							•	
	250700	0.55 - 1.20	4.0 - 12.0			•	•	○	•	•					•								
	320900	0.65 - 1.50	5.0 - 15.0						•	•													
 For Roughing	RCMX 100300 RA	0.20 - 0.50	1.0 - 4.0						•	•													
	120400 RA	0.25 - 0.60	2.0 - 5.0						•	•													
	160600 RA	0.35 - 0.75	2.5 - 7.0						•	•													
	200600 RA	0.40 - 0.90	3.0 - 9.0						•	•													
	250700 RA	0.50 - 1.20	3.5 - 12.0						•	•													
	320900 RA	0.60 - 1.50	4.0 - 15.0						•	•													

• Marked: Standard Items
○ Marked: Semi Standard Items

Positive 11° Clearance Square Inserts

Insert	Designation	Recommended Machining Conditions		Grade																			
				Cermet		CVD Coated								PVD Coated				Uncoated					
		feed (mm/rev)	ap (mm)	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	P20	P30	K10	K20
 For Finishing	SPGN 090304	0.08 - 0.20	0.7 - 3.5																				
	090308	0.10 - 0.25	0.7 - 3.5																				
	120304	0.08 - 0.20	1.0 - 5.0																				
	120308	0.10 - 0.25	1.0 - 5.0							•	•										•	•	•
	120312	0.15 - 0.30	1.0 - 5.0																				
	120404	0.08 - 0.20	1.0 - 5.0																				•
	120408	0.10 - 0.25	1.0 - 5.0																				
	120412	0.15 - 0.30	1.0 - 5.0																				
	120416	0.18 - 0.33	1.0 - 5.0																				
	150404	0.08 - 0.20	1.5 - 7.0							•													•
	150408	0.10 - 0.25	1.5 - 7.0																				
	150412	0.15 - 0.30	1.5 - 7.0																				
190404	0.08 - 0.20	1.5 - 9.0																				•	
190408	0.10 - 0.25	1.5 - 9.0																				•	
 For Medium	SPMR 090304	0.10 - 0.25	0.7 - 3.5																				
	090308	0.13 - 0.30	1.0 - 3.5																				
	120304	0.10 - 0.25	1.0 - 5.0																				
	120308	0.13 - 0.30	1.0 - 5.0																				
 For Medium	SPUN 090304	0.10 - 0.30	1.0 - 3.5																				
	090308	0.15 - 0.40	1.0 - 3.5																				
	120304	0.10 - 0.30	1.0 - 5.0																				
	120308	0.15 - 0.40	1.0 - 5.0																				
	120312	0.20 - 0.50	1.0 - 5.0																				
	150404	0.10 - 0.30	1.5 - 7.0																				
190412	0.20 - 0.50	1.5 - 9.0																					

• Marked: Standard Items

Inserts for Aluminum

Positive 7° Clearance Inserts for Aluminum Machining

Insert	Designation	Dimension(mm)				Grade
		d	t	r	OD1	
	CCGT 060202 FL	6.35	2.38	0.2	2.8	●
	060204 FL	6.35	2.38	0.4	2.8	●
	09T302 FL	9.525	3.97	0.2	4.4	●
	09T304 FL	9.525	3.97	0.4	4.4	●
	09T308 FL	9.525	3.97	0.8	4.4	●
	120402 FL	12.70	4.76	0.2	5.5	●
	120404 FL	12.70	4.76	0.4	5.5	●
	DCGT 070202 FL	6.35	2.38	0.2	2.8	●
	070204 FL	6.35	2.38	0.4	2.8	●
	11T302 FL	9.525	3.97	0.2	4.4	●
	11T304 FL	9.525	3.97	0.4	4.4	●
	11T308 FL	9.525	3.97	0.8	4.4	●
	RCGT 0803MO FL	8.0	3.18	-	3.4	●
	1003MO FL	10.0	3.18	-	4.4	●
	10T3MO FL	10.0	3.97	-	4.4	●
	SCGT 09T308 FL	9.525	3.97	0.8	4.4	●
	120402 FL	12.70	4.76	0.2	5.5	●
	120404 FL	12.70	4.76	0.4	5.5	●
	120408 FL	12.70	4.76	0.8	5.5	●
	TCGT 090204 FL	5.56	2.38	0.4	2.5	●
	110204 FL	6.35	2.38	0.4	2.8	●
	16T304 FL	9.525	3.97	0.4	4.4	●
	16T308 FL	9.525	3.97	0.8	4.4	●
	VCGT 110302 FL	6.35	3.18	0.2	2.8	●
	110304 FL	6.35	3.18	0.4	2.8	●
	160402 FL	9.525	4.76	0.2	4.4	●
	160404 FL	9.525	4.76	0.4	4.4	●
	160408 FL	9.525	4.76	0.8	4.4	●
	160412 FL	9.525	4.76	1.2	5.5	●
	220530 FL	12.70	5.56	3.0	5.5	●

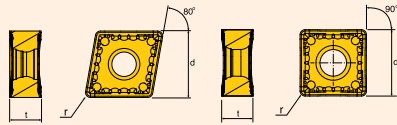
● Marked: Standard Items



TURN-RUSH

CNMX HB SNMX HB

Designation	d	t	r
CNMX 160712 HB	15.88	6.92	1.2
CNMX 160716 HB	15.88	6.92	1.6
SNMX 150712 HB	15.88	6.92	1.2
SNMX 150716 HB	15.88	6.92	1.6



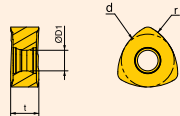
Insert	Designation	Recommended Machining Conditions		Grade																		
		feed (mm/rev)	ap (mm)	Cermet	CVD Coated						PVD Coated			Uncoated								
	CNMX 160712 HB	0.30 - 0.80	1.5 - 8.0	PV3010	CT3000	TT1300	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
	160716 HB	0.30 - 0.80	1.5 - 8.0					•	•													
	SNMX 150712 HB	0.30 - 0.80	1.5 - 8.0					•	•													
	150716 HB	0.30 - 0.80	1.5 - 8.0					•	•													

• Marked: Standard Items

TOPFEED

BNMX HF

Designation	d	t	r	OD1
BNMX 150720R/L HF	15	8	15	6.2



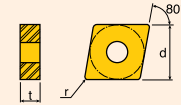
Insert	Designation	Recommended Machining Conditions		Grade																		
		feed (mm/rev)	ap (mm)	Cermet	CVD Coated						PVD Coated			Uncoated								
	BNMX 150720R/L HF	0.5 - 2.5	0.5 - 2.5	PV3010	CT3000	TT1300	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
								•	•													

• Marked: Standard Items

TOPDUTY

CNMD HD HT HY HZ

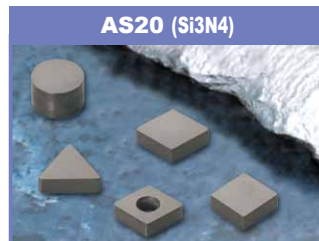
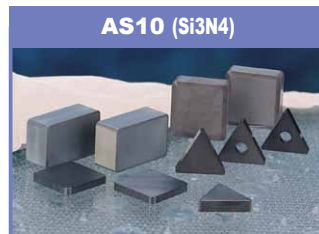
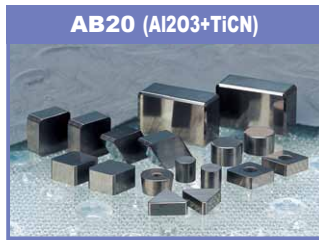
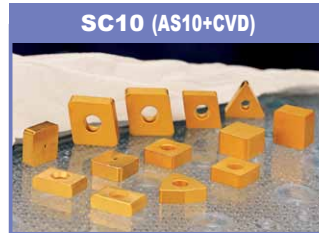
Designation	d	t	r
CNMD 190624	19.05	6.35	2.4
CNMD 250924	25.40	9.52	2.4



Insert	Designation	Recommended Machining Conditions		Grade																			
		feed (mm/rev)	ap (mm)	Cermet	CVD Coated						PVD Coated			Uncoated									
	CNMD 250924 HD	0.55 - 1.50	4.0 - 15.0	PV3010	CT3000	TT7005	TT7015	TT7310	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100	TT5080	TT8020	TT9020	TT9080	P20	K10	K20
											•	•											
	CNMD 190624 HT	0.35 - 0.90	4.0 - 9.0								•	•											
													•	•									
	CNMD 250924 HT	0.55 - 1.30	5.0 - 12.0								•	•											
													•	•									
	CNMD 190624 HY	0.50 - 1.10	4.0 - 12.0								•	•											
													•	•									
	CNMD 250924 HY	0.55 - 1.50	4.0 - 15.0								•	•											
													•	•									
	CNMD 250924 HZ	0.55 - 1.50	4.0 - 15.0								•	•											
													•	•									

• Marked: Standard Items

Ceramic Inserts













Insert	Designation		Grade								
	ISO	ANSI	AW120	AB2010	AB20	AB30	TC430	AS500	SC10	AS10	AS20
	CNGA 120404	CNGA 431		•	•	•					
	120408	432		•	•	•			•	•	
	120408 E	432 E									•
	120408 T7	432 T7						•			
	120412	433		•	•	•			•	•	
	120412 E	433 E									•
	120412 T7	433 T7						•			
	120416	434				•			•	•	
	160608	542				•					
	160612	543				•				•	
	160616	544				•					
	160624	546				•					
	190608	642				•					
	190612	643				•					
190616	644				•						
190624	646				•					•	
	CNGN 120404	CNGN 431				•					
	120408	432		•	•	•					
	120408 T6	432 T6						•			
	120408 E	432 E									•
	120412	433		•		•			•	•	
	120412 E	433 E									•
	120412 T6	433 T6						•			
	120416	434				•				•	
	120708	452				•					
	120708 E	452 E									•
	120708 T6	452 T6							•		
	120712	453		•							•
	120712 E	453 E									•
	120712 T6	453 T6									•
120716	454		•						•	•	
120716 E	454 E									•	
	CNGX 120712 CH	CNGX 453 CH									•
	120712 T7-CH	453 T7-CH									
	120716 CH	454 CH								•	•
	120716 T7-CH	454 T7-CH							•		
	CNMG 120404 CE	CNMG 431 CE									
	120408 CE	432 CE								•	
	DNGA 150404	DNGA 431				•					
	150408	432				•					
	150412	433				•					
	150416	434				•					
	150604	441				•					
	150606	442				•					
	150608	442		•		•					
	150612	443				•					•
	150616	444				•					

•Marked: Standard Items







Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TaeguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TaeguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Ceramic Inserts

Insert	Designation		Grade									
	ISO	ANSI	AM120	AB2010	AB20	AB80	TC430	AS500	SC10	AS10	AS20	
	DNGN 150408 150704 150708 150712 150716	DNGN 432 451 452 453 454	•		•	•						
	DNGX 120712 CH 120712 T7-CH 150716 CH	DNGX 120712 CH 120712 T7-CH 454 CH						•	•			
	DNMG 150608 CE	DNMG 442 CE				•						
	ENGN 130708 130712 130716	ENGN 452 453 453	•	•	•	•						
	HNGX 050712 CH 050712 T7-CH 050716 CH 050716 T7-CH	HNGX 453 CH 453 T7-CH 454 CH 454 T7-CH						•		•		
	RCGX 060600 U1 090700 T6 090700 U1 120700 120700 T6 120700 U2 151000 U2 191000 U2 251200 U3	RCGX 24 U1 35 T6 35 U1 45 45 T6 45 U2 57 U2 67 U2 88 U3			•	•	•					
	RNGN 090300 090300 T6 120400 120400 E 120400 T6 120700 120700 E 120700 T6 150700 190700 190700 T6	RNGN 32 32 T6 43 43 E 43 T6 45 45 E 45 T6 55 65 65 T6	•	•	•	•	•				•	
	RPGN 120400 T6	RPGN 43 T6					•					
	RPGX 090700 T6 120700 T6	RPGX 35 T6 45 T6					•					
	SNGA 120404 120408 120408 E 120412 120416	SNGA 431 432 432 E 433 434	•	•	•	•				•	•	

•Marked: Standard Items









Insert	Designation		Grade									
	ISO	ANSI	AM120	AB2010	AB20	AB80	TC430	AS500	SC10	AS10	AS20	
	SNGN 120404 120408 120408 E 120408 T6 120412 120412 T6 120412 T7 120416 120424 120704 120708 120708 T6 120712 120712 T6 120716 120720 150612 150712 150716 190716 190720	SNGN 431 432 432 E 432 T6 433 433 T6 433 T7 434 436 451 452 452 T6 453 453 T6 454 455 543 553 554 654 655	•	•	•	•						
	SNGX 120712 CH 120712 T7-CH 120716 CH 120716 T7-CH	SNGX 453 CH 453 T7-CH 454 CH 454 T7-CH							•	•		
* 	SNGX 120712 T7-CHX 120716 T7-CHX	SNGX 453 T7-CHX 454 T7-CHX						•				
	SNMG 120408 CE	SNMG 432 CE				•						
	SPGN 090308 120308 120312 120412	SPGN 322 422 423 433	•			•				•	•	
	TNGA 160304 160308 160404 160408 160408 E 160412 160416 220404 220408 220412 220416	TNGA 321 322 331 332 332 E 333 334 431 432 433 434		•	•	•	•			•	•	

* Marked: DCL S-4D clamp is applied only to marked insert.

•Marked: Standard Items

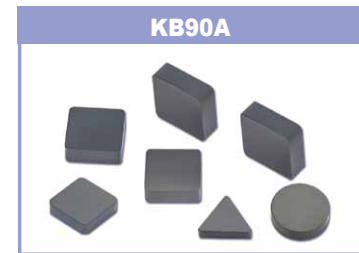
Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TeaguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TeaguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Insert	Designation		Grade								
	ISO	ANSI	AM120	AB2010	AB20	AB30	TC430	AS500	SC10	AS10	AS20
	TNGN 110308	TNGN 222				•					
	110312	223								•	
	160404	331	•		•	•					
	160408	332	•	•	•	•			•	•	
	160408 E	332 E									•
	160412	333	•		•	•		•	•	•	
	160416	334	•			•					
	160420	335	•			•					
	160704	351				•					
	160708	352				•					
	160712	353	•			•				•	
	220408	432			•						
	220412	433				•					
	270616	543				•					
	TNMG 160408 CE	TNMG 332 CE				•					
	TPGN 110302	TPGN 221				•					
	110304	222		•	•	•					
	110308	222		•	•	•					
	160304	321	•	•	•	•					
	160308	322	•	•	•	•				•	
	160312	323			•	•					
	220404	431			•						
220408	432				•						
220412	433				•						
	VNGA 160404	VNGA 331		•	•	•			•		
	160408	332		•	•	•				•	
	160412	334			•	•					
	220412	433				•					
	WNGA 080408	WNGA 432		•	•	•			•	•	
	080412	433		•	•	•			•	•	
	080412 T7	433 T7						•			
	080416	434			•	•			•		
	LNU 6688 T				•	•					
	T11 - 3219				•						
	T32 - 32 - R2				•				•		

•Marked: Standard Items

CBN Inserts



CBN Inserts

Insert	Designation		Grade				
	ISO	ANSI	TB610	TB650	TB670	TB730	KB90A
	CCGW 060202 LS2	CCGW 21.50.5 LS2	•	•	•	•	•
	060204 LS2	21.51 LS2	•	•	•	•	•
	060208 LS2	21.52 LS2	•	•	•	•	•
	09T304 LS2	32.51 LS2	•	•	•	•	•
	09T304 WZ-LS2	32.51 WZ-LS2	•	•	•	•	•
	09T308 LS2	32.52 LS2	•	•	•	•	•
	09T308 WZ-LS	32.52 WZ-LS	•	•	•	•	•
	09T308 WZ-LS2	32.52 WZ-LS2	•	•	•	•	•
	120404 LS2	431 LS2	•	•	•	•	•
	120408 LS2	432 LS2	•	•	•	•	•
	CNGA 120404 WZ-LS	CNGA 431 WZ-LS	•	•	•	•	•
	120404 WZ-LS2	431 WZ-LS2	•	•	•	•	•
	120404 WZ-LS4	431 WZ-LS4	•	•	•	•	•
	120408 WZ-LN	432 WZ-LN	•	•	•	•	•
	120408 WZ-LS	432 WZ-LS	•	•	•	•	•
	120408 WZ-LS2	432 WZ-LS2	•	•	•	•	•
	120408 WZ-LS4	432 WZ-LS4	•	•	•	•	•
	120412 WZ-LN	433 WZ-LN	•	•	•	•	•
	120412 WZ-LS	433 WZ-LS	•	•	•	•	•
	120412 WZ-LS2	433 WZ-LS2	•	•	•	•	•
	CNMA 120404 LN	CNMA 431 LN	•	•	•	•	•
	120404 LN2	431 LN2	•	•	•	•	•
	120404 LS	431 LS	•	•	•	•	•
	120404 LS2	431 LS2	•	•	•	•	•
	120404 LS4	431 LS4	•	•	•	•	•
	120408 LN	432 LN	•	•	•	•	•
	120408 LS	432 LS	•	•	•	•	•
	120408 LS2	432 LS2	•	•	•	•	•
	120408 LS4	432 LS4	•	•	•	•	•
	120412 LN	433 LN	•	•	•	•	•
	CNMN 090308 SD	CNMN 322 SD					•
	090312 SD	323 SD					•
	090316 SD	324 SD					•
	120416 SD	434 SD					•
	DCGW 070202 LS	DCGW 21.50.5 LS	•	•	•	•	•
	070202 LS2	21.50.5 LS2	•	•	•	•	•
	070204 LS	21.51 LS	•	•	•	•	•
	070204 LS2	21.51 LS2	•	•	•	•	•
	070208 LS2	21.52 LS2	•	•	•	•	•
	11T304 LN	32.51 LN	•	•	•	•	•
	11T304 LS	32.51 LS	•	•	•	•	•
	11T304 LS2	32.51 LS2	•	•	•	•	•
	11T308 LN	32.52 LN	•	•	•	•	•
	11T308 LS	32.52 LS	•	•	•	•	•
11T308 LS2	32.52 LS2	•	•	•	•	•	

• Marked: Standard Items

Insert	Designation		Grade				
	ISO	ANSI	TB610	TB650	TB670	TB730	KB90A
	DNMA 150404 LN	DNMA 431 LN	•	•	•	•	•
	150404 LS	431 LS	•	•	•	•	•
	150404 LS2	431 LS2	•	•	•	•	•
	150404 LS4	431 LS4	•	•	•	•	•
	150408 LN	432 LN	•	•	•	•	•
	150408 LS	432 LS	•	•	•	•	•
	150408 LS2	432 LS2	•	•	•	•	•
	150408 LS4	432 LS4	•	•	•	•	•
	150412 LN	433 LN	•	•	•	•	•
	150412 LS2	433 LS2	•	•	•	•	•
	150412 LS4	433 LS4	•	•	•	•	•
	150604 LN	441 LN	•	•	•	•	•
	150604 LS	441 LS	•	•	•	•	•
	150604 LS2	441 LS2	•	•	•	•	•
	150608 LN	442 LN	•	•	•	•	•
150608 LS2	442 LS2	•	•	•	•	•	
	RCGX 060300 FT	RCGX 22 FT					•
	090300 FT	32 FT					•
	120400 FT	43 FT					•
	RNMN 090300 FT	RNMN 32 FT		•	•	•	•
	120300 FT	42 FT					•
	RNMN 090300 SD	RNMN 32 SD					•
	120300 SD	42 SD					•
	120400 SD	43 SD					•
	SCGW 09T304 LS2	SCGW 32.51 LS2					•
	09T308 LS2	32.52 LS2					•
	SNMA 120404 LN	SNMA 431 LN	•	•	•	•	•
	120404 LS	431 LS	•	•	•	•	•
	120404 LS2	431 LS2	•	•	•	•	•
	120404 LS4	431 LS4	•	•	•	•	•
	120408 LN	432 LN	•	•	•	•	•
	120408 LS	432 LS	•	•	•	•	•
	120408 LS2	432 LS2	•	•	•	•	•
	120408 LS4	432 LS4	•	•	•	•	•
	120408 LS8	432 LS8	•	•	•	•	•
	120412 LS	433 LS	•	•	•	•	•
	SNMN 090308 SD	SNMN 322 SD					•
	090312 SD	323 SD					•
	090316 SD	324 SD					•
	120312 SD	423 SD					•
120316 SD	424 SD					•	

• Marked: Standard Items

Material & Hardness Conversion Table

Insert Selection by Workpiece Material

TaeguTurn Workpiece Material Group

Trouble Shooting

Insert Geometry by Workpiece Shape

Chipbreakers

Grades

New Grades

Material & Hardness Conversion Table

Grade & Chipbreaker Comparison Table

Insert Selection by Workpiece Material

TaeguTurn Workpiece Material Group

Trouble Shooting

Insert Geometry by Workpiece Shape

Chipbreakers

Grades

New Grades

CBN Inserts

Insert	Designation		Grade				
	ISO	ANSI	TB610	TB650	TB670	TB730	KB90A
	TCGW 090204 LS3	TCGW 731 LS3	●				
	090208 LS3	732 LS3			●		
	110204 LS	21.51 LS		●			
	110204 LS3	21.51 LS3	●		●	●	
	110208 LS	21.52 LS		●			
	110208 LS3	21.52 LS3			●	●	
	16T304 LS	32.51 LS		●			
	16T304 LS3	32.51 LS3	●		●	●	
	16T308 LS	32.52 LS		●			
	16T308 LS3	32.52 LS3	●		●	●	
	TNMA 160404 LN	TNMA 331 LN		●	●		
	160404 LS	331 LS		●	●		
	160404 LS3	331 LS3	●		●	●	
	160404 LS6	331 LS6		●	●		
	160408 LN	332 LN		●	●		
	160408 LS	332 LS		●	●		
	160408 LS3	332 LS3	●	●	●	●	
	160408 LS6	332 LS6		●	●		
	160412 LS	333 LS		●			
	160412 LS3	333 LS3			●	●	
	160416 LN	334 LN		●			
	160416 LS	334 LS		●			
	220404 LN	431 LN					
	220408 LS	432 LS		●			
	TNMN 110308 SD	TNMN 222 SD					●
	TPGN 090204 LS3	TPGN 731 LS3	●				
	110302 LS3	220.5 LS3				●	
	110304 LS	221 LS		●			
	110304 LS3	221 LS3	●		●	●	
	110308 LS	222 LS		●			
	110308 LS3	222 LS3	●		●	●	
	160304 LS	321 LS		●			
	160304 LS3	321 LS3	●		●	●	
	160308 LS	322 LS		●			
	160308 LS3	322 LS3	●		●	●	
	220408 LS	432 LS		●			
	TPGW 080204 LS3	TPGW 080204 LS3			●		
	090204 LS3	731 LS3			●	●	
	090208 LS3	732 LS3			●		
	110302 LS3	220.5 LS3	●			●	
	110304 LS	221 LS		●	●		
	110304 LS3	221 LS3	●		●	●	
	110308 LS3	222 LS3	●		●	●	
	160404 LS3	331 LS3		●	●		
	160408 LS3	332 LS3		●	●		
	VBGW 110304 LS2	VBGW 221 LS2			●		
	110308 LS2	222 LS2			●	●	
	160402 LS2	330.5 LS2			●		
	160404 LN	331 LN		●	●		
	160404 LS	331 LS		●	●		
	160404 LS2	331 LS2	●		●	●	
	160408 LS	332 LS		●	●		
	160408 LS2	332 LS2	●		●	●	

●Marked: Standard Items

Insert	Designation		Grade				
	ISO	ANSI	TB610	TB650	TB670	TB730	KB90A
	VNGA 160404 LN	VNGA 331 LN		●	●		
	160404 LS	331 LS		●	●		
	160404 LS2	331 LS2	●		●	●	
	160408 LN	332 LN		●	●		
	160408 LS	332 LS		●	●		
	160408 LS2	332 LS2	●		●	●	
	WNGA 060408 WZ-LS6	WNGA 332 WZ-LS6			●		
	080408 WZ-LS3	432 WZ-LS3	●	●	●		
	080408 WZ-LS6	432 WZ-LS6			●		
	080412 WZ-LS3	434 WZ-LS3			●		
	WNMA 080408 LS3	WNMA 432 LS3			●		
	080408 LS6	432 LS6			●		

●Marked: Standard Items

Material & Hardness Conversion Table

Grade & Chipbreaker Comparison Table

Insert Selection by Workpiece Material

TaeguTurn Workpiece Material Group

Trouble Shooting

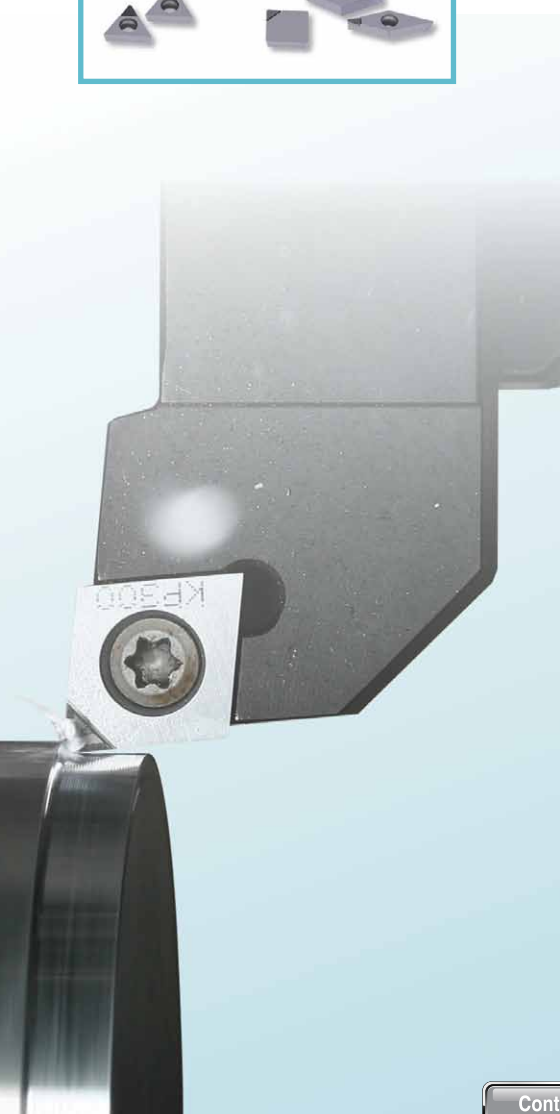
Insert Geometry by Workpiece Shape


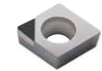
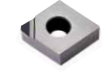

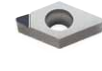
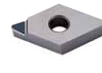





Chipbreakers

Grades

New Grades

PCD Inserts



Insert	Designation		Grade		
	ISO	ANSI	KP100	KP300	KP500
	CCGT 060204 CB	CCGT 21.51 CB		•	
	09T302 CB	32.50.5 CB		•	
	09T304 CB	32.51 CB		•	
	09T308 CB	32.52 CB		•	
	120404 CB	431 CB		•	
120408 CB	432 CB		•		
	CCGW 060202 LN-7	CCGW 21.50.5 LN-7		•	
	060204 LN-7	21.51 LN-7		•	
	060208 LN-7	21.52 LN-7		•	
	09T304 LN-7	32.51 LN-7		•	
	09T308 LN-7	32.52 LN-7		•	
	120404 LN-7	431 LN-7		•	
	120408 LN-7	432 LN-7		•	
	CNMA 120404 LN-10	CNMA 431 LN-10		•	
	120408 LN-10	432 LN-10		•	•
	120412 LN-10	434 LN-10		•	
	DCGT 070202 CB	DCGT 21.50.5 CB		•	
	070204 CB	21.51 CB		•	
	11T302 CB	32.50.5 CB		•	
	11T304 CB	32.51 CB		•	
	11T308 CB	32.52 CB		•	
	DCGW 070202 LN-7	DCGW 21.50.5 LN-7		•	
	070204 LN-7	21.51 LN-7		•	
	11T302 LN-7	32.50.5 LN-7		•	
	11T304 LN-7	32.51 LN-7		•	
	11T308 LN-7	32.52 LN-7		•	
	DNMA 150404 LN-10	DNMA 431 LN-10		•	
	150408 LN-10	432 LN-10		•	
	150412 LN-10	433 LN-10		•	
	150604 LN-10	441 LN-10		•	
	150608 LN-10	442 LN-10		•	
	SNMA 120408 LN-10	SNMA 432 LN-10		•	•
	120412 LN-10	433 LN-10		•	
	SPGN 090308 LN-7	SPGN 322 LN-7		•	
	120308 LN-7	422 LN-7		•	
	TCGT 090204 CB	TCGT 731 CB		•	
	110204 CB	21.51 CB		•	
	16T304 CB	32.51 CB		•	
	16T308 CB	32.52 CB		•	
	TCGW 090204 LN-7	TCGW 731 LN-7		•	
	090208 LN-7	732 LN-7		•	
	110204 LN-7	21.51 LN-7		•	
	110208 LN-7	21.52 LN-7		•	
	16T304 LN-7	32.51 LN-7		•	
16T308 LN-7	32.52 LN-7		•		
	TNMA 160404 LN-10	TNMA 331 LN-10		•	
	160408 LN-10	332 LN-10		•	

CB: PCD chipbreaker type insert. • Marked: Standard Items

Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TeaguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

Material & Hardness Conversion Table | Grade & Chipbreaker Comparison Table | Insert Item List | Insert Selection by Workpiece Material | TeaguTurn Workpiece Material Group | Trouble Shooting | Insert Geometry by Workpiece Shape | Chipbreakers | Grades | New Grades

PCD Inserts

Insert	Designation		Grade		
	ISO	ANSI	KP100	KP300	KP500
	TPGN 110302 LN-7	TPGN 220.5 LN-7		●	
	110304 LN-7	221 LN-7		●	
	110308 LN-7	222 LN-7		●	
	160302 LN-7	320.5 LN-7		●	
	160304 LN-7	321 LN-7		●	
	VBGW 160402 LN-7	VBGW 330.5 LN-7		●	
	160404 LN-7	331 LN-7		●	
	160408 LN-7	332 LN-7		●	
	VCGT 110302 CB	VCGT 220.5 CB		●	
	110304 CB	221 CB		●	
	160404 CB	331 CB		●	
	160408 CB	332 CB		●	
	160412 CB	333 CB		●	
	220530 CB	43.57.5 CB		●	
	VCGW 160404 LN-7	VCGW 331 LN-7		●	
	160408 LN-7	332 LN-7		●	
	VNGA 160404 LN-10	VNGA 331 LN-10		●	
	160408 LN-10	332 LN-10		●	

CB: PCD chipbreaker type insert. ● Marked: Standard Items

Grade Comparison Table

ISO class	TaeguTec	SANDVIK	WALTER	SECO	KENAMETAL	MMC	SUMITOMO	TUNGALOY	KYOCERA	KORLOY	ISCAR	
P	TT8115	GC4205 GC4215	WPP05 WPP10S	TP0500 TP1500	KCP05 KCP10	UE6105 UE6110	AC810P AC1000	T9105 T9115	CA5505 CA5515	NC3010 NC3015	IC8150 IC9150	
	TT8125 TT5100	GC4225 GC4025	WPP20S WPP20	TP2500 TP2000	KCP25 KC9125	MC6025 UE6020	AC820P AC2000	T9125	CA5525 CR7025	NC3120 NC3020 CX269	IC8250 IC9250	
	TT8135 TT7100	GC4235 GC4035	WPP30S WPP30	TP3500 TP3000	KCP30 KCP40 KC9040	UE6135 UH6400	AC830P AC3000	T9135 T9035	CA5535 CR9025	NC3030 NC500H	IC8350 IC9350	
M	TT9215	GC2015	WAM10	TM2000 TP200	KCM15	MC7015 US7020	AC610M EH10Z		CA6515	PC8110 NC9020	IC6015 IC807	
	TT9225	GC2025	WAM20	CP500	KCM25	MC7025 US735	AC630M AC304	T6020	CA6525	NC9025	IC6025 IC9300	
	TT9235 TT8020	GC2035 GC30	WAM30	TM4000 TP400	KCM35	UH6400 MP7035	AC3000	T6030	PR630	NC5330 PC9030	IC3028	
K	TT7005	GC3205	WAK10	TK1001 TK1000	KCK05 KC9315	UC5105	AC405K AC410K	T5105 T5010	CA4505 CA4010	NC6205 NC6105	IC5010 IC4028	
	TT7015 TT7310	GC3210	WAK20	TK2001 TK2000	KCK15 KC9325	UC5115	AC415K	T5115 T5020	CA4515 CA4115 CA4120	NC6210 NC6110	IC5005	
	GC3215	WAK30			KCK20		AC420K	T5125		NC315K		
S	H	TT5080	GCS05F GC1105 GC1115	WSM10	TH1000 TH1500 TS2000 TS2500	KC5510	VP05RT VP10RT	AC510U	AH110	PR1005 PR930	PC8110	IC807 IC907
		TT9080	GC15 GC1125	WSM20 WSM30	CP500	KC5525	VP15TF VP20RT	AC520U	AH120	PR1025 PR1125 PR1225 PR1425	PC5300 PC9530	IC808 IC908

Grade Comparison Table

Cermet Grade

ISO class	TaeguTec	SANDVIK	KENAMETAL	SUMITOMO	KYOCERA	TUNGALOY	mitsubishi	HITACHI	KORLOY	SECO	NTK	DIJET	CERAMTEC	WALTER	CERATIZIT
P01	PV3030 PV3010		KT315	T110A T1000A T1500Z	PV30 TN30 PV7010	GT720 NS710	AP25N NX2525		CC105 CC115 CN1000		T3N	LN10	SC35		TCM407 TCC410
P10	CT3000	CT5005 CT5015 CT525 GC1525	KT5020 KT125 KT150	T1500A T1200A T2000Z	PV7020 PV60 TN6010 TN6020 TN60	GT730 GT530 NS520 NS720	MP3025 UP35N	CZ25	CN2000 CC125	TP1030 CMP CM	T15 C30 Q50	CX50 CX75	SC15 SC8015 SC7035 SC40	WCE10	TCM10
P20	CT7000	CT530	KT1120 KT175	T3000Z T130Z	TN100M TC60M PV90	NS730 NS530	VP45N NX99 NX3035	CH550 CH7030 MZ1000 MZ2000	CN20 CN30	TP1020 C15M	N20 Z15 C50 C7X	CX90	SC7015 SC60		
P30				T250A T130A		NS740	NX4545	MZ3000 CH7035			Q50 N40	CX99			
M01	PV3010 PV3030		KT315	T110A	PV30 TN30 PV7010	GT720 NS710	AP25N NX2525		CC105 CC115 CN1000		T3N	LN10	SC35		TCM407 TCC410
M10	CT3000	CT5005 CT5015 CT525 GC1525	KT5020 KT125 KT150	T1500A T1200A T2000Z	PV7020 PV60 TN6010 TN6020 TN60	GT730 GT530 NS520 NS720	MP3025 UP35N	CZ25	CN2000 CC125	TP1030 CMP CM	T15 C30 Q50	CX50 CX75	SC15 SC8015 SC7035 SC40	WCE10	TCM10
M20	CT7000	CT530	KT1120 KT175	T3000Z T130Z	TN100M TC60M PV90	NS730 NS530	VP45N NX99 NX3035	CH550 CH7030 MZ1000 MZ2000	CN20 CN30	TP1020 C15M	N20 Z15 C50 C7X	CX90	SC7015 SC60		
M30				T250A T130A		NS740	NX4545	MZ3000 CH7035			Q50 N40	CX99			
K01	PV3030		KT315	T110A T1000A T1500Z	PV30 PV7005 PV7020 PV60	NS710 GT720 NS720 NS520	AP25N NX2525	CH350	CN1000	CM	T3N Q15	LN10	SC8015		TCM407 TCC410
K10	CT3000	CT5015	KT125	T1200A T2000Z	TN60 TN6020	GT730 NS730 NS530		CH550 MZ1000	CN2000	C15M	T15 Z15 C7Z	CX75	SC7015	WCE10	TCM10
K20				T3000Z			MZ2000								

Ceramic Grade

Application	Composition	ISO Code	TaeguTec	SANDVIK	KENAMETAL	CERAMTEC	NTK	KYOCERA	SUMITOMO	SSANG-YONG
Cast Iron	Al ₂ O ₃	K01-K10	AW120	CC620		SN60 SN80	HC1 HW2	KA30		SZ200 SZ300
	Al ₂ O ₃ +TiC	K05-K15	AB30	CC650	KY1615	SH2 SH4	HC2 HC5 HC6	A65	NB90S NB90M	ST100 SD200 TC100(PVD)
	SiAlON	K10-K20	AS500		KY300 KY1310 KYK10	SL506 SL508 SL606 SL608			SN200K SN2100K	
	Si ₃ N ₄	K15-K25	AS10	CC6090 CC6091	KY1320 KY3500	SL500 SL808	SX1 SX2 SX6	KS500 KS6000 KS6050	NS260	SN26 SN300 SN400 SN500 SN600
Si ₃ N ₄ +CVD	K15-K25	SC10	CC1690	KY3400 KYK25	SL550C SL554C SL654C SL658C SL854C SL858C	SP2 SP9	CS7050	NS260C		
Hardened Steel	Al ₂ O ₃ +TiCN	H01-H10	AB20			SH2 SH4	HC2 HC5 HC7			ST300 ST500 ST700
	Al ₂ O ₃ +TiCN + PVD	H01-H10	AB2010	CC6050	KY4400		ZC4 ZC7	A66N PT600M	NB100C	TC300
Super Alloy	Al ₂ O ₃ +SiCw	S01-S15	TC430	CC670	KY4300		WA1		WX2000	SW500 SW800
	Si ₃ N ₄ +TiN	S10-S20	AS20							
	SiAlON	S05-S20		CC6060 CC6065	KY2100 KY1540 KYS30 KYS25		SX5 SX7 SX9	KS6040		SN800 SN900

CBN Grade

Application	TaeguTec	TUNGALOY	SANDVIK	KENAMETAL	CERAMTEC	SECO	SUMITOMO	
Hardened Steel	Continuous	TB610	BX310	CB7015	KB1610 KB5610 KB9610	WBN575	CBN10 CBN050C	BNX10 BNC100
		TB650	BX530 BX330 BXM20	CB7025	KB1625 KB5625	WBN570 WBN560	CBN100 CBN160C	BN250 BNX20 BNC200
		TB670	BX360 BX380 BXC50		KB1630 KB5630	WBN555	CBN150 CBN100P	BN350 BNX25 BN500 BNC300
Cast Iron	General	TB730(KB90)	BX930 BX850 BX950 BX470 BX480	CB7050	KB1345 KB9640	WBN735 WBN750	CBN200 CBN400C	BN100 BN700
		Solid CBN	KB90A	BX90S BXC90			WBN100 WBN100C	CBN300 CBN350

PCD Grade

Grade	TaeguTec	TUNGALOY	SANDVIK	KENAMETAL	SECO	SUMITOMO	NTK	KYOCERA
Fine	KP100	DX110 DX120		KD1415	PCD05	DA2200 DA1000		KPD001 KPD002
Medium	KP300	DX140	CD10	KD1410	PD20	DA150	PD1	KPD010
Coarse	KP500	DX160 DX180		KD100	PCD20 PCD20	DA90		KPD025

Comparison of Chipbreaker

Description	TaeguTec	SANDVIK	KENAMETAL	SECO	WALTER	VALENITE	MITSUBISHI	SUMITOMO	KYOCERA	TUNGALOY	KORLOY	ISCAR		
Negative Insert	For Steel	WS WT FA	WF, WL WMX, WM	FW MW FF FS FP	W-MF2 W-M3 FF1	NF NM	W3 W6 F2	SW MW FH	LUW, SEW GUW FL, FA	WP WQ GP, DP, XF XP	AFW ASW TF	LW VW, HW HU	WG SF	
		FG	QF	FN	MF2	NF3 FP5 NFT	SH	SU SE	HQ	ZF ZM, TS, NS, NM TSF	VG, HF, GF VF VQ HC	NF		
		FC	PF, LC XF K			NS6		FY, SA	LU	CJ CQ		VL, VB, HC		
		VF			95		ES	GX, HM			S			
		ML		GP-K, MS- MS GP		G-NMT, NS4 NS5, G1		FJ, SY MJ		XQ A3, AH XS	CB, 17	HA VP2	12 PP	
		MP	XM QM	P	MF3	NM4	M2						HS, GS, VP3	TF VL
		MC PC	SM PM XMR	MN	MR3 M3	MP3 NM4 NM6 MP5		MP, MV	GE, GU	GS PS	AS TM		VM	
		MT		MP RP		NS8	M3	MA	UX, UG	HS CS MG- C			HM, GM	GN
		MG-		UN	M4	MG-		MG-		UZ	38 DM, MG- 33, 37		B20, B25	MG-
		RT	PR HM	UM RN MG-	M5 MR7	NM5, NM7 NRT, RP5 NM6, NM9	R3	MH, GJ GH HAS, HDS	ME MU, MX	GT, PT PH, HT				NR
	Single sided	RX	PR	RM		NRF				PX				
		RH	QR MR	RP	R6, RR9 R5, R4, 37 RR6 R8, 56, 57 R7	NR6 NR5, NR8 NR7	R6	HZ HA HH HC5 HX, HBS HV, HDS, HXD	MP HG HP HF HU HW	HX	TRS 57	GH	RP NM	
		HT, HD HY, HZ	HR, 31	RH		NRR					65 TU	VT, HH VH, B40		
		EA, SF	MF	FP MU1, MS1 UP	MF1	NF4	F5	FS MS	SU EX	MQ, GU MU MS		HA		
		EM	MM		MF4	NM4					SS	VP3 HS GS	TNM	
		ET	MR MM-MR SF, SGF MX-SM, 23, SM SR, SMR	RP	MR6, MF5 MM-RR6	NR4	M5		GU	HU		HMM, SA		
		SU		FH, FX MS, MH, MX										
		MT MG- RT	KF, KM KR UN	FN RP UN	M5	NM5		MA MG- GH	UZ	MG- C ZS, GC	CF CM	B25 GR		
		WT	WM	MW	W-F2	PF		MW					WG	
		Positive Insert	for Steel	FA	PF, UF	UF, 11, GM	FF1	PF4 PF5		FV	LU FP FC	XP GK, GP, DP	01, PF, PSF	HFP
SA								SMG		CF, GF GQ GR XQ HQ		JS		
FG	UM XF			FP LF	F1	PS4 PS5	PM3 PM4	SQ, SV	FK SU SC, SK				VF HMP, C05	SM 16, GT-
PC				MP		PF2						PSS PS		
MT	PM XM PR, UR XR			MF	F2	PM5 E47, MT-	PM5	MQ, MV MT- G	SF, MU	MT-	PM	C25	14, 17 19, MT-	
PMR-	PMR-			PMR-		PMR-		PMR-	UJ	GPHQ G, PMR-		23		
for Aluminum	FL			AL	HP	AL	PM2	IL	AZ	AG	AH	AL	AR	AF, AS

Material Properties

Recommended cutting condition-According to DIN / ISO 513 and VDI 3323 Standard

ISO	Material	Condition	Tensile Strength [N/mm ²]	Kc ⁽¹⁾ [N/mm ²]	mc ⁽²⁾	Hardness (HB)	Material Group	
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	420	1350	0.21	125	1	
		>= 0.25 %C	650	1500	0.22	190	2	
		< 0.55 %C	850	1675	0.24	250	3	
		>= 0.55 %C	750	1700	0.24	220	4	
	Low alloy steel and cast steel (less than 5% all elements)	Quenched and tempered	1000	1900	0.24	300	5	
		Annealed	600	1775	0.24	200	6	
		Quenched and tempered	930	1675	0.24	275	7	
		Quenched and tempered	1000	1725	0.24	300	8	
		Quenched and tempered	1200	1800	0.24	350	9	
		Annealed	680	2450	0.23	200	10	
		Quenched and tempered	1100	2500	0.23	325	11	
M	Stainless steel and cast steel	Ferritic/martensitic	680	1875	0.21	200	12	
		Martensitic	820	1875	0.21	240	13	
		Austenitic	600	2150	0.20	180	14	
K	Grey cast iron (GG)	Ferritic	-	1150	0.20	180	15	
		Pearlitic	-	1350	0.28	260	16	
	Cast iron nodular (GGG)	Ferritic	-	1225	0.25	160	17	
		Pearlitic	-	1350	0.28	250	18	
	Malleable cast iron	Ferritic	-	1225	0.25	130	19	
		Pearlitic	-	1420	0.3	230	20	
N	Aluminum-wrought alloy	Not curable	-	700	0.25	60	21	
		Cured	-	800	0.25	100	22	
	Aluminum-cast, alloyed	< = 12% Si	Not curable	-	700	0.25	75	23
			Cured	-	700	0.25	90	24
		> 12% Si	High temperature	-	750	0.25	130	25
	Copper alloys	> 1% Pb	Free cutting	-	700	0.27	110	26
			Brass	-	700	0.27	90	27
		Electrolytic copper	-	700	0.27	100	28	
	No-metallic	Duroplastics, fiber plastics	-				-	29
		Hard rubber	-					30
S	High temp. alloys	Fe based	-	2600	0.24	200	31	
			Cured	-	3100	0.24	280	32
		Ni or Co based	Annealed	-	3300	0.24	250	33
			Cured	-	3300	0.24	350	34
	Titanium and Ti alloys	Cast	-	3300	0.24	320	35	
		Alpha+beta alloys cured	RM 400	1700	0.23	-	36	
		RM 1050	2110	0.22	-	37		
H	Hardened steel	Hardened	-	4600		55 HRC	38	
		Hardened	-	4700		60 HRC	39	
	Chilled cast iron	Cast	-	4600		400	40	
	Cast iron nodular(GGG)	Hardened	-	4500		55 HRC	41	

■ Steel ■ Stainless Steel ■ Cast Iron ■ Nonferrous ■ High Temp. Alloys ■ Hardened Steel

⁽¹⁾Specific cutting force for 1 mm² chip section.

⁽²⁾Chip thickness factor.

Hardness Conversion Table

VICKERS 50kg HV	BRINELL HB10mm BALL LOAD 3000kgf		ROCKWELL				SHORE'S HS	TENSILE STRENGTH N/mm ² (kgf/mm ²)
	STANDARD BALL	TUNGSTEN CARBIDE BALL	A SCALE 60kgf Diamond brale HRA	B SCALE 100kgf 1/16in BALL HRB	C SCALE 150kgf Diamond brale HRC	D SCALE 100kgf Diamond brale HRD		
1900			93.1		80.5			
1800			92.6		79.2			
1700			91.9		77.9			
1600			91.3		76.6			
1500			90.5		75.3			
1450			90.1		74.6			
1400			89.6		74.0			
1350			89.1		73.4			
1300			88.7		72.7			
1250			88.3		72.1			
1200			87.9		71.5			
1150			87.5		70.9			
1100			87.1		70.3			
1050			86.6		69.6			
1000			86.2		68.9			
940			85.6		68.0	76.9	97	
920			85.3		67.5	76.5	96	
900			85.0		67.0	76.1	95	
880		(767)	84.7		66.4	75.7	93	
860		(757)	84.4		65.9	75.3	92	
840		(745)	84.1		65.3	74.8	91	
820		(733)	83.8		64.7	74.3	90	
800		(722)	83.4		64.0	74.8	88	
780		(710)	83.0		63.3	73.3	87	
760		(698)	82.6		62.5	72.6	86	
740		(684)	82.2		61.8	72.1	84	
720		(670)	81.8		61.0	71.5	83	
700		(656)	81.3		60.1	70.8	81	
690		(647)	81.1		59.7	70.5		
680		(638)	80.8		59.2	70.1	80	
670		630	80.6		58.8	69.8		
660		620	80.3		58.3	69.4	79	
650		610	80.0		57.8	69.0		
640		601	79.8		57.3	68.7	77	2205(210)
630		591	79.5		56.8	68.3		2020(206)
620		582	79.2		56.3	67.9	75	1985(202)
610		573	78.9		55.7	67.5		1950(199)
600		564	78.6		55.2	67.0	74	1905(194)
590		554	78.4		54.7	66.7		1860(190)
580		515	78.0		54.1	66.2	72	1825(186)
570		535	77.8		53.6	65.8		1795(183)
560		525	77.4		53.0	65.4	71	1750(179)
550	(505)	517	77.0		52.3	64.8		1710(174)
540	(496)	507	76.7		51.7	64.4	69	1660(169)
530	(488)	497	76.4		51.1	63.5		1620(165)
520	(480)	488	76.1		50.5	63.5	67	1570(160)
510	(473)	479	75.7		49.8	62.9		1530(156)
500	(465)	471	75.3		49.1	62.2	66	1459(153)
490	(456)	460	74.9		48.4	61.6		1460(149)
480	488	452	74.5		47.7	61.3	64	1410(144)

Note: Gothic figures come from ASTM E 140 table(Calculated by SAE-ASM-ASTM together)

Material Conversion Table

According to VDI 3323 Standard

Material Group	USA	Germany	UK	France	Sweden	Italy	Spain	Japan	Korea	Russia
1	A368 (1012) 1008	0.0030 C10	040 A 10 045 M 10 1449 10 CS	AF 34 C 10 XC 10		C 10 1 C 10	F.1511 F.151A	S 10C	SM 10C	10
1		1.0028 Ust 34-2 (S250G1T)		A 34-2		Fe 330, Fe 330 B FU		SS 330	SS 330	
1		1.0034 RSt 34-2 (S250G2T)	1449 34/20 HR, HS, CR, CS	A 34-2 NE		Fe 330 B FU				St2sp
1		1.0035 St185 (Fe 310-0) St 33	Fe 310-0 1449 15 HR, HS	A 33	1300	Fe 320	Fe 310-0			St0
1	A 570 Gr. 33.36	1.0036 S235JR G1 (Fe 360 B) Ust 37-2	Fe 360 B 4360-40 B			1311 1312	FE37BFU	AE 235 B Fe 360 B		16D, 18Kp St3Kp
1		1.0037 S235JR (Fe 360 B) St 37-2	Fe 360 B 4360-40 B	E 24-2		1311	Fe 360 B 1449 37/23 HR	AE 235 B Fe 360 B	STKM 12A,C	STKM 12A,C
1	1115	1.0038 GS-CK16	030A04	1A		1325	Fe 330, Fe 330 B FU		SS 330	SS 330
1	A 570 Gr. 40	1.0044 S275JR (Fe 430 B) S44-2	Fe 430 B FN 1449 43/25 HR, HS 4360-43 B			1412	Fe 430 B Fe 430 B FN	AE 275 B Fe 430 B FN	SM 400 A,B,C	SM 400 A,B,C
1		1.0045 S355JR	4360-50 B	E 36-2	2172		Fe 510 B	AE 355 B		
1	A 570 Gr.50 A 572 Gr.50	1.0050 E295 (Fe 490-2) St 50-2	Fe 490-2 FN 4360-50 B	A 50-2	2172	1550	Fe 490	a 490-2 Fe 490-2 FN	SS 490	SS 490
1	A 572 Gr. 65	1.0060 E335 (Fe 590-2) St 60-2	Fe 60-2 4360-55 E, 55 C	A 60-2		1650	Fe 60-2 Fe 590	A 590-2 Fe 590-2 FN	SM 570	SM 570
1		1.0060 St 60-2	Fe 60-2				Fe 60-2			St6ps; sp
1		1.0070 E360 (Fe 690-2) St 70-2	Fe 690-2 FN	A 70-2	1655		Fe 70-2 Fe 690	A 690-2 Fe 690-2 FN		
1		1.0112 P235S	1501-164-360B LT20	A37AP			Fe 360 C	AE 235 C		
1		1.0114 S235JU;St 37-3 U	4360-40C	E 24-3			Fe 360 C	AE 235 C		
1	A 284 Gr.D A 573 Gr.58 A 570 Gr. 36 C A 611 Gr. C	1.0116 S235J2G3 (Fe 360 D 1) St 37-3	Fe 360 D1 FF 1449 37/23 CR 4360-40 D	E 24-3 E 24-4	1312 1313		Fe 360 D1 FF Fe 360 C FN Fe 360 D FF Fe 37-2	AE 235 D Fe 360 D1 FF		St3Kp; ps; sp 16D
1		1.0130 P265S	1501-164-400B LT 20	A 42 AP				SPH 265		
1		1.0143 S275J0; St 44-3 U	4360-43C	E 28-3	1414-01		Fe 430 D	AE 275 D		
1	A 573 Gr. 70 A 611 Gr.D	1.0144 S275J2G3 (Fe 430 D 1) St 44-3	Fe 430 D1 FF 4360-43 C, 43 D	E 28-3 E 28-4	1411, 1412 1414		Fe 430 B, Fe 430 C (FN) Fe 430 D (FF)	AE 275 D Fe 430 D1 FF	SM 400 A,B,C	SM 400 A,B,C
1		1.0149 S275J0H; RoSt 44-2	4360-43C		1412-04		Fe 430 C			St4Kp; ps; sp
1		1.0226 DX51D; St 02 Z	Z2	GC	1151 10		FeP 02 G	FeP 02 G		
1	M 1010	1.0301 C10	040 A 10 045 M 10 1449 10 CS	AF 34 C 10 XC 10			C 10 1 C 10	F.1511 F.151A	S 10C	SM 10C
1	A 621 (1008)	1.0330 DC 01 St 2; St 12	1449 4 CR 1449 3 CS		1142		FeP 00 FeP 01	AP 11	SPHD	SPHD
1	A 619 (1008)	1.0333 Ust 3 (DC03G1) Ust 13	1449 2 CR,3 CR	E			FeP 02	AP 02	SPCD	SPCD
1	A 621 (1008)	1.0334 USW 23 (DD12G1)		SC			FeP 12	AP 12	SPHE	SPHE
1	A 622 (1008)	1.0335 DD13; StW 24	1449 1 HR	3C			FeP 13	AP 13	SPHE	SPHE
1	A 620 (1008)	1.0338 DC04 St4; St 14	1449 1 CR,2 CR	ES	1147		FeP 04	AP 04	SPCE	SPCE
1	A 516 Gr. 65.55 A 515 Gr. 65.55 A 414 Gr. C A 442 Gr.55	1.0345 P235GH HI	1501 Gr. 141-360 1501 Gr. 161-360; 151-360 1501 Gr. 161-400; 154-360 1501 Gr. 164-360; 161-360	A 37 CP; AP	1331 1330		FeE235, Fe 360 1 KW/KG; Fe 360 2 KW/KG	A 37 RC I RA II	SGV 410, SGV 450, SGV 48, 480, SPPV 450; SPPV 480	SGV 410, SGV 450, SGV 480, SPPV 450; SPPV 480
1	(M) 1020 M 1023	1.0402 C22	055 M 15, 070 M 20 2C/2D 1499 22 HS, CS	AF 42 C 20; XC 25; 1 C 22	1450		C 20 C 21, C 25	1 C 22 F.112	S20C	SM 20C
1	1020	1.0402 C22	050A20	2C/2D CC20	1450		C 20, C 21	F.112	S22C	SM 22C
1	1020;1023	1.0402 C22	055 M 15, 070 M 20 2C	AF 42 C 20; XC 25; 1 C 22	1450		C 20; C 21; C 25	1 C 22F.112	S 20 C; S 22 C	SM 20 C; SM 22C
1		1.0425 P265GH	H II 1501 Gr. 161-400;151-400 1501 Gr. 164-360; 161-400 1501 Gr. 164-400;154-400	A 42 CP; AP	1431 1430 1432		Fe 410 1 KW; KG; KT Fe 410 2 KW; KG	A 42 RC I A 42 RC II	SPV 315; SPV 355 SG 285; SGV 410 SGV 450; SGV 480	SPPV 315; SPPV 355 SG 285; SGV 410 SGV 450; SGV 480
1	A27 65-35	1.0443 GS-45	A1	E 23-45 M	1305					
1		1.0539 S355NH;SIE 335		TSE 355-4	2134-04		Fe 510 B	Fe 355 KGN		
1		1.0545 S355N; SIE 355	4360-50E	E 355 R	2334-01		FeE 355 KG	AE 355 KG		
1		1.0546 S355NL;TSIE 355	4360-50EE	E 355 FP	2135-01		FeE 355 KT	AE 355 KT		
1		1.0547 S355J0H	4360-50C	TSE 355-3	2172-04		Fe 510 C	Fe 510 C		
1		1.0549 S355 NLH;TSIE 355			2135		Fe 510 D	FeE 355 KTM		
1		1.0553 S355J0;St 52-3U	4360-50C	E 36-3			Fe 510 C			

Material Conversion Table

According to VDI 3323 Standard

Material Group	USA	Germany	UK	France	Sweden	Italy	Spain	Japan	Korea	Russia
Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
1	A 633 Gr.C A 588	1.0562 P355N SIE 355	1501 Gr.225-490A LT 20	FeE 355 KG N E 355 RFP; A 510 AP	2106	FeE 355 KG;KW	AEE 355 KG;DD	SM 490 A,B,C; YA,YB	SM 490 A,B,C; YA,YB	15GF
1		1.0565 P355NH; WSIE 355	1501-225-490B LT 20	A 510 AP	2106	FeE 355-2				
1		1.0566 P355NL1; TSIE 355	1501-225-490A LT 50	A 510 FP	2107-01	FeE 355-3				
1	1	1.0570 S355J2G3 S12-3	Fe 510 D1 FF 1449 50/35 HR>HS 4360-50 D	E 36-3 E 36-4	2132, 2133 2134, 2174	17GS 17G1S	AE 355 D Fe 510, D1 FF	SM 490 A,B,C; YA,YB	SM 490 A,B,C; YA,YB	17GS 17G1S
1	1213	1.0715 9 SMn 28 (1SMn30)	230 M 07	S 250	1912	CF SMn 28	F2111 - 11 SMn 28	SUM 22	SUM 22	
1	1213	1.0715 9 SMn 28	230 M 07	S 250	1912	CF 9 SMn 28	11 SMn 28	SUM 22	SUM 22	
1	12 L 13	1.0718 9 SMnPb 28 (11SMnPb30)		S 250 Pb	1914	CF 9 SMnPb 28	F2122-11 SMnPb 28	SUM 22 L	SUM 22 L	
1	1108 1109	1.0721 10 S 20	(210 M 15)	10S20 10F 2		CF 10 S 20	F 2121 - 10 S 20	SUM 23 L, SUM 24 L	SUM 23 L, SUM 24 L	
1	11 L 08	1.0722 10 SPb 20		10PbF 2		CF 10 SPb 20	F2122-10 SPb 20			
1	11 L 08	1.0722 10 SPb 20		10PbF 2		CF 10 SPb 20	10 SPb 20			
1	1215	1.0736 9 SMn 36 11SMn37		S 300		CF 9 Mn 36	F213 - 12 SMn 35	SUM25	SUM25	
1	12 L 14	1.0737 9 SMnPb 36 (11SMnPb37)								
1		1.0972 S315MC; QSIE 300 TM	1501-40F30	E 315 D						
1		1.0976 S355MC; QSIE 360 TM	1501-43F35	E 355 D	2642	FeE 355TM				
1		1.0982 S460MC; QSIE 460 TM	1501-50F45							
1		1.0984 S500MC; QSIE 500 TM		E 490 D	2662	FeE 490 TM				
1		1.0986 S500MC; QSIE 500 TM	1501 - 60F55	E 560 D		FeE 560 TM				
1	1010	1.1121 CK 10 (C10E)	040 A 10	XC 10	1265	C 10, 2 C 10 2 C 15	F-1510-C 10 K	S 9 CK S 10 C	S 9 CK S 10 C	08;10
1		1.1121 ST 37-1	4360 40 A		1300					
1	1015	1.1141 CK 15 (C15E)	040 A 15 080 M 15	XC 12 XC 15 XC 18	1370	C 15 C 16	F.1110-C 15 F.1511-C 16 K	S 15 S 15 CK	SM 15C SM 15CK	15
1	1020 1023	1.1151 C22E CK 22	055 M 15 (070 M 20)	2 C 22 XC 18 XC 25	1450	C 20 C 25	F.1120-C 25 K	S 20 C, S 20 CK S 22 C	SM 20 C, SM20 CK S 22 C	
1	D 3	1.2080 X 210 Cr 12	BD 3	Z 200 C 12	2642					
1	A 36	St 44-2	4360 43 A	NFA 35-01 E 28	1411					
1		SIE 320-3Z	1 501 160		1421					
1	A572-60	1.8900 SIE 380	4360 55 E		2145	FeE390KG		S 25C	SM 25C	
2	(M) 1025	1.0406 C 25	070 M 26	1 C 25		C 25	1 C 25			
2		1.0416 GS-38		20-400 M	1306					
2	A 537 Cl.1 A 414 Gr. G A 612	1.0473 P355GH	19 Mn 6	A 52 CP	2101 2102	Fe E 355-2	A 52 RC I RAIL	SGV 410 SGV 450 SGV 480	SGV 410 SGV 450 SGV 480	
2	1035	1.0501 C 35	080 A 32, 080 A 35 080 M 36, 1449 40 CS	1 C 35 AF 55 C 35 XC 38	1572 1550	C 35 1 C 35	F.113	S35C	SM35C	35
2	1045	1.0503 CF 45 (C45G)	080 A 47 080 M 46	XC 42 H 1 TS	1672	C 43 C 46		S 45 C	SM 45 C	45
2	1040	1.0511 C 40	080 M 40	1 C 40 AF 60 C 40		C 40	1 C 40	S 40 C	SM 40 C	
2		1.0540 C 50			1674	C 50	1 C 50			
2	A27 70-36	1.0551 GS-52	A2	280-480 M	1505					
2	A148 80-40	1.0553 GS-60	A3	320-560 M	1606					
2	A738	1.0577 S355J2G4 (Fe 510 D 2)	Fe 510 D2 FF 1501 Gr.224-460 1501 Gr. 224-490	A 52 FP	2107		A 52 RB II AE 355 D			
2	1140	1.0726 35 S 20	212 M 36	35MF 6	1957		F.210.G			
2	1146	1.0727 45 S 20 (46S20)		45 MF 4	1973					
2	1035 1041	1.1157 40Mn4	150 M 36	35 M 5 40 M 5				S 09CK	SMn 433	
2	1025	1.1158 C25E CK 25	(070 M 25)	2 C 25 XC 25	C 25	F.1120 - C 25 K	S 25 C S 28 C	S 25 C	SM 25 C	
2	1536	1.1166 34Mn5				TO.B	SMn 433 H			
2	1330	1.1170 28Mn6	(150 M 28), (150 M 18)	20 M 5, 28 Mn 6	1421	C 28 Mn	28 Mn 6	SCMn 1	SCMn 1	30G
2	1330	1.1170 28Mn6	150 M 5	20 M 5	2145					
2	1330	1.1170 28Mn6		20 M 5		C 28 Mn		SCMn 1	SCMn 1	
2		1.1178 C30E; CK 30	080M30	XC 32		C 30	2 C 30			

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Material Group	USA	Germany	UK	France	Sweden	Italy	Spain	Japan	Korea	Russia
Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
2	1035	1.1180 C35R Cm 35	080 A 35	3 C 35 XC 32	1572					
2	1035 1038	1.1181 C35E CK 35	080 A 35 (080 M 36)	2 C 35, XC 32 XC 38 H 1	1550 1572	C35	F.1130-C 35 K	S 35 C	SM 35 C	35
2	1035	1.1181 C35E CK 35	080 A 35 (080 M 36)		1572	C36		S 35 C	SM 35 C	
2	1042	1.1191 GS- Ck 45	080 A 46	XC 45	1660	C45	F-1140			
2	1049 1050	1.1206 C50E CK 50	080 M 50	2 C 50 XC 48 H 1; XC 50 H 1	1674	C 50				50
2	1050 1055	1.1213 Cf 53 (C53G)	070 M 55	XC 48 HTS	1674	C 53		S 50 C	SM 50 C	50
2	4520	1.5423 22Mo4	1503-245-420			16 Mo 5 KG; KW	F.2602- 16 Mo 5	SB 450 M	SB 450 M	SB 480 M
3		1.0050 ST50-2				FE50				
3	A 516 Gr.70 A 515 Gr. 70 A 414 Gr.F, G	1.0481 P295GH 17 Mn 4	1501 Gr. 224	a 48 CpAP		Fe 510 KG;KT/KW Fe 510-2 KG;KT/KW FeE 295	A 47 RC I RAIL	SG 365, SGV 410 SGV 450 SGV 480	SG 365, SGV 410 SGV 450 SGV 480	14G2
3	1043	1.0503 C35	060 A 47 080 M 46 1449 50 HS, CS	1 C 45 AF 65 C 45	1672 1650	C 45 1 C 45	F.114	S 45 C	SM 45 C	45
3	1074	1.0614 C 76 D; D 75-2		XC 75						
3	1086	1.0616 C 86 D; D 85-2		XC 80	C 85					
3	1095	1.0618 C 92 D,D 95-2		XC 90						
3	1036 1330	1.1165 30Mn5	120 M 36 (150 M 28)	35 M 5						27CHGSMMDTL 30GSL
3	1335	1.1167 30Mn5	150 M 36	40 M 5	2120					35G2 35GL
3	1040	1.1186 C40E CK 40	060 A 40, 080 A 40 080 M 40	2 C 40 XC 42 H 1		C 40				
3	1045	1.1191 C45E CK 45	080 M 46 060 A 47	2 C 45 XC 42 H 1 XC 45 XC 48 H 1	1672	C 45 C 46	F.1140-C 45 K F.1142-C48 K	S 45 C S 48 C	S 45 C S 48 C	45
3	1049	1.1201 C45R Cm 45	080 M 46	3 C 45 XC 42 H 1 XC 48 H 1	1660	C 45	F.1145-C 45K-1 F.1147C 48 K-1	S 50 C	SM 50 C	
3		1.7242 18 CrMo 4				18 CrMo 4				
3	A 387 Gr. 12 Cl	1.7337 16 CrMo 4 4				A 18 CrMo 4 5 KW				
3	A 20-37 Gr. 12 Cl	1.7337 16 CrMo 4 4				A 18 CrMo 4 5 KW				
3		1.7362 12 CrMo 19 5	3606-625	Z 10 CD 5.05		16 CrMo 20 5				
3	A572-60	17 MnV 6	436055 E	NFA 35-501 E 36	2142					
4	1055	1.0535 C55	070 M 55	1 C 55 AF 70 C 55	1655	C 55 1 C 55		S 55 C	SM 55 C	55
4	1060	1.0601 C60	060 A 62 1449 HS,CS	43D 1 C 60 AF 70 C 55		C 60 1 C 60		S 58 C	SM 58 C	60(G)
4	1070	1.0603 C67	080 A 67 1449 70HS	XC65		C 67				
4	1074 1075	1.0605 C75	1449 80 HS			C 75				75
4	1055	1.1203 C55E CK 55	060 A 57 070 M 55	2 C 5 XC 55 H 1	1655	C 55	F.1150-C 55 K	S 55 C	SM 55 C	55
4	1055	1.1209 C55R Cm 55	070 M 55	3 C 55 XC 55 H 1		C 55	F.1155-C 55 K-1	S 58 C	SM 58 C	60 60G, 60GA 65GA 68GA, 70 75(A)
4	1060 1064	1.1221 C60E CK 60	060 A 62	43D 2 C 60 XC 60 H 1	1655 1678	C 60		S 58 C	SM 58 C	
4	1070	1.1231 CK 67 (C67E)	060 A 67	XC 68	1770	C 70				
4	1074 1075 1078	1.1248 CK 75 (C75E)	060 A 78	XC 75	774	C 75				
4	1086	1.1269 CK 85 (C85E)		XC 90		C 90				85(A)
4	1095	1.1274 Ck 101 (C101E)		XC 100		C 100		SUP 4	SPS 4	
4	W 112	1.1663 C 125 W		Y2 120	2223					
5		1.0070 St70-2				FE70-2				
5		1.7238 49 CrMo 4								
5		1.7701 51 CrMoV 4				51 CrMoV 4				

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Material Group	AIS/SAE	Material No. DIN	BS	EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
6	A573-81 65	1.0116 St 37-3	4360 40 B		E 24-U	1312	F637-3				
6	A515 65	1.0345 H1	1 501 161		A 37 CP	1330					
6	5120	1.0841 St 52-3	150 M 19		20 MC 5	2172	Fe 52	F-431			
6	9255	1.0904 55 Si 7	250A53	45	55S7	2085	55Si8	56Si7			
6	9254	1.0904 55 Si 7	250 A 53		55 S 7	2090		F-431			
6	9262	1.0961 60SiCr7	1 501 161		60SiCr8	60SiCr8	60SiCr8				
6	L3	1.2067 100Cr6	BL3		Y100C6		100Cr6				
6	L1	1.2108 90 CrSi 5				2092	105WCr 5				
6	L2	1.2210 115CrV3			100C3		107CrV3KU				
6		1.2241 51CrV4									
6		1.2311 40 CrMnMo 7					35 cRmO 8 KU				
6	4135	1.2330 35 CrMo 4	708 A 37		34 CD 4	2234	35CrMo4	34CrMo4	SCM435TK	SCM435TK	
6		1.2419 105WC6	BO1		105WC13	2140	10WC6				
6	O 1	1.2510 100 MnCrW 4	BS1		8 MO 8	2140	10WC6		SKS 31	STS 31	
6	S1	1.2542 45 WCrV7				2710	45 WCrV8 KU	45WCrSi8			
6	S1	1.255 60WCv7			55WC20	2710	58WC9KU				
6	L6	1.2713 55NiCrMoV6			55NCDV7			F.520.S	SKT 4	STF 4	
6	L6	1.2721 50NiCr13			55 NCV 6	2550		f.528			
6	O2	1.2842 90MnCrV8	BO2		90 MV8						
6	E 50100	1.3501 100 Cr 2			55WC20						
6	52100	1.3505 100Cr6	2 S 135 535 A 99	31	100 C 6	2258	100Cr6	F.1310 - 100 Cr 6	SUJ2	STB 2	SchCh 15
6		1.5024 46S7			45 S 7; Y 46 7;46 Si 7			F. 1451 - 46 Si 7			
6	9255	1.5025 51S7			51 S 7 51 Si 7	2090	48 Si 7 50 Si 7 55 Si 7	F.1450-50 Si 7			
6	9255	1.5026 55S7	251 a 58		55 S 7	2085 2090		F.1440 - 56 Si 7		55S2	
6	9260	1.5027 60S7	251 A 60 251 H 60		60 S 7		60 Si 7	F. 1441 - 60 Si 7		60S2	
6	9260 H	1.5028 65S7			60 S 7			50 P 7 SUP 6	SPS 6		
6		1.5120 38 MnSi 4									
6	A 204 Gr.A 4017	1.5415 16Mo3 15 Mo 3	1503-243 B		15 D 3	2912	16Mo3(KG;KW)	F.2601 - 16 Mo 3			
6	4419	1.5419 20Mo4	1503-243-430			-2512	G 20 Mo 5 G 22 Mo5		SCPH 11	SCPH 11	
6	A 350-LF 5	1.5622 14Ni6			16N6		14 Ni 6 KG;KT	F.2641 - 15 Ni 6			
6	3415	1.5732 1 NiCr10			14 NC 11		15NiCr11		SNC415(H)		
6	3310; 3314	1.5752 14NiCr14	655M13	36A	12NC15		14NiCrMo13		SNC815(H)		
6		1.6587 17CrNiMo6	820A16		18NCD6						
6		1.6657 14NiCrMo134					14NiCrMo131				
6	5515	1.7015 15 Cr 3	523 M 15		12 C 3			SCr415(H)	SCr415(H)		
6	5132	1.7033 34Cr4	530A32	18B	32C4		34Cr4(KB)	35Cr4	SCr430(H)	SCr430(H)	
6	5140	1.7035 41C r4	530M40	18	42C4		41Cr4	42Cr4	SCr440(H)	SCr440(H)	
6	5140	1.7045 42Cr41	530 A 40		42 C 4 TS	2245	41Cr4	42Cr4	SCr440	SCr440	
6	5115	1.7131 16MnCr5	527 M 17		16 MC 5	2511	16MnCr5	16MnCr5			
6		1.7139 16MnCr5				2127					
6	5515	1.7176 55Cr3	527 A 60	48	55 C 3	2253			SUP9(A)	SPS 9(A)	
6	4135; 4137	1.7220 34CrMo4	708 Aa 37		35 CD 4	2234					
6	4142	1.7223 41CrMo4					41CrMo4	42CrMo4	SNB 22-1	SNB 22-1	
6	4140	1.7225 42CrMo4	708 M 0		42 CD 4	2244					
6		1.7228 55NiCrMoV6G	823M30			2512	653M31				
6		1.7282 15CrMo5			12 CD 4	2216		12CrMo4			
6		1.7321 20 mCrR 4				2625					
6	ASTM A182 F-12	1.7335 13CrMo4 4	1501-620Gr27				14CrMo4 5	14CrMo45			
6	A 182-F11;12	1.7335 13 CrMo 4 4	1 501 620 Gr. 27		15 CD 4.5	2216		12CrMo4	SCM415(H)	SCM415(H)	
6	ASTM A 182 F22	1.7380 10CrMo9 10	1501-622grR31; 45								
6	A182 F-22	1.7380 10 CrMo 9 10	1501-622		12 CD 9.10	2218	12CrMo9,10	TUJ.H			
6		1.7715 14MoV6 3	1503-660-440					13MoCrV6			
6	A355A	1.8509 41CrAlMo 7	905 M 39	41B	40 CAD 6.12	2940	41CrAlMo7	41CrAlMo7			
7	A570.36	1.0038 S235JRG2 (Fe 360 B) RSt 37-2	Fe 360 B FU 1449 2723 CR 4360-40 B 640A35		E 24-2NE	1312	Fe 360 B FN	AE 235 B FN FU Fe 360 B FN; FU			St3ps; sp
7	3135	1.5710 36NiCr6			35NC6						

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7		1.5755 31 NiCr 14	653 M 31		18 NC 13						
7	8620	1.6523 2 NiCrMo2	805M20	362	20 NCD 2	2506					
7	8740	1.6546 40 NiCrMo 22	311-Tyre 7				20NiCrMo2	20NiCrMo2	SNCM220(H)	SNCM220(H)	
7	4130	1.7218 25CrMo4	CDS 110		25 CD 4	2225	40NiCrMo2(KB)	40NiCrMo2	SNCM240	SNCM240	
7		1.7733 24 CrMoV 5 5			20 CDV 6		25CrMo4(KB)	55Cr3	SCM420/430	SCM420/430	
7		1.7755 GS-45 CrMOV 10 4					21 CrMoV 5 11				
7		1.8070 21 CrMoV 5 11									
8	4142	1.2332 47 CrMo 4	708 M 40	19A	42 CD 4	2244	35 NiCr 9				
8	A128 (A)	1.3401 G-X120 Mn 12			Z 120 M 12	2183	42CrMo4	42CrMo4	SCM (440)	SCM (440)	
8	3435	1.5736 36 NiCr 10			30 NC 11		GX120Mn12	F.8251-AM-X120Mn12	SCMH1, SCMH11	SCMH1, SCMH11	110G13L
8	9840	1.6511 36CrNiMo4	816M40	110	40NCD3			36NiCrMo4(KB)	35NiCrMo4	SUP 10	SPS 10
8	4340	1.6582 35CrNiM 6	817 M 40	24	35 NCD 6	2541		35NiCrMo6(KB)	SNCM 447	SNCM 447	
8		1.7361 32 CeMo12	722 M 24	40B	30 CD 12	2240		30CrMo12	F.124.A		
8	6150	1.8159 50 CrV 4	735 A 50	47	50CrV4	2230		50CrV4	51CrV4		
8		1.8161 58 CrV 4									
8		1.8515 32 CrMo 12	722 M 24	40B	30 CD 12	2240		32CrMo12	F.124.A		
8		1.8523 39CrMoV13 9	897M39	40C				36CrMoV12			
9		1.4882 X 50 CrMnNiNbN 21 9			Z 50 CMNnb 21.09						
9	3135	1.5710 36NiCr6	640A35	111A	35NCD6					SNC236	SNC236
9		1.5864 35 niCr 18									
9		31 NiCrMo 13 4	830 m 31			2534					
10	A573-81	1.0144 ST 44-3	4360 43 C		E 28-3	1412				f-1270	
10	A 619	1.0347 DCO3 RSt;RRSt 13	1448 3 CR 1449 2 CR		E		Fep 02		AP 02	SM 400A,B,C	SM 400A,B,C
10	M 1015 M 1016 M 1017	1.0401 C15	080 M 15 080 M 15 1449 17 CS		AF 37 C12 XC 18	1350		C15 C16 1 C 15	F.111	S 15 C	SM 15 C
10		1.0570 ST 52-3	4360 50 B		E 36-3	2132		Fe52BFN/Fe52CFN	SM490A,B,C;YA,YB	SM490A,B,C;YA,YB	
10	12L13	1.0718 9SMnPb28			S250Pb	1914		CF9SMnPb28	11SMnPb28	SUM 22L	SUM 22L
10	(12L13)	1.0718 9 SMnPb 28			S 250 Pb	1914		CF 9 SMnPb 28	11 SMnPb 28	SUM 22L	SUM 22L
10		1.0723 15 S 22 15 S 20	210 A 15 210 M 15			1922			F.210.F	SUM 32	SUM 32
10		1.2083				2314					
10	H 11	1.2343 x 38 CrMoV 5 1	BH 11		Z 38 CDV 5			X 37 CrMoV 5 1 KU			
10	H 13	1.2344 X 40 CrMoV 5 1	BH 13		Z 40 CDV 5	2242		X40CrMoV511KU	F-5318	SKD61	STD61
10	A 2	1.2363 X100 CrMoV 5 1	BA 2		Z 100 CDV 5	2260		X100CrMoV51KU	F-5227	SKD12	STD12
10	D 2	1.2379 X 155 CrVMo 12 1	BD2		Z 160 CDV 12	2310		X165CrMoW12KU	X160CrMoW12KU		
10	HNV3	1.2379 X210Cr12G	BD2		Z160CDV12	2736					
10	D 4 (D 6)	1.2436 X 210 CrW 9 3	BD6		Z 200 CD 12	2312		X215CrW 12 1 KU	F-5213		
10	H 21	1.2581 X 30 WCrV 9 3	BH 21		Z 30 WCV 9			X30WCrV 9 3 KU	F-526	SKD5	STD5
10		1.2601 X 165 CrMoV 12				2310					
10	H 12	1.2606 X 37 CrMoV 5 1	BH 12		Z 35 CWDV 5			X 35 CrMoV 05 KU	F.537		
10	D3	1.3343 S 6-5-2	BM2		Z200C12	2715		X210Cr13KU	X210Cr12	SUH3	STR3
10	N08028	1.4563			Z1NODU31-27-03	2584					
10	ASTM A353	1.5662 X8Ni9	1501-509;510					14 Ni 6 KG;KT	XBNi09		
10	ASM A353	1.5662 X8Ni9	502-650		9 Ni			X10Ni9	F-2645	SL9N60(53)	SL9N590(520)
10	2517	1.5680 12Ni19	12Ni19		Z18N5						
10	2515	1.5680 12 Ni 19			Z 18 N 5						
11		1.3202 S 12-1-4-5	BT 15					HS 12-1-5-5	12-1-5-5		
11		1.3207 S 10-4-3-10	BT 42								
11	T15	1.3243 S 6-5-2-5									
11		1.3246 S 7-4-2-5									
11		1.3247 S 2-10-1-8	BM 42		Z110 DKCWW 09-08-04	2723		HS 6-5-2-5	6-5-2-5	SKH55	SKH55
11	M 42	1.3249 S 2-9-2-8	BM 34		Z110 WKCDV 07-05-04	2723		HS 7-4-2-5	M 35		
11	T 4	1.3255 S 18-1-2-5	BT 4		Z110 DKCWW 09-08-04	2723		HS 2-9-1-8 2-9-2-8	M 41		
11	M 2	1.3343 S6-5-2	BM2		Z 85 WDCV	2722		HS 652	F-5604	SKH 51	SKH 51
11	M 7	1.3348 S2-9-2			Z 100 DCWW 09-04-02	2782		HS 292	F-5607		

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According to VDI 3323 Standard

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Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
11	T 1	1.3355 S 18-0-1	BT 1	Z80 WCV 18-401						
11	630	1.4548		Z7CNU17-04						
11	HNv 3	1.4718 X45CrSi 9 3	401S45	Z45CS9		X45CrSi8	F322	SUH1	STR1	
11	422	1.4935 x20 CrMoWV 12 1								
12	403	1.4000 X6Cr13	403 S 17	Z 6 C 13	2301	X6Cr13	F.3110	SUS403	STS 403	
12		1.4001 X6Cr14					F8401			
12	(410S)	1.4001 X7 Cr 13	(403 S 7)	Z 8 C 13	2301					
12	405	1.4002 X6CrAl2	405S17	Z8CA12		X6CrAl13				
12	405	1.4002 X6 CrAl 13	405 S 17	Z6CA13	2302	X6CrAl13				
12	416	1.4005 X12CrS 13	416 S 21	Z11 CF 13	2380	X12 CrSC13	F-3411	SUS 416	SUS 416	
12	410; CA-15	1.4006 (G-)X10 Cr 13	410S21	Z10 C 13	2302	X12Cr13	F3401	SUS 410	SUS 410	
12	430	1.4016 X8Cr17	Z8C17	430S15	2320	X8Cr17	F3113			
12	430	1.4016 X6 Cr 17	430 S 15	Z 8 C 17	2320	X8Cr17	F.3113	SUS 430	SUS 430	
12		1.4027 G-X20Cr14	420 C 29	Z20 C 13M						
12		1.4027 G-X 20 Cr 14	420 C 29	Z 20 C 13M						
12	420	1.4028 X30 Cr 13	420 S 45	Z 30 C 13	2304					
12		1.4086 G-X120Cr29	452C11							
12	430 F	1.4104 X12CrMoS17	420 S 37	Z 10 CF 17	2383	X10CrS17	F.3117	SUS430F	STS 430F	
12	440B	1.4112 X90 CrMoV 18								
12	434	1.4113 X6CrMo 17	434 S 17	Z 8 CD 17.01	2325	X8CrMo17		SUS434	STS 434	
12		1.4340 G-X40CrNi27 4								
12	S31500	1.4417 X2CrNiMoSi19 5			2376					
12	S31500	1.4417 X2 CrNiMoSi 18 5 3			2376					
12		1.4418 X4 CrNiMo16 5		Z6CND16-04-01	2387					
12	XM 8	1.4510		Z 4 CT 17		X 6 CrTi 17	F3115-X 5 CrTi 17	SUS 430 LK	STS 430 LX	08 Ch1T7
12	430Ti	1.4510								
12	430H	1.4510 X6 CrTi 17		Z 4 CT 17						
12		1.4511 X 6 CrNb 17(X 6 CrNb 17		Z 4 CNb 17		X 6 CrNb 17	F3122-X 5 CrNb 17	SUS 430 LK	STS 430 LX	
12	409	1.4512 X 6 CrTi 12 (X2CrTi12)	LW 19 409 S 19	Z 3 CT 12		X 6 CrTi 17		SUH 409	STR 409	
12		1.4720 X20CrMo13								
12	405	1.4724 X10CrAl13	405S17	Z10C13		X10CrAl12	F.311			
12	430	1.4742 X10CrAl18	439S15	Z10CAS18	60	X8Cr17	F.3113	SUS430	STS430	
12	HNv6	1.4747 X80CrNiS20	443S65	Z80CSN20.02		X80CrSiNi20	F.320B	SUH4	STR4	
12	446	1.4749 x18 crRn 28								
12	446	1.4762 X10CrAl24		Z10CAS24	2322	X16Cr26		SUH446	STR446	
12	EV 8	1.4871 X 53 CrMnNiN 21 9	349 S 54	Z52 CMN 21.09		X53CrMnNiN21 9		SUH35,SUH36	STR35,STR36	
12	302	x12 CrNi 18 9	302 S 31	Z 10 CN 18-09	2330					
12	429	X10 CrNi 15								
13	420	1.4021 X20Cr13	420S37	Z 20 C 13	2303	14210				
13	420	1.4031 X40 Cr 13		Z 40 C 14	2304					
13		1.4034 X46Cr13	420 S 45	Z40 C 14		X40Cr14	F.3405	SUS420J2	STS420J2	
13	431	1.4057 X20CrNi172	431 S 29	Z 15 CN 16.02	2321	X16CrNi16	F.3427	SUS431	STS431	
13		1.4125 X 105 CrMo 17		Z 100 CD 17		X 105 CrMo 17				
13	CA6-NM	1.4313 G-X4 CrNi 13 4	425 C 11	Z 4 CND 13-04 M	2385	(G)X6CrNi304		SCS5	SSC5	
13	630	1.4542 X 5 CrNiCuNb 17 4 (X5CrNiCuNb 16-4)								
13		1.4544	S. 524 S. 526			X 6 CrNiTi 18 11				08Ch 18Ni2T
13	348	1.4546 X5CrNiNb 18-10	347 S 31 2 S. 130 2 S. 143/144/145 S.525/527			X 6 CrNiNb 18 11				
13		1.4922 x20crMv12-1			2317	x20crMnO 12 01				
13		1.4923 X22 CrMoV12 1								
14	304	1.4301 X 5 CrNi 18 9	304 S 15	Z 5 CN 18.09	2332,2333					
14	303	1.4305 X10 CrNiS 18 9	303 S 21	Z 8 CNF 18-09	2346	X10CrNiS18.09	F.3508	SUS303	STS303	
14	304L	1.4306 X20CrNi18 9	304S12	Z20CrNi18 10	2352	x20CrNi18 11	F.3503	SCS19	SSC19	
14	304L	1.4306 X2 CrNi 18 10	304 S 11	Z 3 CN 19-11	2352	X2CrNi18 11				
14	CF-8	1.4308 X6 CrNi 18 9	304 C 15	Z 6 CN 18-10 M	2333			SUS304L	STS304L	
14	301	1.4310 X12CrNi 17 7	301 S 21	Z 12 CN 17.07	2331	X2CrNi18 07	F.3517			

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Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
14	304 LN	1.4311 X2 CrNiN 18 10	304 S 62	Z 2 CN18.10	2371	X2CrNiN18 10		SUS304LN	STS304LN	
14		1.4312 G-X10CrNi18 8	302C25	Z10CN18.9M						
14	305	1.4312 X8 CrNi 18 12	305 S 19							
14		1.4332 X2 CrNi 18-8								
14	304	1.4350 X5CrNi18 9	304S15	Z6CN18.09	2332	X5CrNi18 10	F.3551	SUS304	STS304	
14	S32304	1.4362 X2 CrNiN 23 4		Z 2 CN 23-04 AZ						
14	202	1.4371 X3 CrMnNiN 188 8 7	284 S 16	Z 8 CMN 18-08-05						
14	316	1.4401 X 5 CrNiMo 17 12 2 (X4 CrNiMo 17 -12-2)	316 S 13 316 S 17 316 S 19 316 S 31 316 S 33	Z 3 CND 17 -11-01 Z 6 CND 17-11 Z 7 CND 17-11-02 Z 7 CND 17-12-02	2347	X 5 CrNiMo 17 12	F.3534-X 5 CrNiMo 17 12 2	SUS 316	STS 316	
14	316L	1.4404 X2 CrNiMo 17 13 2 (X2 CrNiMo 17-12-2) GX 2 CrNiMoN 18-10	316 S 11, 316 S 13 316 S 14, 316 S 31; 316 S 42, S.537,316 C 12, T.75, S. 161	Z 2 CND 17-12 Z 2 CND 18-13 Z 3 CND 17-11-02 Z 3 CND 18-12-03 Z 3 CND 19.10 M	2348	X 2 CrNiMo 17 12	F.3533 - X 2 CrNiMo 17 13 3	SUS 316 L	STS 316 L	
14	316LN	1.4406 X2 CrNiMoN 17 12 2 (X2CrNiMoN 18-10)	316 S 61 316 S 63	Z2 CND 17-12 AZ		X 2 CrNiMoN 17 12	F.3542-X 2 CrNiMoN 17 12 2	SUS316LN	STS316LN	
14	CF-8M	1.4408 GX 5 CrNiMoN 7 12 2 G-X 6 CrNiMo 18 10	316 C 16 (LT 196) ANC 4 B		2343		F.8414-AM-X 7 CrNiMo 20 10	SCS 14	SSC 14	07 Ch 18Ni10G2S2NSL
14		1.4410 G-X10CrNiMo18 9		Z5CND20.12M	2328					
14	316 Ln	1.4429 X2 CrNiMo 17 -13-3	316 S 62	Z 2 CND 17-13 Az	2375	X 2 CrNiMoN 17 13	F.3543-X 2 CrNiMo 17 13 3	SUS 316 LN	STS 316 LN	
14	316L	1.4435 X2 CrNiMo18 14 3	316 S 11;316 S 13 316 S 14;316 S 31 LWCF 22	Z 3 CND 17-12-03 Z 3 CND 18-14-03	2375	X 2 CrNiMoN 17 13	F.3533-X 2 CrNiMo 17 13 2	SUS 316 L	STS 316 L	03 Ch 17Ni14M3
14	316	1.4436 X 5 CrNiMo 17 13 3 (X4CrNiMo 17-13-3)	316 S 19; 316 S 31 316 S 33 LWCF 23	Z 6 CND 18-12-03 Z 7 CND 18-12-03	2343	X 5 CrNiMo 117 13 X 6 CrNiMo 17 13	F.3543-X 5 CrNiMo 17 13 2 F.3538-X 5 CrNiMo 17 13	SUS 316	STS 316	
14	317L	1.4438 X2 CrNiMo 18 16 4 (X2CrNiMo 18-15-4)	317 S 12	Z 2 CND 19-15-04 z 3 cnd 19-15-04	2367	X2CrNiMo18 16	f.3539-x 2 crNiMo 18 16 4	SUS317L	STS317L	
14	(s31726)	1.4439 X2 CrNiMoN 17 13 5		Z 3 CND 18-14-06 AZ						
14		1.4440 X 2 CrNiMo 18 13								
14	317	1.4449 X5 CrNiMo 17 13 3	317 S 16			X 5 CrNiMo 18 15		SUS 317	STS 317	
14	329	1.4449 X 4 CrNiMo 27 5 2 (X3CrNiMo27-5-2)		(Z 3 CND 25-07 Az) Z 5 CND 27-05 Az	2324		F3309-X 8 CrNiMo 17 12 2 F.3552-X 8 CrNiMo 18 16 4	SUS 329 J 1	STS 329 J 1	
14	329	1.4460 X8CrNiMo27 5								
14		1.4462 X2CrNiMoN22 5 3	318 S 13	Z 3 CND 22-05 Az (Z 2 CND 24 -08 Az) (Z 3 CND 25-06-03 Az)	2377			SUS 329 J3L	STS 329 J3L	
14		1.4500 G-X7NiCrMoCuNb25 20		Z3NCDU25.20M		Z8CNA17-07	X2CrNiMo1712			
14	17-7PH	1.4504	316S111							
14	443 444	1.4521 X2CrMoTi18-2	317 S 16		2326		F.3123-X 2 CrMoTiNb 18 2	SUS 444	STS 444	
14	UNS N 08904	1.4539 X1NiCrMoCu25-20-5		Z 2 NCDU 25-20	2562					
14	CN-7M	1.4539 (G-)X1 NiCrMoCu 25 20 5		Z1 NCDU 25-02 M	2564					
14	321	1.4541 Z 6 CrNiTi 18-10	321 S 31 321 S 51 (1010,1105) LWCF 24	Z 6 CNT 18-10	2337	X 6 CrNiTi 18 11	F.3523 - X 6 CrNiTi 18 10	SUS 321	STS 321	06Ch18Ni10T 08Ch18Ni10T 09Ch18Ni10T 12Ch18Ni10T
14	630	1.4542 X5 CrNiCuNb 17 4 (X5 CrNiCuNb 16-4)		Z 7 CNU 15-05 Z 7 CNU 17-04				SCS 24 SUS 630	SSC 24 STS 630	
14	17-4PH	1.4542		Z7CNU17-04						
14	S31254	1.4547 X1 CrNiMoN 20 18 7			2378					
14	17-4PH	1.4548		Z7CNU17-04						
14	347	1.4550 X6 CrNiNb 18 10	347 S 17	Z 6 CNB 18.10	2338	X6CrNiNb18 11	F.3552	SUS347	STS347	
14		1.4552 G-X7CrNiNb18 9		Z4CNCN19.10M						
14	17-7PH	1.4568	316S111			Z8CNA17-07	X2CrNiMo1712			
14	316Ti	1.4571 X6 CrNiMoTi 17 12 2	320 S 31	Z 6 CNDT 17-12002	2350					
14		1.4581 G-X 5 CrNiMoNb	318 C 17	Z 4 CNDNb 18.12 M						
14	318	1.4583 X 10CrNiMoNb 18 12	303 S 21	Z15CNS20.12						

New Grades, Grades, Chipbreakers, Insert Geometry by Workpiece Shape, Trouble Shooting, Teagum Workpiece Material Group, Insert Selection by Workpiece Material, Stocked Standard Inserts, Grade & Chipbreaker Comparison Table, Material & Hardness Conversion Table

Material Conversion Table

According to VDI 3323 Standard

Material Group	USA	Germany	UK	France	Sweden	Italy	Spain	Japan	Korea	Russia
Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
14		1.4585 G-X7CrNiMoCuNb18 18				X6CrNiMoTi17 12				
14		1.4821 X20CrNiSi25 4		Z20CNS25.04						
14		1.4823 G-X40CrNiSi27 4								
14	309	1.4828 X15CrNiSi20 12	309 S 24 58C	Z15CNS20.12			F.8414	SCS17	SSC17	
14	309S	1.4833 X6 CrNi 22 13	309 S 13	Z 15 CN 24-13						
14	310 S	1.4845 X12 CrNi 25 21	310S24	Z 12 CN 25-20	2361	X6CrNi25 20	F.331	SUH310	STR310	
14	321	1.4878 X6 CrNiTi 18 9	32 1 S 20 58B	Z 6 CNT 18-12 (B)	2337	X6CrNiTi18 11	F.3553	SUS321	STS321	
14	Ss30415	1.4891 X5 CrNiNb 18 10		Z20CNS25.04	2372					
14	S30815	1.4893 X8 CrNiNb 11			2368					
14	304H	1.4948 X6 CrNi 18 11	304 S 51	Z 5 CN 18-09	2333					
14	660	1.498 X5 NiCrTi 25 15		Zz 8 nctv 25-15 b f	2570					
14		X5 NiCrN 35 25								
14	S31753	X2 CrNiMoN 18 13 4								
14		X2 CrNiMoN 25 22 7								
15	CLASS20	0.6010 GG10		F110D	110	G 10				
15	A48-20B	0.6010 GG-10		F1 10 D	0110-00					
15	NO 25 B	0.6015 GG 15	Grade 150	F1 15 D	0115-00	G 15	FG 15	FC150	GC150	
15	CLASS25	0.6015 GG 15	Grade 150	F1 15D	115	G 15	FG 15			
15	A48 25 B	0.6015 GG 15	Grade 150	F1 15 D	01 15-00	G 14	FG 15			
15	A48-30B	0.6020 GG-20	Grade 220	F1 20 D	0120-00					
15	NO 30 B	0.6020 GG 20	Grade 220	F1 20 D	120	G 20		FC200	GC200	
15	A436 Type 2	0.6660 GGL-NiCr202	L-NiCuCr202	L-NC 202	0523-00					
15	60-40-18	0.7040 GGG 40	SNG 420/12	FCS 400-12	0717-02	GS 370-17	FGE 38-17	FCD400	GCD400-18,15	
15	No 20 B	0.7040 GGG 40		F1 10 D	110			FC100	GC100	
16	CLASS30	0.6020 GG 20	Grade 220	F1 20D	120	G 20	FG 20			
16	CLASS45	0.6030 GG 30	Grade 300	F1 30D	130	G 30	FG 30	FC300	GC300	
16	A48-45 B	0.6030	Grade 350	F1 30D	01 30-00					
16	A48-50	0.6035 GG-35	Grade 350	F1 35 D	135	G 35	FG 35	FC350	GC350	
16	A48-60 B	0.6040 GG40	Grade 400	F1 40 D	140					
16	100/70/03	0.7070 GGG-70	SNG700/2	FGS 700-2	07 37-01	GGG 70	GGG 70	FCD700	GCD700-2	
16		1.4829 X 12 CrNi 22 12								
17		0.7033 GGG35.3			0717-15					
17		0.7033 GGG-35.3	350/22 L 40	FGS 370/17	0717-15					
17	60-40-18	0.7040 GGG-40	SNG 420/12	FGS 400-12	0717-02					
17	60/40/18	0.7043 GGG-40.3	370/7	FGS 370/17	0717-15					
17	80-55-06	0.7050 GGG50	SNG500/7	FGS 500/7	0727-02	GGG 50				
17	65-45-12	0.7050 GGG-50	SNG 500/7	FGS 500-7		0727-02		FCD 500	GCD 500-7	
17		0.7652 GGG-NiMn 13 7	S-NiMn 137	S-Mn 137						
17	A43D2	0.7660 GGG-NiCr 20 2	Grade S6	S-NC 202	0772-00					
17		GGG 40.3	SNG 370/17	FGS 370-17	0776-00					
18	A48-40 B	0.6025 GG25	Grade260	F1 25 D	0717-12					
18		0.7060 GGG60	SNG600/3	FGS600-3	125	G 25	FG 25	FC250	GC250	
18	80/55/06	0.7060 GGG-60	600/3	FGS 600/3	07 32-03	GGG 60	GGG 60			
18	A48 40 B				0727-03			FCD600	GCD600-3	
19		0.8055 GTW55								
19	32510	0.8135 GTS-35-10	B 340/12	MN35-10			GTW 55			
19	A47-32510	0.8135 GTS-35-10	B 340/2	Mn 35-10		810	GTS 35			
19	A220-40010	0.8145 GTS-45-06	P 440/7	Mn 450-6	0815-00					
19		GTS-35	B 340/12			0852-00	GMN 45		FCMW370	
19			B 290/6	MN 32-8						
19	32510	GTS-35	B340/12	MN 35-10	0810-00					
20		0.8035 GTM-35	W340/3	MB35-7	814			AC4A	AC4A	
20		0.8040 GTW-40	W410/4	MB40-10	08 15			FCMW330	FCMW330	
20		0.8045			852		GTM 35			
20		0.8065 GTMW-65				GTB40	GTM 40			
20	A220-50005	0.8155 GTS-55-04	P 510/4	Mn 550-4		GMB45	GTM 45			
20	50005	0.8155 GTS-55-04	P 510/4	MP 50-5			GTM 65			
20	70003	0.8165 GTS-65-02	P 570/3	Mn 650-3	0854-00					
20	90001	0.8170 GTS-70-02	P 690/2	Mn 700-2	0854-00	GMN 55		FCMP490	PMC 490	
20	A220-90001	0.8170 GTS-70-02		Mn 700-2	0856-00	GMN 65		FCMP590	PMC 590	

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Material Group	AIS/SAE	Material No. DIN	BS EN	AFNOR	SS	UNI	UNE	JIS	KS	GOST
20		0.8170 GTS-70-02	IP 70-2							
20	1022	1.1133 20Mn5	120 M 19		0862-00			FCMP690	PMC 690	
20	1518			20 M 5	0864-00					
20	1035	1.1183 Cr 35 (C35G)	080 A 35	XC 38 H 1 TS	2132	G 22 Mn 3				
20	400 10	GTS-45	P440/7			20 Mn 7	F.1515-20 Mn 6	SMnC 420	SMnC 420	
20	70003	GTS-65	P 570/3	MP 60-3	1572	C 36; C 38		S 35 C	SM 35 C	35
21	A199	3.0205			08 52					
21	1000	3.0255 A199.5	L31/34/36	A59050C	858			FCMP540	PMC 540	
21		3.3315 AlMg1								
22		3.1325 AlCuMg 1								
22		3.1655 AlCuSiPb								
22		3.2315 AlMgSi1								
21	7050	3.4345 AlZnMgCu0.5	L 86	AZ 4 GU9051						
23		3.2381 G-AlSi 10 Mg								
23		3.2382 GD-AlSi10Mg			811-04					
23		3.2581 G-AlSi12								
23		3.3561 G-AlMg 5								
23	ZE 41	3.5101 G-MgZn4sE1Zr1	MAG 5							
23	EZ 33	3.5103 MgSe3Zn27r1	MAG 6	G-TR322						
23	AZ 81	3.5812 G-MgAl8Zn1	NMAG 1							
23	AZ 91	3.5812 G-MgAl9Zn1	MAG 7							
24		2.1871 G-AlCu 4 TiMg								
24		3.1754 G-AlCu5Ni1.5								
24		3.2163 G-AlSi9Cu3								
24	4218 B	3.2371 G-AlSi 7 Mg								
24	SC64D	3.2373 G-AlSi9MgWA		A-S7G	4231			C4BS	C4BS	
24		3.2373 G-AlSi 9 Mg								
24	QE 22	3.5106 G-MgAl3Se2Zr1	mag 12							
24	GD-AlSi12	G-ALMG5	LM5	A-SU12	4252					
23-24	A360.2	3.2383 G-AlSi0Mg(Cu)	LM9		4253					
23-24	A356-72		2789;1973	NF A32-201						
23-24	356.1		LM25		4244			A5052	A5052P	
23-24	A413.2	G-AlSi12	LM6		4261					
23-24	A413.1	G-AlSi 12 (Cu)	LM20		4260			ADC12	ALDC12	
23-24	A413.0	GD-AlSi12			4247			A6061	A6061P	
23-24	A380.1	GD-AlSi8Cu3	LM24		4250			A7075	A7075P	
26	C83200	2.1090 G-CuSn 7.5 pb								
26	C83600	2.1096 G-CuSn5ZnPb	LG 2							
26	C83600	2.1098 G-CuSn 2 Znpb								
26	C23000	2.1182 G-CuPb15Sn	LB1					U-pb 15 E 8		
26	C93800	2.1182 G-CuPb15Sn						Uu-PB 15e 8		
27		2.0240 CuZn 15								
27	C27200	2.0321 CuZn 37	cz 108					CuZn 36, CuZn 37		
27	C27700	2.0321 CuZn 37	cz 108					CuZn 36, CuZn 37		
27		2.0590 G-CuZn40Fe								
27	C 86500	2.0592 G-CuZn 35 Al 1	U-Z 36 N 3					HTB 1		
27	C 86200	2.0596 G-CuZn 34 Al 2	HTB 1					U-Z 36 N 3		
27	C 18200	2.1293 CuCrZr	CC 102					U-Cr 0.8 Zr		
28		2.0060 E-Cu57								
28		2.0375 CuZn36Pb3								
28	C 94100	2.0596 G-CuZn 34 Al 2	HTB 1					U-Z 36 N 3		
28	C 63000	2.0966 CuAl 10 Ni 5 Fe 4	Ca 104					U-A 10 N		
28	B-148-52	2.0975 G-CuAl 10 Ni								
28	C 90700	2.1105 G-CuSn 10	CT1							
28	C 90800	2.1052 G-CuSn 12	pb 2					UE 12 P		
28	C 81500	2.1292 G-CuCrF 35	CC1-FF							
28		2.4784 CoCr20W15Ni								
31	N 08800	1.4558 X 2 NiCrAlTi 32 20	NA 15							
31	N 08031	1.4562 X 1 NiCrMoCu 32 28 7								

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