

YE-TU19

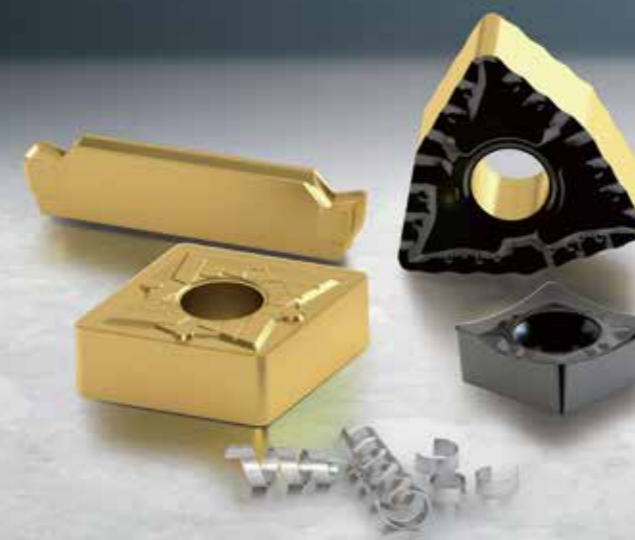
METRIC



TURNING

YG **TURN**

**ISO Turning
Parting & Groove Turn**



YG-1 CO., LTD.

HEAD OFFICE

211, Sewolcheon-ro, Bupyeong-gu, Incheon, South Korea

Phone : +82-32-526-0909

E-mail : yg1@yg1.kr

www.yg1.kr

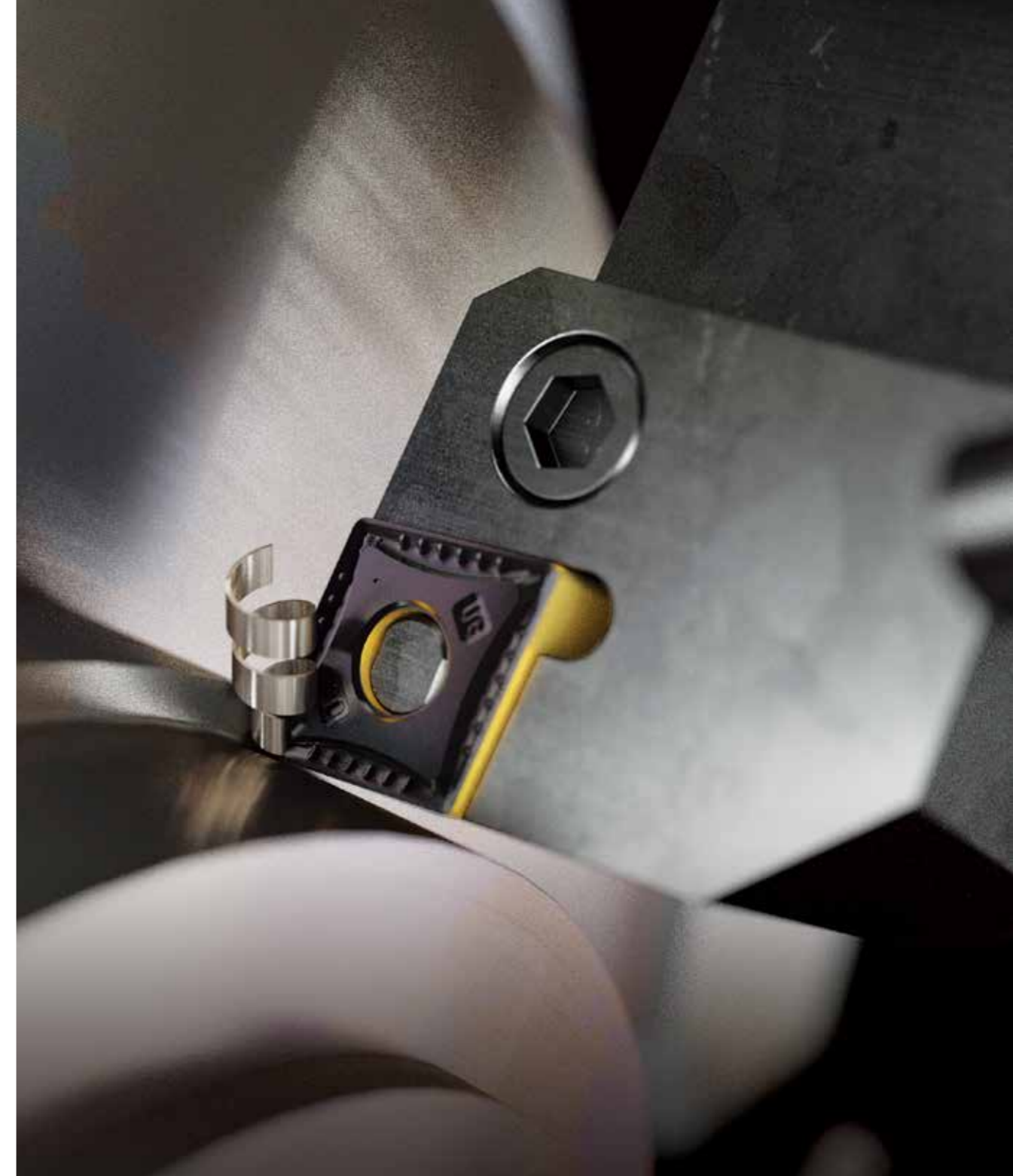
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ISO TURNING

Product Overview

Application Guide

Turning Inserts Overview

Turning Inserts

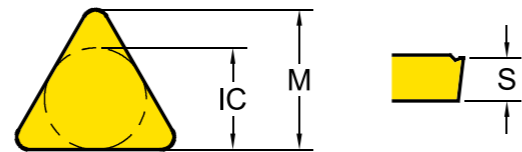
Insert ISO Code System

*Metric : According to ISO 1832

1	2	3	4	5	6	7	8	9
C	N	M	G	12	04	08	-UG	YG3020
Shape	Clearance	Tolerance	Clamping & Chipbreaker	Insert Size	Insert Thickness	Corner Radius	Chipbreaker Geometry	Grade

1 - Shape

Symbol	Shape	Diagram
H	Hexagonal	
O	Octagonal	
P	Pentagonal	
S	Square	
T	Triangular	
C	Rhombic 80°	
D	Rhombic 55°	
V	Rhombic 35°	
W	Trigon	
L	Rectangular	
K	Parallelogram 55°	
R	Round	



3 - Tolerance Class

Symbol	Inner Circle IC (mm)	Nose Height M (mm)	Thickness S (mm)
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
K*	±0.05~0.15*	±0.013	±0.025
M*	±0.05~0.15*	±0.08~0.2*	±0.13
U*	±0.08~0.25*	±0.13~0.38*	±0.13

*Tolerance is different by insert IC size. Please see ISO 1832

4 - Clamping & Chipbreaker

Symbol	Clamping	Chipbreaker	Figure
N	No clamping hole	X	
R		One Face	
A	Cylindrical Clamping hole	X	
M		One Face	
G		Both Faces	
W	Screw Hole	X	
T		One Face	
U		Both Faces	
X		Special	

2 - Relief Angle (AN)

Symbol	Relief Angle (AN)	Diagram
N	No Relief Angle	
B	Relief 5°	
C	Relief 7°	
P	Relief 11°	
D	Relief 15°	
E	Relief 20°	
F	Relief 25°	
O	Special	

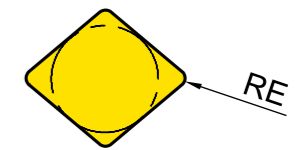
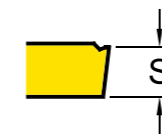
Insert ISO Code System

*Inch

1	2	3	4	5	6	7	8	9
C	N	M	G	4	3	2	-UG	YG3020
Shape	Clearance	Tolerance	Clamping & Chipbreaker	Insert Size	Insert Thickness	Corner Radius	Chipbreaker Geometry	Grade

5 - Insert Size

Metric							Inner Circle IC (mm)	Inch
S	T	C	D	V	W	R		
06	11	06	07	11			6.35	2
07							7.94	2.5
09	16	09	11	16	06	09 (00)	9.525	3
12	22	12	15	22	08	12 (00)	12.7	4
15		16					15.875	5
		19					19.05	6
						06 (M0)	6	
						08 (M0)	8	
						10 (M0)	10	
						12 (M0)	12	
						16 (M0)	16	



6 - Insert Thickness (S)

Metric	Thickness - S (mm)	Inch
T1	1.98	1.2
02	2.38	1.5
03	3.18	2
T3	3.97	2.5
04	4.76	3
05	5.56	3.5
06	6.35	4
07	7.94	5

7 - Corner Radius (RE)

Metric	Corner Radius - RE (mm)	Inch
01	0.1	0
02	0.2	0.5
04	0.4	1
08	0.8	2
12	1.2	3
16	1.6	4
20	2.0	5
24	2.4	6

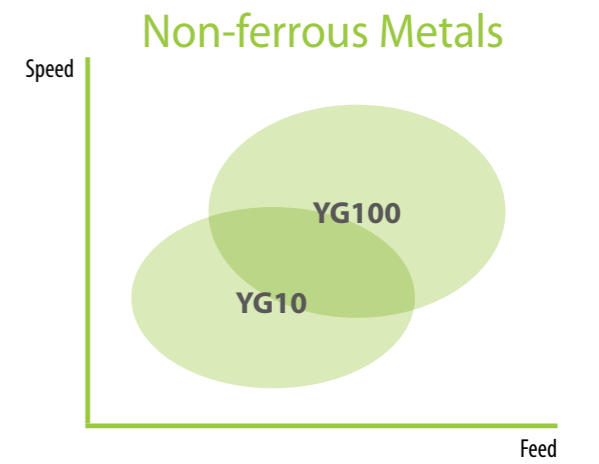
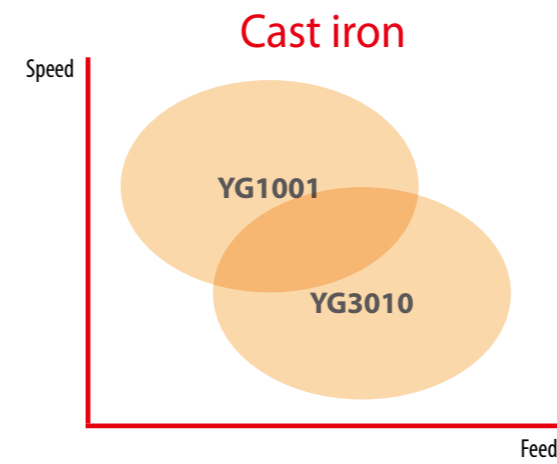
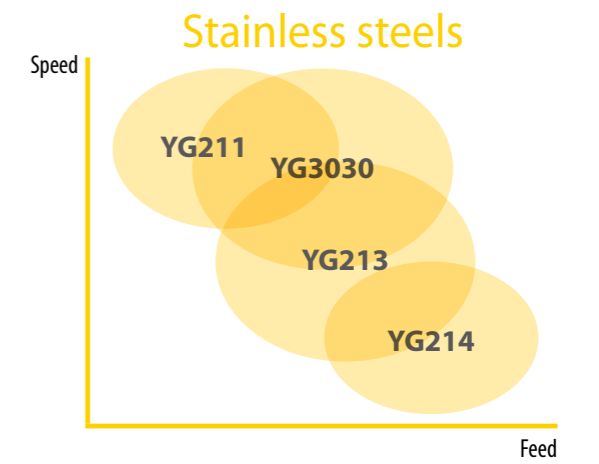
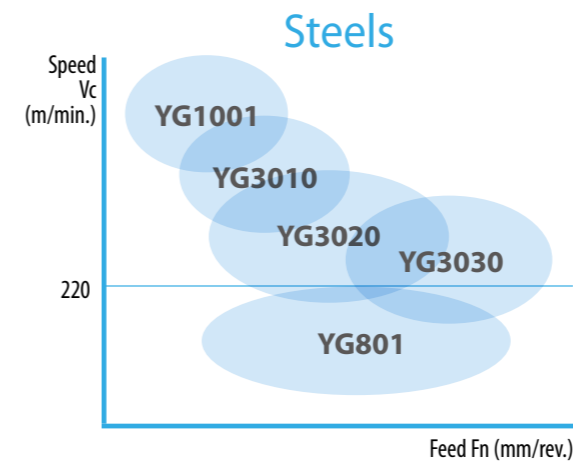
Product Overview Turning Grades

Turning Grades	P Steel				M Stainless steel			K Cast iron			N Non-ferrous		S Superalloys	
	P10	P20	P30	P40	M10	M20	M30	K10	K20	K30	N10	N20	S10	S20
CVD	YG1001	1001						1001						
	YG3010		3010					3010						
	YG3020			3020										
	YG3030				3030									
PVD	YG801	801												
	YG211				211								211	
	YG213					213								213
	YG214						214							214
DLC	YG100										100			
-	YG10										10			

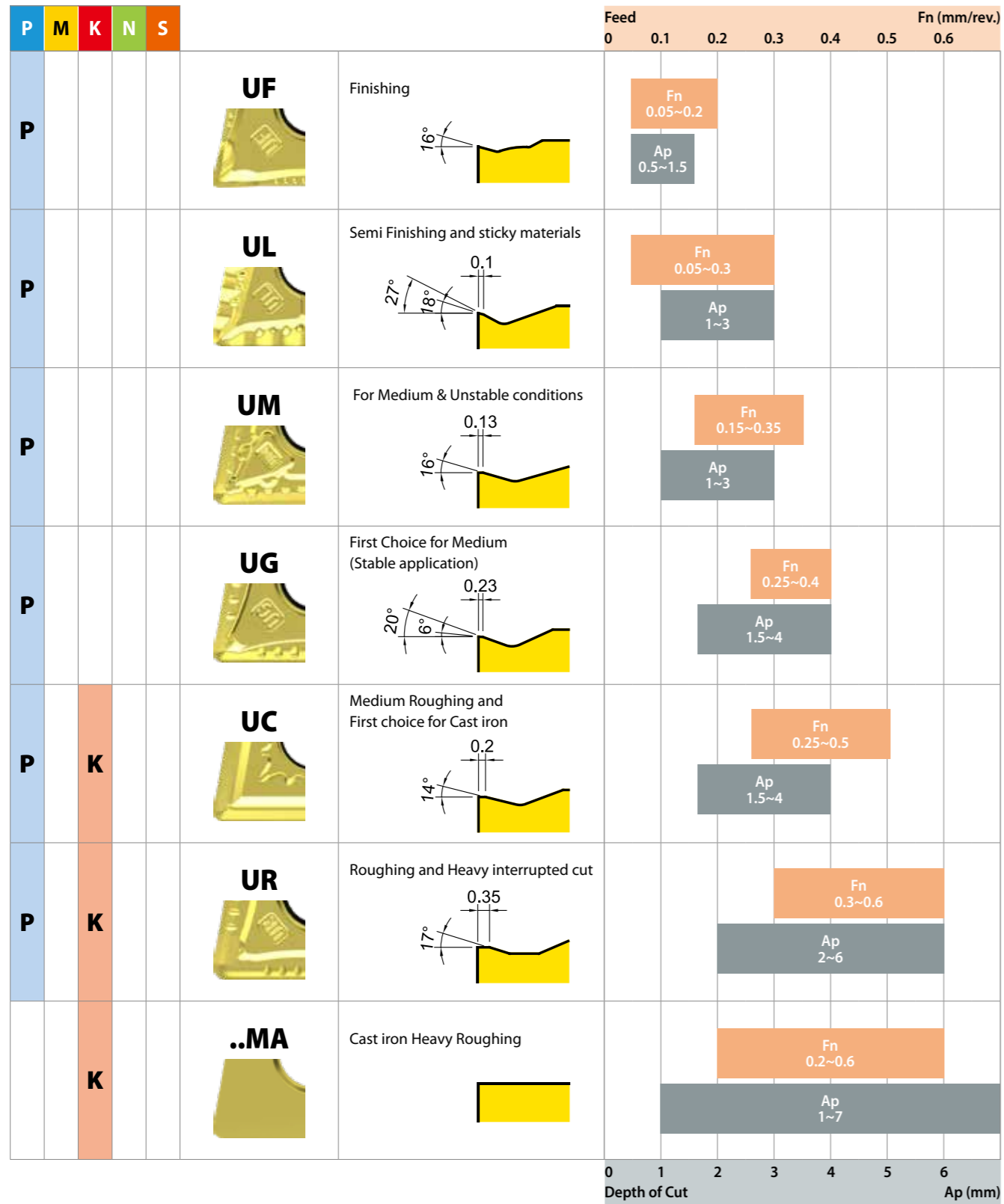
YG1001 P01 - P10 K10 - K25		First choice for stable machining of Cast iron <ul style="list-style-type: none"> Substrate especially designed for high wear resistance Thick Al₂O₃ layer ensures good wear resistance at high cutting speeds including dry machining
YG3010 P05 - P20 K15 - K35		First choice for Finishing Steels, and Ductile Cast iron <ul style="list-style-type: none"> Finishing and light machining of steel under in stable condition New Al₂O₃ coating technology and excellent surface smoothness increase wear resistance and chipping resistance
YG3020 P15 - P30		First Choice grade for general Steel application <ul style="list-style-type: none"> Substrate especially designed for good toughness Excellent surface smoothness increases wear resistance and reliability
YG3030 P20 - P35 M10 - M30		Interrupted cut of Steel and Stainless steel <ul style="list-style-type: none"> Heavy interrupted cut for Steel High cutting speed for Stainless steel
YG801 P10 - P30		for Carbon Steel with Low cutting speed <ul style="list-style-type: none"> Recommended for mild steel and boring application Substrate and special PVD coating for excellent wear resistance
YG100 N05 - N25		First Choice grade for aluminum with DLC coating <ul style="list-style-type: none"> Submicron carbide for high wear resistance DLC coating minimizes Built Up Edge tendency. Improve tool life in sticky non-ferrous alloy
YG10 N05 - N25		Uncoated Grade for General Aluminum <ul style="list-style-type: none"> Substrate consisted of submicron carbide for high wear resistance Shining surface to prevent built up edge

Product Overview Turning Grade Map

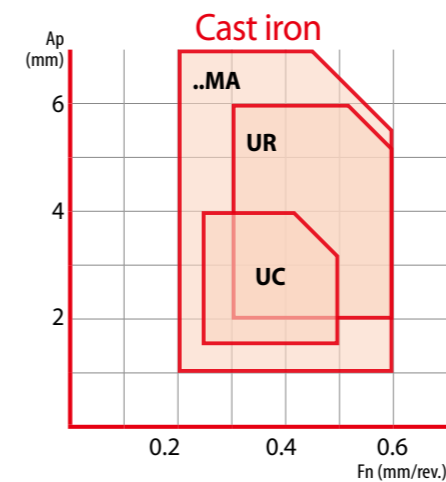
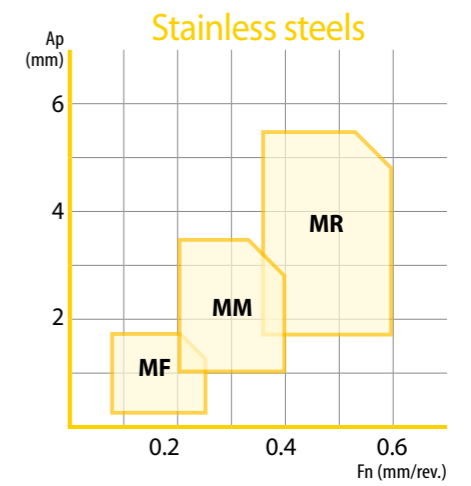
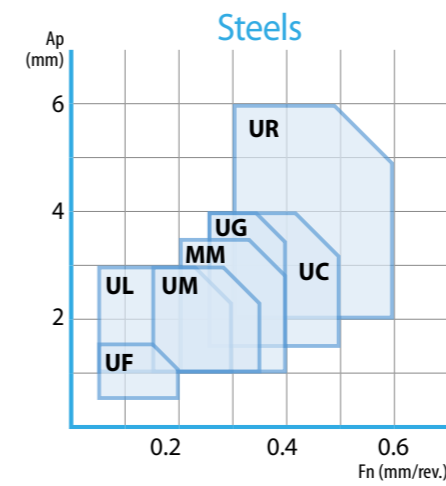
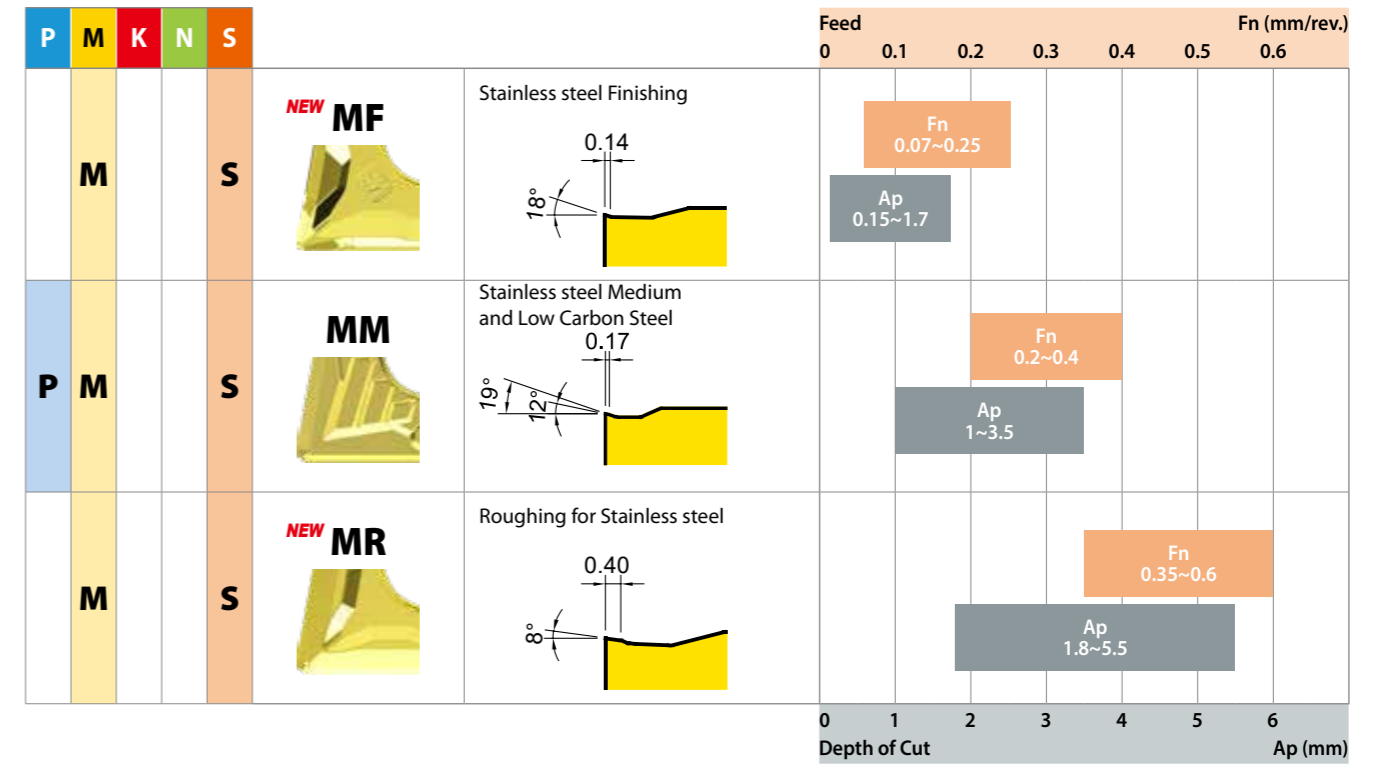
NEW YG211 M05 - M25 S05 - S20		High wear resistance grade for Super alloys and Stainless steel <ul style="list-style-type: none"> Finishing Stainless steel Finishing Super alloys and Titanium
NEW YG213 M20 - M35 S15 - S25		First Choice Grade on low cutting speed of Stainless steel <ul style="list-style-type: none"> First choice on Stainless steel for Low cutting speed For Medium to low cutting speed
NEW YG214 M30 - M40 S25 - S30		Heavy Interrupted cut for Stainless steel <ul style="list-style-type: none"> For Heavy Interrupted cut on Stainless steel Minimize risk of Mechanical fracture or Chipping



Product Overview
Turning Chipbreakers - Negative

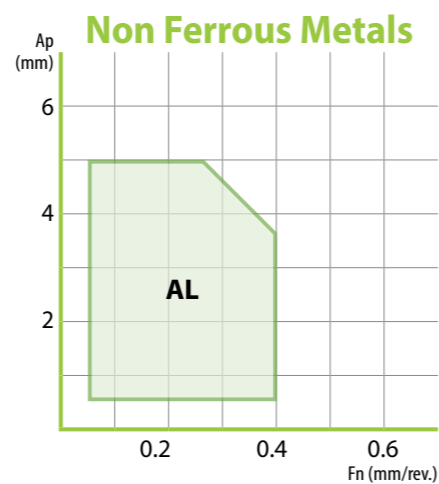
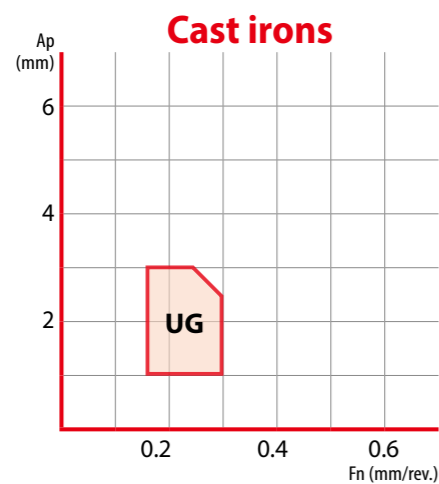
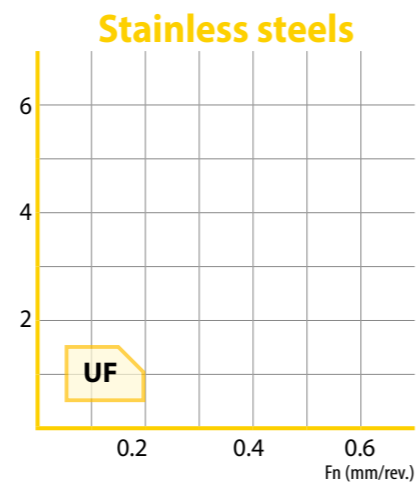
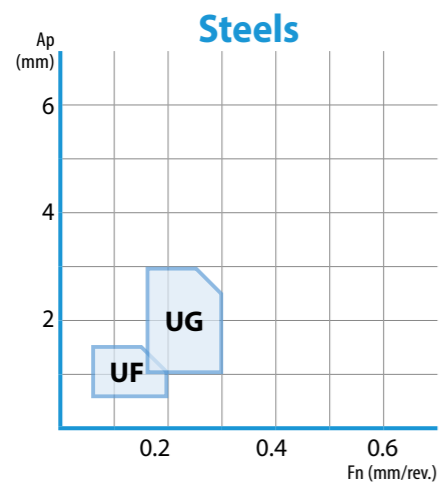
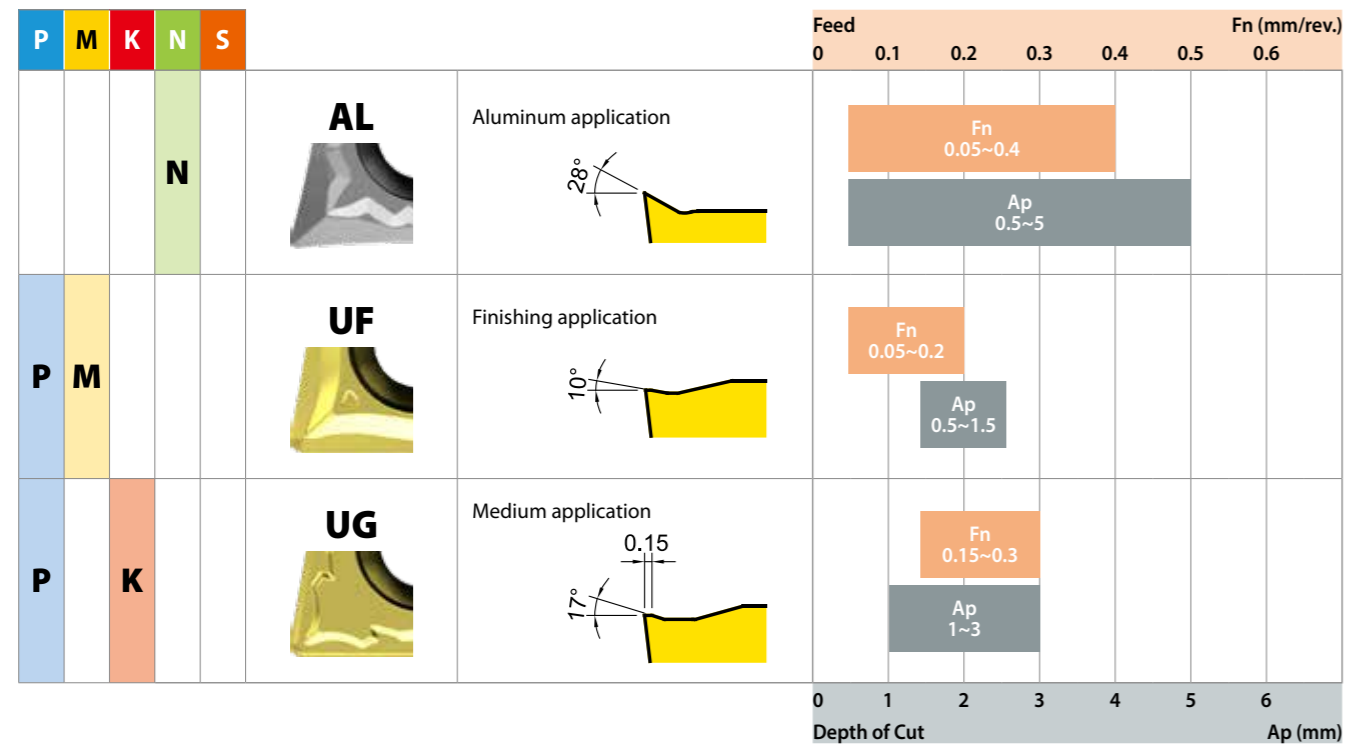


Product Overview
Turning Chipbreakers - Negative



Product Overview

Turning Chipbreakers - Positive



Application Guide Steel Guide

Grade Recommendation based on Workpiece Material Condition

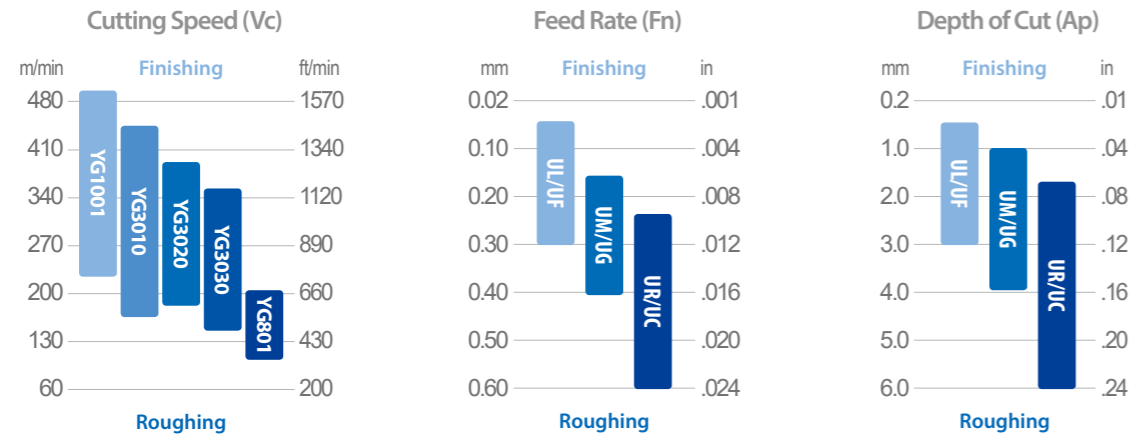
	Pre Machined Condition No Outer Skin Uniform hardness on material Has stable machining condition	↑ HARD YG3010 YG3020 YG3030 ↓ TOUGH
	Welded Condition Soft / No Outer Skin Weld Bead Could be of Different Hardness than Actual Part Stock on Part could even except weld Seam during Machining causing shock loads	
	Cast Condition Hard Outer Skin Could have Sand Inclusion,- if Green Sand Cast Component could have uneven Stock during machining	
	Hot Rolled Condition Soft / No Outer Skin Usually heat treated before machine to reduce Hardness Component could have uneven Stock During Machining	
	Forged Condition Soft Outer Skin Usually heat treated before machine to reduce Hardness Component could have uneven Stock during machining	

Chipbreaker, Feed Rate and Depth of Cut

		Sharp Edge	General	Strong Edge
	Continuous			
	General			
	Heavy Interrupt			

Application Guide Steel Guide

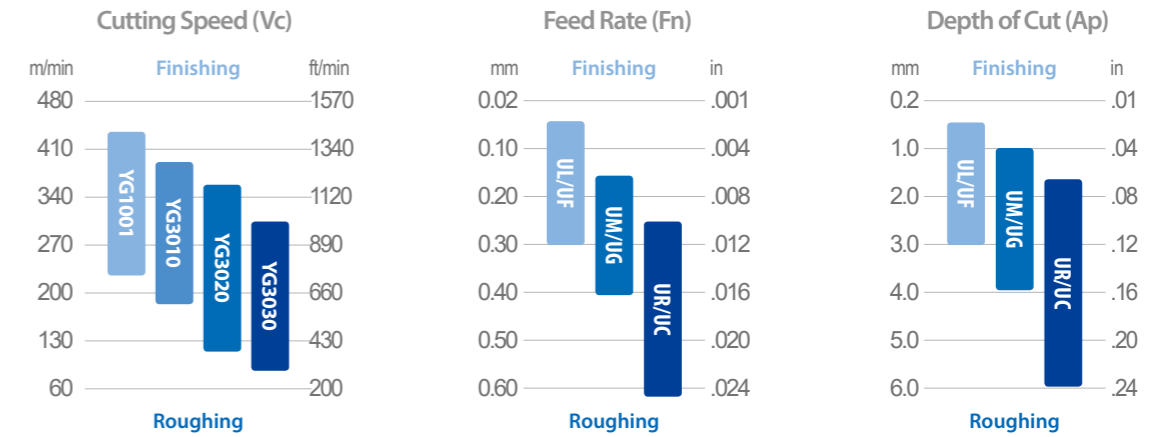
P	Non Alloy Steel, About 0.15% C (Low Carbon Steel)									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
1	S15C	CK15	1.0401	1015	1350	XC18	C15	F.1110	080M15	15



First Choice Grade and Value
 YG3010 - Vc 330m/min (1,080ft/min)
 YG801 - Vc 170m/min (560ft/min)

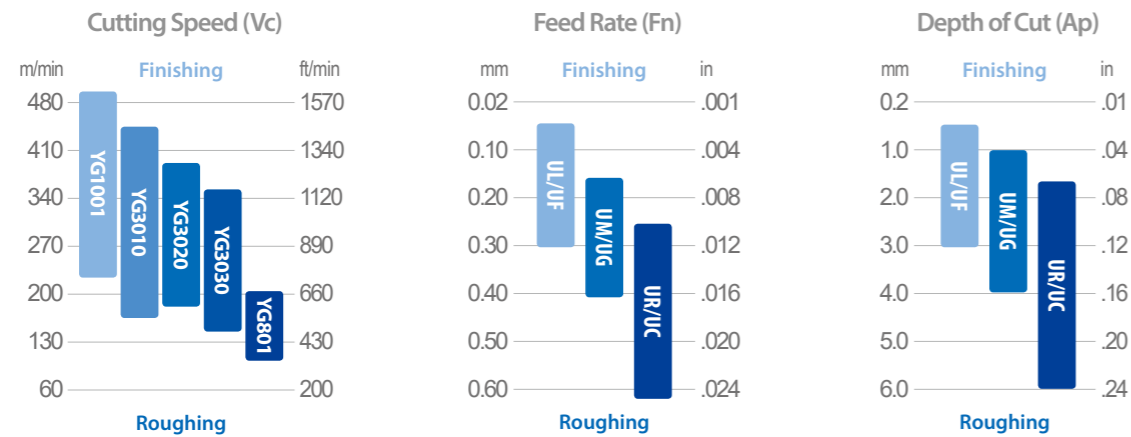
Application Guide Steel Guide

P	Low-alloyed Steel									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
6-9	SCM440	42CrMo4	1.7225	4140	2244	42 CD 4	42CrMo4	F.1252	708M40	38HM



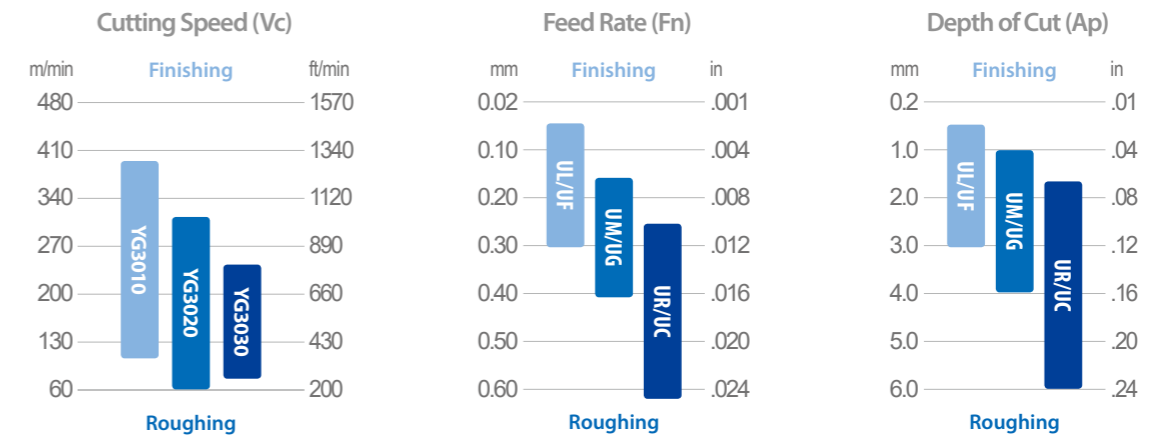
First Choice Grade and Value
 YG3020 - Vc 240m/min (790ft/min)

P	Non Alloy Steel, About 0.45% C (Medium Carbon Steel)									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
2-3	S45C	C45	1.0503	1045	1672	XC42H1TS	C45	F.1140	060A47	45



First Choice Grade and Value
 YG3010 - Vc 330m/min (1,080ft/min)
 YG801 - Vc 170m/min (560ft/min)

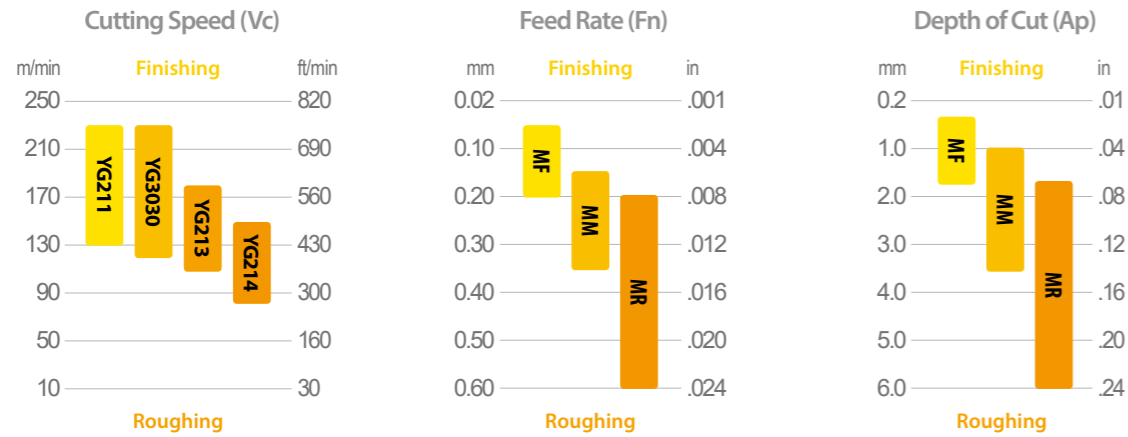
P	High Alloyed Steel, and Tool Steel									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
10-11	SKD11	X155CrMo121	1.2379	D2	2310	Z160CDV12	X165CrMoW12KU	F.5318	BD2	KH12MF



First Choice Grade and Value
 YG3020 - Vc 230m/min (750ft/min)

Application Guide Stainless steel Guide

M	Ferritic / Martensitic Stainless									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
12-13	SUS430	X6Cr17	1.4016	430	2320	Z8C17	Z8C17	F3113	430S15	12C17



First Choice Grade and Value

Ferritic Stainless steel

YG3030 - Vc 200m/min (660ft/min)

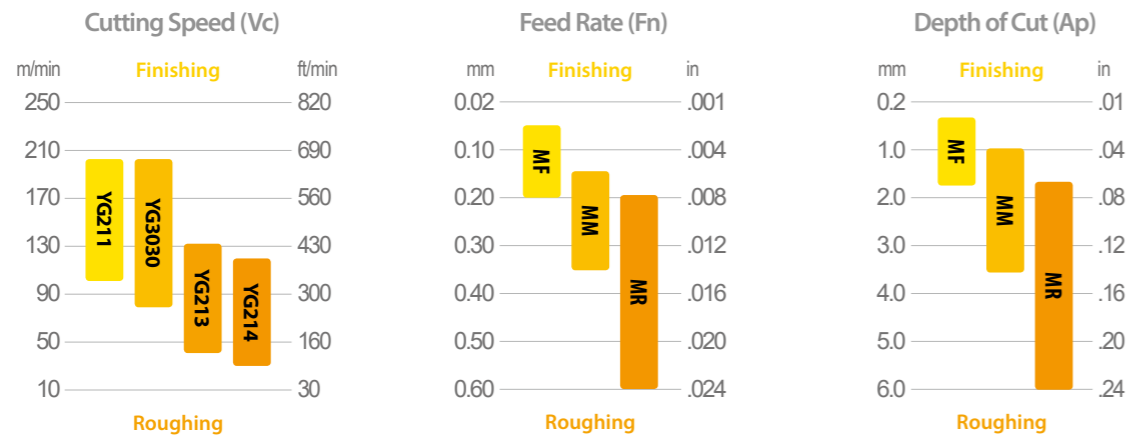
YG213 - Vc 160m/min (520ft/min)

Martensitic

YG3030 - Vc 160m/min (520ft/min)

YG213 - Vc 130m/min (430ft/min)

M	Austenitic Stainless steel									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
14	SUS304	X5CrNi18 9	1.4350	304	2332	Z6CN18 09	X5CrNi18 10	F3551	304S15	03KH18N11



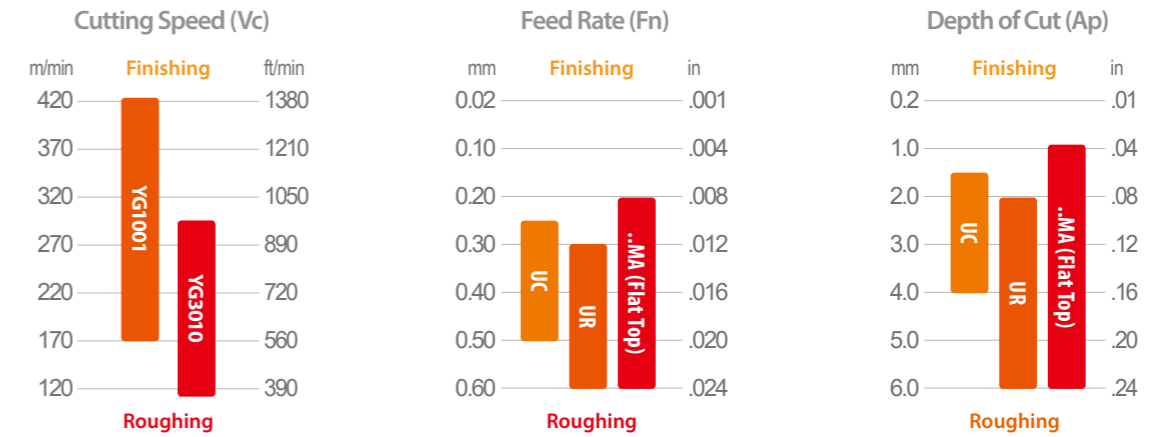
First Choice Grade and Value

YG3030 - Vc 180m/min (590ft/min)

YG213 - Vc 140m/min (460ft/min)

Application Guide Cast iron Guide

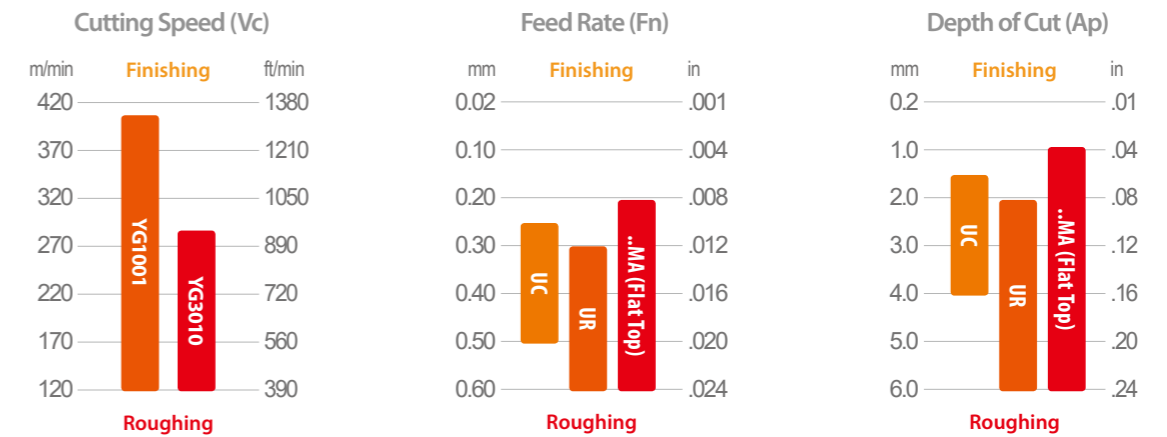
K	Grey cast iron									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
15-16	FC250	GG25	0.6025	A48 40 B	0125	Ft 25 D	G25	FG25	Grade 260	Sc 25



First Choice Grade and Value

YG1001 - Vc 350m/min (1,150ft/min)

K	Nodular cast iron									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
17-18	FCD500	GGG50	0.7050	80-55-06	0.7050	FGS 500-7	GS 500-7	FGE50-7	SNG 500-7	Vc 50-2



First Choice Grade and Value

YG3010 - Vc 220m/min (720ft/min)

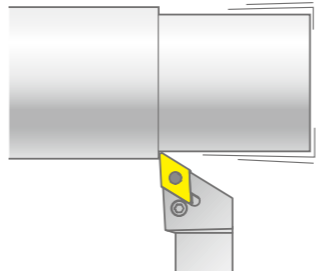
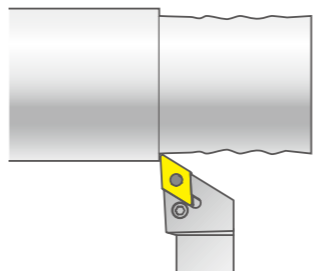
Formulas

Cutting Speed (Vc)	Metric $Vc = D \times RPM \times 0.0031$ (m/min)
	Inch $Vc = D \times RPM \times .262$ (ft/min)
	Metric Vc to Inch Vc $Inch\ Vc = Metric\ Vc \times 3.28$ (ft/min)
	Inch Vc to Metric Vc $Metric\ Vc = Inch\ Vc \times .305$ (m/min)
Spindle Speed (RPM)	Metric $RPM = Vc \times 318.3 \div D$ (rev/min)
	Inch $RPM = Vc \times 3.82 \div D$ (rev/min)
Feed Rate (Vf = Table Feed)	$Vf = Fn \times RPM$ (mm/min or in/min)
Feed per Revolution (Fn)	$Fn = Vf \div RPM$ (mm/min or in/min)
Metal Removal Rate (Q)	Metric $Q = Vc \times Fn \times Ap$ (cm ³ /min)
	Inch $Q = Vc \times Fn \times Ap \times 12$ (in ³ /min)
Cutting Time	$T = L \div Vf$ (min)

Terms

RPM (n)	Spindle Speed (Revolution per minute)
Vc	Cutting Speed
D	Work Diameter
Vf	Feed Rate (Table Feed)
Fn	Feed per Revolution
Ap	Depth of Cut
Q	Metal Removal Rate
L	Length of cut
T	Cutting Time (min)

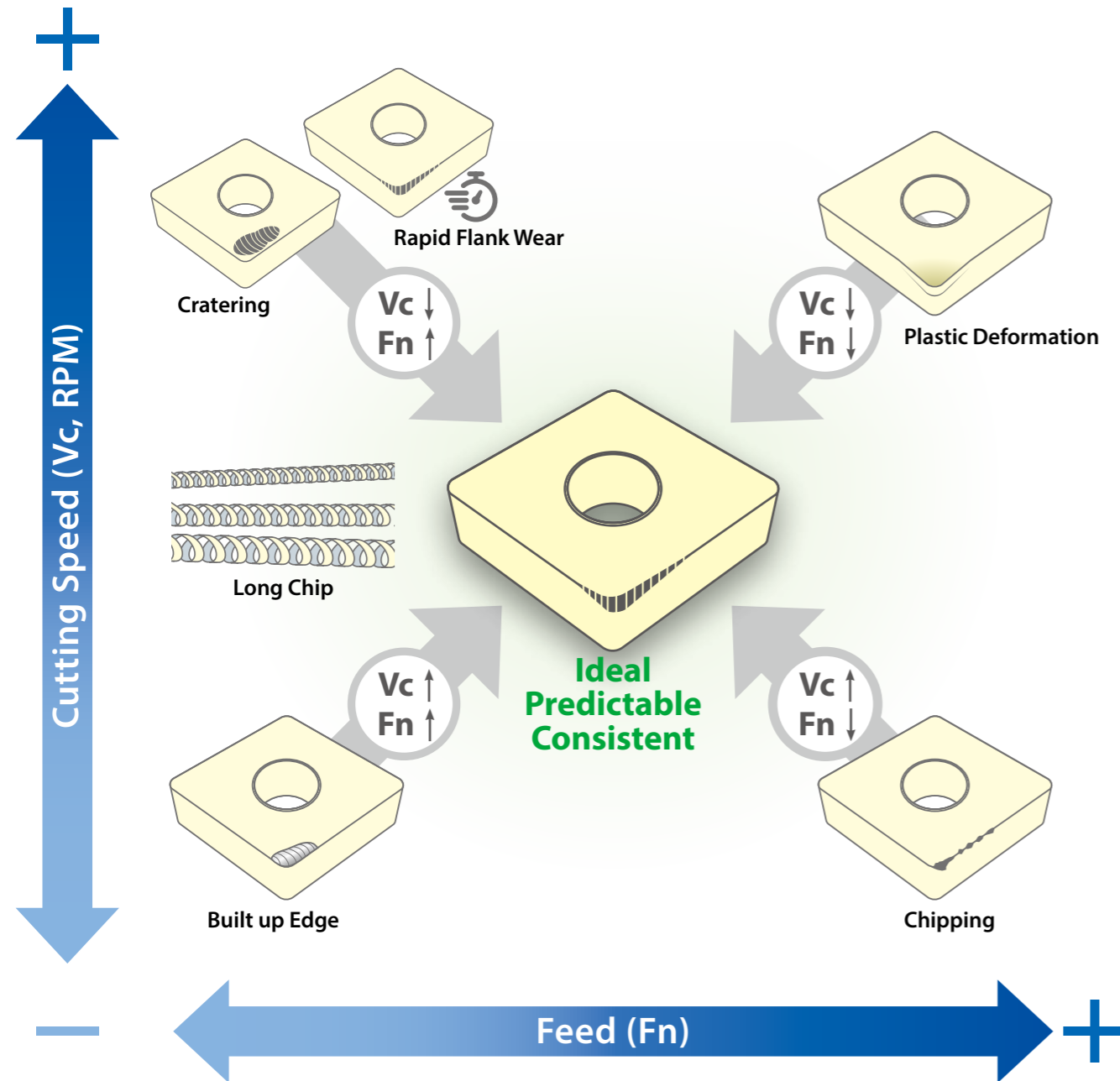
Trouble Shooting

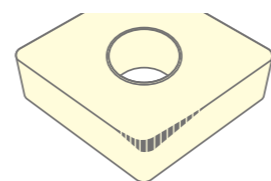
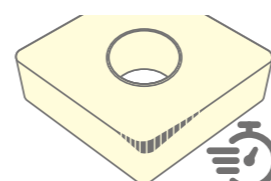
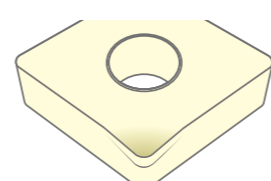
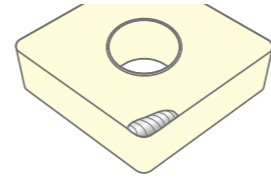
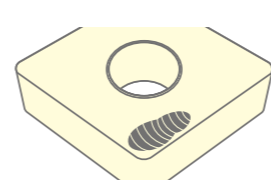
Pattern	Reasons	Solutions
Vibration 	<ul style="list-style-type: none"> - High radial or tangential force - Unstable condition 	<ul style="list-style-type: none"> - Lower depth of cut (ap) - Use sharper chipbreaker - Check stability, and position of tool and workpiece - Reduce the overhang (bigger and shorter tool)
Bad Surface 	<ul style="list-style-type: none"> - Work material is damaged by chips - Feed is too high for corner radius 	<ul style="list-style-type: none"> - Different chipbreaker - Lower depth of cut (ap) - Lower feed - Bigger corner radius

Theoretical Surface Roughness

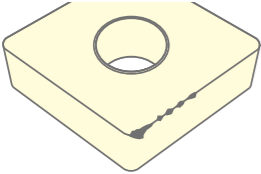
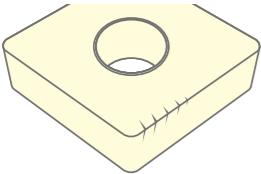
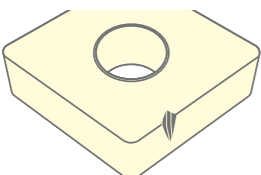
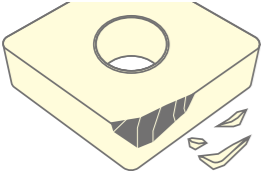
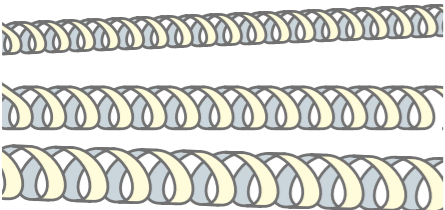
Ra / Rz μm (μ inch)	Insert Corner Radius Code ISO (ANSI)					
	02 (0)	04 (1)	08 (2)	12 (3)	16 (4)	24 (6)
	Feed Rate mm/rev (inch/rev)					
0.4 / 1.6 (16 / 64)	0.05 (.002)	0.07 (.003)	0.1 (.004)	0.12 (.005)	0.14 (.006)	0.18 (.007)
1.6 / 6.3 (64 / 256)	0.1 (.004)	0.14 (.006)	0.2 (.008)	0.25 (.010)	0.28 (.011)	0.35 (.014)
3.2 / 12.5 (128 / 512)	0.14 (.006)	0.2 (.008)	0.28 (.011)	0.35 (.014)	0.4 (.016)	0.49 (.019)
6.3 / 25 (250 / 1000)	-	0.28 (.011)	0.4 (.016)	0.49 (.019)	0.57 (.022)	0.69 (.027)
8 / 32 (320 / 1280)	-	-	0.45 (.018)	0.55 (.022)	0.64 (.025)	0.78 (.031)

Trouble Shooting Guide map



Pattern	Reasons	Solutions
<p>General Flank Wear</p>  <p>Flank face near by corner is abraded</p>	<ul style="list-style-type: none"> - The most ideal wear - Consistent and predictable - General wear behavior when machining condition is normal 	
<p>Rapid Flank Wear</p>  <p>Looks same as general flank wear, but happens quickly</p>	<p>Grade</p> <ul style="list-style-type: none"> - Not enough wear resistance - Too tough grade <p>Heat</p> <ul style="list-style-type: none"> - Cutting speed is too high - Not enough coolant 	<ul style="list-style-type: none"> - More wear resistant grade - Reduce the cutting speed (Vc, SFM, RPM or SFPM) - Optimize coolant - Increase Feed (Fn) if feed is low
<p>Plastic Deformation</p>  <p>Deformed Edge</p>	<ul style="list-style-type: none"> - Excess thermal load - Excess mechanical load 	<ul style="list-style-type: none"> - Reduce cutting temperature - More wear resistant grade - Reduce the cutting speed (Vc, SFM, RPM or SFPM) - Lower feed (Fn) - Lower depth of cut (ap) - Optimize coolant
<p>Built up Edge</p>  <p>Workpiece material is welded on the cutting edge</p>	<ul style="list-style-type: none"> - Sticky materials (low carbon steel, Stainless steel, non-ferrous metal, heat resistant super alloys) - Too low cutting speed 	<ul style="list-style-type: none"> - Increase cutting speed - Lower feed rate - Sharper chipbreaker & geometry - Use high pressure coolant - Use PVD grade - Use Positive Insert
<p>Cratering</p> 	<p>Heat</p> <ul style="list-style-type: none"> - Cutting speed is too high - Too tough grade 	<ul style="list-style-type: none"> - Reduce cutting temperature - Lower cutting speed (Vc, SFM, RPM or SFPM) - Adjust Feed (Fn) - Harder grade

Application Guide Trouble Shooting

Pattern	Reasons	Solutions
Chipping 	<ul style="list-style-type: none"> - Unstable machining condition (Vibration) - Grade is too hard / brittle - Grade is too sharp 	<ul style="list-style-type: none"> - Focus on stabilizing cutting condition - Reduce overhang (shorter and bigger tool) - Tougher grade - Tougher chipbreaker
Thermal Crack 	<ul style="list-style-type: none"> - Thermal stress due to rapid change of temperature 	<ul style="list-style-type: none"> - Tougher grade - Lower cutting speed (Vc, SFM, RPM or SFPM) - Lower feed (Fn) - Sharper chipbreaker - Change coolant / dry cut
Notching 	<ul style="list-style-type: none"> - Improved edge strength work piece has hardened skin 	<ul style="list-style-type: none"> - More wear resistant grade - Reduce the cutting speed (Vc, SFM, RPM or SFPM) - Adjust Feed (Fn) - Lower depth of cut (ap) - Optimize coolant - Go for tougher chipbreaker
Breakage (Mechanical Fracture) 	<ul style="list-style-type: none"> - Mechanical load is too heavy (feed or depth is too high) - Heavy interrupted cut - Grade is too hard for work material - Unstable machining(vibration) - Cutting speed is too low - Impurities in work material 	<ul style="list-style-type: none"> - Lower feed (Fn)or depth of cut (ap) - Tougher grade - Reduce overhang and check stability of tool and work material - Higher cutting speed (Vc, SFM, RPM or SFPM)
Long Chip 	<ul style="list-style-type: none"> - Feed is too low for chipbreaker - Depth of cut is too shallow for corner radius - Chip area (Fn x Ap) too low 	<ul style="list-style-type: none"> - Higher feed - Sharper chipbreaker - Higher depth of cut - Select a smaller corner radius

Turning Inserts Overview

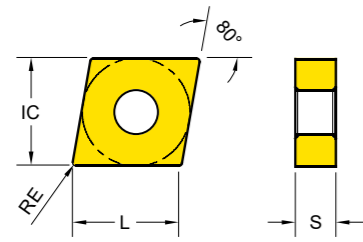
Negative Inserts

Shape	Series	Size				Page
C	CNMA	12	16	19		22
	CNMG	12		19		
D	DNMA		1506			25
	DNMG	1504	1506			
K	KNUX	16				27
S	SNMA	12				28
	SNMG	12				
T	TNMA	16				30
	TNMG	16	22			
	TNUX	16				
V	VNMG	16				33
W	WNMA		08			35
	WNMG	06	08			

Positive Inserts

Shape	Series	Size				Page
C	CCGT		09	12		38
	CCMT	06	09	12		
D	DCGT		11			39
	DCMT	07	11			
R	RCMT	06	08	10	12	40
S	SCMT	09	12			41
T	TCGT		16			42
	TCMT	11	16			
V	VBMT	16				43
	VCGT / VCMT	16				44

Turning Inserts - Negative CNMG / CNMA (80° Negative)

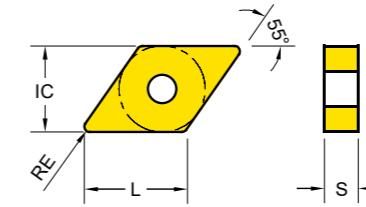


Series	L	IC	S
CNM□ 1204	12	12.7	4.76
CNM□ 1606	16	15.88	6.35
CNM□ 1906	19	19.05	6.35

● : Stock item ○ : Order made item

CNMA CNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)												
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
-MF Stainless steel Finishing	CNMG 120404 - MF	0.4	0.07~0.25	0.15~1.5							●	●				
	CNMG 120408 - MF	0.8	0.07~0.25	0.15~1.5							●	●	●			
-MM Stainless steel Medium	CNMG 120404 - MM	0.4	0.2~0.3	0.5~3							●	●				
	CNMG 120408 - MM	0.8	0.2~0.35	1~3.5			●	●	○	●	●	●				
	CNMG 120412 - MM	1.2	0.2~0.4	1.5~3.5				●		●	●	●				
-MR Stainless steel Roughing	CNMG 120408 - MR	0.8	0.3~0.5	1.2~5.5				●		●	●	●				
	CNMG 120412 - MR	1.2	0.35~0.6	1.5~5.5						●	●	●				

Turning Inserts - Negative DNMG / DNMA (55° Negative)



Series	L	IC	S
DNM□ 1504	14	12.7	4.76
DNM□ 1506	14	12.7	6.35

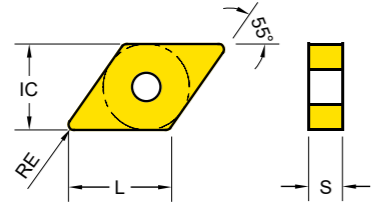
● : Stock item ○ : Order made item

DNMA DNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)												
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
-MA Cast iron	DNMA 150408	0.8	0.15~0.35	1~3	●	●										
	DNMA 150412	1.2	0.25~0.45	1.5~4	●	●										
	DNMA 150608	0.8	0.15~0.35	1~3	●											
	DNMA 150612	1.2	0.25~0.45	1.5~4	●											
-UF Finishing	DNMG 150404 - UF	0.4	0.05~0.15	0.5~1.5		●	●	●	●							
	DNMG 150604 - UF	0.4	0.05~0.2	1~2		●	●	●	●							
	DNMG 150608 - UF	0.8	0.1~0.25	1.5~3.5		●	●	●								
-UL Light Machining and Sticky Material	DNMG 150604 - UL	0.4	0.05~0.25	0.5~2		●	●									
	DNMG 150608 - UL	0.8	0.15~0.3	1.5~3		●	●	●								
-UM Medium Machining Unstable condition	DNMG150412 - UM	1.2	0.15~0.35	1.5~4									●			
	DNMG150608 - UM	0.8	0.15~0.35	0.5~2									●	●	●	

Cutting Speed			Vc (m/min.)																			
ISO	VDI	Sub Group	YG1001		YG3010		YG3020		YG3030		YG801		YG211		YG213		YG214		YG100		YG10	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (m/min.)																			
ISO	VDI	Sub Group	YG1001		YG3010		YG3020		YG3030		YG801		YG211		YG213		YG214		YG100		YG10	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative DNMG / DNMA (55° Negative)



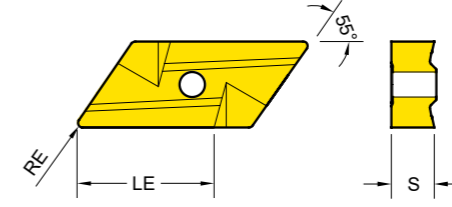
Series	L	IC	S
DNM□ 1504	14	12.7	4.76
DNM□ 1506	14	12.7	6.35

● : Stock item ○ : Order made item

DNMA DNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
-UG Medium Machining at stable condition	DNMG 150408 - UG	0.8	0.2~0.35	1~2.5	●	●	●	●	●								
	DNMG 150412 - UG	1.2	0.2~0.35	1.5~3			●										
	DNMG 150604 - UG	0.4	0.2~0.3	0.5~2		●	●	●									
	DNMG 150608 - UG	0.8	0.2~0.35	1~3	●	●	●	●	●								
-UC Cast iron and Medium roughing	DNMG 150408 - UC	0.8	0.25~0.4	1~3	●	●											
	DNMG 150412 - UC	1.2	0.25~0.45	1.5~3.5	●	●											
	DNMG 150608 - UC	0.8	0.25~0.4	1~3	●	●	●	●									
-UR Roughing	DNMG 150408 - UR	0.8	0.3~0.5	1~3.5		●											
	DNMG 150412 - UR	1.2	0.3~0.5	1.5~4		●											
	DNMG 150612 - UR	1.2	0.3~0.5	1.5~4		●	●	●	●								
-MM Stainless steel Medium	DNMG 150404 - MM	0.4	0.2~0.3	0.5~3				●		●	●						
	DNMG 150408 - MM	0.8	0.2~0.35	1~3.5				●		●	●						
	DNMG 150412 - MM	1.2	0.2~0.4	1.5~3.5				●		●	●						
	DNMG 150604 - MM	0.4	0.2~0.3	0.5~3				●		●	●						
	DNMG 150608 - MM	0.8	0.2~0.35	1~3.5				●		●	●						
DNMG 150612 - MM	1.2	0.2~0.4	1.5~3.5				●		●	●							

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative KNUX (55° - 2 Corners Single Side)



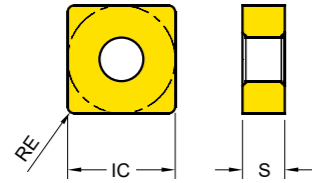
Series	LE	S
KNUX 1604	15	4.76

● : Stock item ○ : Order made item

KNUX	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
..UX Left 	KNUX 160405L	0.5	0.1~0.4	0.5~6			●	●	●	●							
	KNUX 160405R	0.5	0.1~0.4	0.5~6			●	●	●	●							

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative SNMG / SNMA (90° Negative)



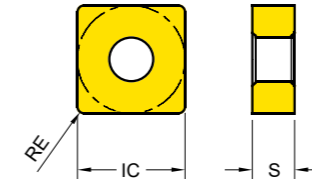
Series	IC	S
SNM□ 1204	12.7	4.76

● : Stock item ○ : Order made item

..MA Cast iron	SNMA SNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
		SNMA 120408	0.8	0.2~0.4	1~3.5	●									
		SNMA 120412	1.2	0.2~0.5	1.5~5	●									
		SNMG 120404 - UF	0.4	0.05~0.2	0.5~1.5					●					
		SNMG 120408 - UL	0.8	0.1~0.3	1~3		●	●	●						
		SNMG 120408 - UG	0.8	0.2~0.4	1~3		●	●	●	●					
		SNMG 120412 - UG	1.2	0.2~0.45	1.5~4		●	●	●						
		SNMG 120408 - UC	0.8	0.25~0.45	1~4	●	●	●	●						
		SNMG 120412 - UC	1.2	0.3~0.55	1.5~4.5	●									

Cutting Speed			Vc (m/min.)																					
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10												
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max								
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-									
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-									
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-									
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-		
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-		
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-	-	
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Turning Inserts - Negative SNMG / SNMA (90° Negative)



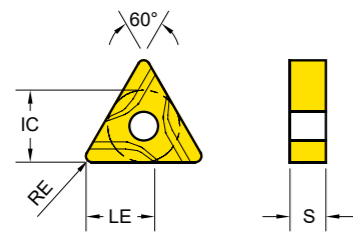
Series	IC	S
SNM□ 1204	12.7	4.76

● : Stock item ○ : Order made item

-UR Roughing	SNMA SNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
		SNMG 120408 - UR	0.8	0.3~0.55	1~4.5		●	●	●						
		SNMG 120412 - UR	1.2	0.3~0.6	1.5~5			●	●	●					
		SNMG 120408 - MF	0.8	0.07~0.25	0.2~1.5						○	○			
		SNMG 120412 - MF	1.2	0.15~0.3	0.2~1.5						○	○			
		SNMG 120408 - MM	0.8	0.2~0.35	1~3.5						○	○			
		SNMG 120412 - MM	1.2	0.2~0.45	1.5~3.5						○	○			
		SNMG 120408 - MR	0.8	0.35~0.5	0.15~5.5						○	○			
		SNMG 120412 - MR	1.2	0.4~0.6	0.15~5.5						○	○			

Cutting Speed			Vc (m/min.)																					
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10												
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max								
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-									
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-									
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-									
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-		
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-		
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative TNUX (60° Negative)

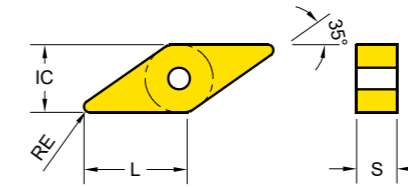


Series	LE	IC	S
TNUX 1604	9.4	9.53	4.76

● : Stock item ○ : Order made item

TNUX	Designation	RE	Fn (mm/rev.)	Ap (mm)												
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
..UX Left	TNUX 160404 L	0.4	0.1~0.3	0.5~4		●	●		●							
	TNUX 160408 L	0.8	0.1~0.4	0.5~6		●	●		●							
..UX Right	TNUX 160404 R	0.4	0.1~0.3	0.5~4		●	●		●							
	TNUX 160408 R	0.8	0.1~0.4	0.5~6		●	●		●							

Turning Inserts - Negative VNMG (35° Negative)



Series	L	IC	S
VNMG 1604	15.8	9.53	4.76

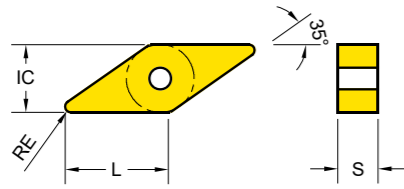
● : Stock item ○ : Order made item

VNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)												
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
..MA Cast iron	VNMA 160408	0.8	0.15~0.35	1~3	●											
-UF Finishing	VNMG 160404 - UF	0.4	0.05~0.15	0.5~2		●	●	●	●							
	VNMG 160408 - UF	0.8	0.05~0.25	1~2.5		●	●	●								
-UL Medium Machining and sticky material	VNMG 160408 - UL	0.8	0.1~0.25	1~2.5		●	●									
-UG Medium Machining at stable condition	VNMG 160408 - UG	0.8	0.2~0.3	1~3	●	●	●	●	●							

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-




Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative VNMG (35° Negative)

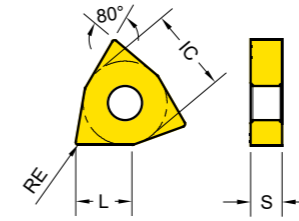


Series	L	IC	S
VNM□1604	15.8	9.53	4.76

● : Stock item ○ : Order made item





VNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UC  Cast iron and Medium roughing	VNMG 160404 - UC	0.4	0.25~0.4	0.5~2.5		●								
	VNMG 160408 - UC	0.8	0.25~0.4	1~3	●	●	●	●						
-UR  Roughing	VNMG 160412 - UR	1.2	0.25~0.35	1.2~3		●	●	●	●					
	VNMG 160404 - MM	0.4	0.2~0.3	0.5~3						○	○			
-MM  Stainless steel Medium	VNMG 160408 - MM	0.8	0.2~0.35	1~3.5						○	○			

Turning Inserts - Negative WNMG / WNMA (80° Trigonal Negative)



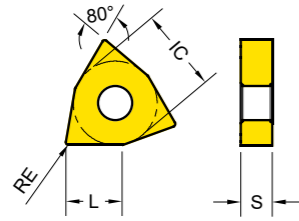
Series	L	IC	S
WNM□0604	5.7	9.53	4.76
WNM□0804	7.8	12.7	4.76

● : Stock item ○ : Order made item

WNMA WNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA  Cast iron	WNMA 080404	0.4	0.15~0.35	0.5~2.5	●									
	WNMA 080408	0.8	0.2~0.4	1~3.5	●	●								
	WNMA 080412	1.2	0.2~0.5	1.5~5	●	●								
-UF  Finishing	WNMG 060404 - UF	0.4	0.05~0.2	0.5~1.5		●	●	●	●					
	WNMG 080404 - UF	0.4	0.05~0.2	0.5~2		●	●	●	●					
	WNMG 080408 - UF	0.8	0.1~0.25	1~2.5		●	●	●						
-UL  Light Machining and sticky material	WNMG 060408 - UL	0.8	0.1~0.3	1~2.5		●	●	●						
	WNMG 080408 - UL	0.8	0.1~0.3	1~3		●	●	●						
-UM  Medium Machining at unstable condition	WNMG 060408 - UM	0.8	0.15~0.2	1~2		●	●							
	WNMG 080408 - UM	0.8	0.15~0.3	1~3	●	●	●	●						
	WNMG 080412 - UM	1.2	0.15~0.3	1.5~3			●							
	WNMG 080416 - UM	1.6	0.15~0.3	2~3.5			●							

Cutting Speed			Vc (m/min.)																						
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-	-	-	-	-	-	-	
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-	-	-	-	-	-	-	
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-	-	-	
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-	-	-	
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-	-	-	
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Turning Inserts - Negative WNMG / WNMA (80° Trigonal Negative)



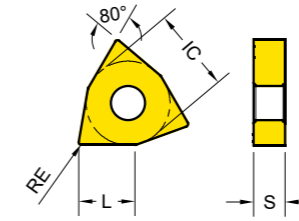
Series	L	IC	S
WNM□0604	5.7	9.53	4.76
WNM□0804	7.8	12.7	4.76

● : Stock item ○ : Order made item

WNMA WNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
-UG Medium Machining at stable condition	WNMG 060408 - UG	0.8	0.2~0.4	1~2.5			●		●								
	WNMG 080404 - UG	0.4	0.2~0.3	1.5~2.5		●	●	●									
	WNMG 080408 - UG	0.8	0.2~0.4	1~3.5	●	●	●	●	●								
	WNMG 080412 - UG	1.2	0.2~0.4	1.5~3.5	●	●	●										
	WNMG 080416 - UG	1.6	0.2~0.4	2~4			●										
-UC Cast iron and Medium roughing	WNMG 080404 - UC	0.4	0.25~0.4	0.5~3.5	●	●	●	●									
	WNMG 080408 - UC	0.8	0.25~0.45	1~4	●	●	●	●									
	WNMG 080412 - UC	1.2	0.3~0.55	1.5~4.5	●	●	●	●									
-UR Roughing	WNMG 080408 - UR	0.8	0.3~0.6	1.2~5	●	●	●	●									
	WNMG 080412 - UR	1.2	0.3~0.6	1.5~5	●	●	●	●	●								
	WNMG 080416 - UR	1.6	0.3~0.6	2~5	●	●											

● : Stock item ○ : Order made item

Turning Inserts - Negative WNMG / WNMA (80° Trigonal Negative)



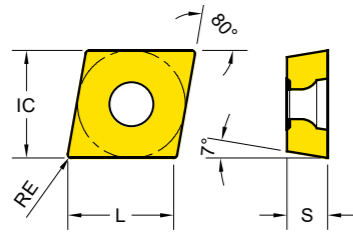
Series	L	IC	S
WNM□0604	5.7	9.53	4.76
WNM□0804	7.8	12.7	4.76

WNMA WNMG	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
-MF Stainless steel Finishing	WNMG 080404 - MF	0.4	0.07~0.25	0.15~1.5												○	○
	WNMG 080408 - MF	0.8	0.07~0.25	0.15~1.5												○	○
-MM Stainless steel Medium	WNMG 080404 - MM	0.4	0.2~0.3	0.5~3												●	●
	WNMG 080408 - MM	0.8	0.2~0.35	1~3.5				●								●	●
	WNMG 080412 - MM	1.2	0.2~0.4	1.5~3.5												●	●
-MR Stainless steel Roughing	WNMG 060412 - MR	1.2	0.2~0.3	1.2~4												●	
	WNMG 080408 - MR	0.8	0.3~0.5	1.2~5												○	○
	WNMG 080412 - MR	1.2	0.3~0.6	1.5~5												○	○

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	350 1200 250 800
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive CCMT / CCGT (80° Positive)



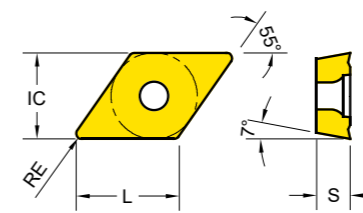
Series	L	IC	S
CCMT 0602	6.2	6.35	2.38
CCMT 09T3	9.2	9.53	3.97
CCMT 1204	12.4	12.7	4.76

● : Stock item ○ : Order made item

CCGT CCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)											
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10	
-AL 	CCGT 09T302 - AL	0.2	0.02~0.08	0.5~1										●	●
	CCGT 09T304 - AL	0.4	0.05~0.25	0.5~2										●	●
	CCGT 09T308 - AL	0.8	0.1~0.35	1~3										●	●
	CCGT 120402 - AL	0.2	0.04~0.15	0.1~1										●	●
	CCGT 120404 - AL	0.4	0.04~0.2	0.3~1.5										●	●
	CCGT 120408 - AL	0.8	0.04~0.2	0.6~2.5										●	●
-UF 	CCMT 060204 - UF	0.4	0.05~0.15	0.5~1.5		●	●								
	CCMT 09T304 - UF	0.4	0.05~0.2	0.5~2		●	●								
-UG 	CCMT 060204 - UG	0.4	0.05~0.25	0.5~2		●			●						
	CCMT 060208 - UG	0.8	0.15~0.25	0.8~2		●			●						
	CCMT 09T304 - UG	0.4	0.15~0.2	0.5~2		●	●		●						
	CCMT 09T308 - UG	0.8	0.15~0.3	0.8~2.5	●	●	●	●	●						
	CCMT 120404 - UG	0.4	0.2~0.25	0.5~2.5		●	●								
	CCMT 120408 - UG	0.8	0.2~0.35	0.8~3.5		●	●	●	●						
CCMT 120412 - UG	1.2	0.2~0.35	1.2~3.5		●										

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	350	1200
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive DCMT / DCGT (55° Positive)



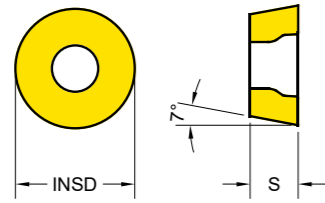
Series	L	IC	S
DCMT 0702	7.5	6.35	2.38
DCMT 11T3	11.2	9.53	3.97

● : Stock item ○ : Order made item

DCGT DCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)												
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
-AL 	DCGT 11T302 - AL	0.2	0.02~0.08	0.5~1											●	●
	DCGT 11T304 - AL	0.4	0.05~0.25	0.5~2											●	●
	DCGT 11T308 - AL	0.8	0.1~0.3	1~2.5											●	●
-UF 	DCMT 070204 - UF	0.4	0.05~0.15	0.5~1.5		●	●									
	DCMT 11T304 - UF	0.4	0.05~0.2	0.5~2		●	●									
	DCMT 11T308 - UF	0.8	0.05~0.25	1~2.5		●	●									
-UG 	DCMT 070204 - UG	0.4	0.15~0.25	0.5~1.5		●	●			●						
	DCMT 070208 - UG	0.8	0.15~0.25	0.8~1.5		●										
	DCMT 11T304 - UG	0.4	0.15~0.25	0.5~2		●	●			●						
DCMT 11T308 - UG	0.8	0.2~0.35	0.8~2.5		●	●	●	●								

Cutting Speed			Vc (m/min.)									
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	350	1200
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive RCMT (Round Positive)

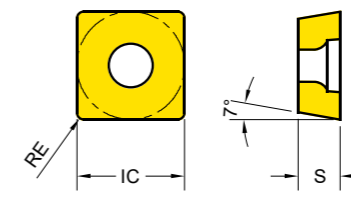


Series	INSD	S
RCMT 0602	6	2.38
RCMT 0803	8	3.18
RCMT 10T3	10	3.97
RCMT 1204	12	4.76

● : Stock item ○ : Order made item

RCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
 General	RCMT 0602M0	3	0.05~0.25	0.2~1.2	●	●	●		●								
	RCMT 0803M0	4	0.05~0.3	0.5~1.5	●	●	●		●								
	RCMT 10T3M0	5	0.1~0.35	0.5~2.5	●	●	●		●								
	RCMT 1204M0	6	0.15~0.45	0.5~3	●	●	●		●								

Turning Inserts - Positive SCMT (Square Positive)



Series	IC	S
SCMT 09T3	9.53	3.97
SCMT 1204	12.7	4.76

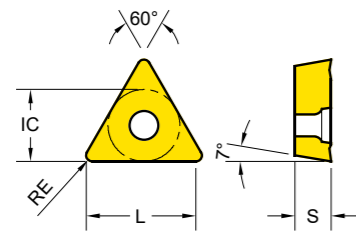
● : Stock item ○ : Order made item

SCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)													
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10			
 Finishing	SCMT 09T304 - UF	0.4	0.1~0.25	0.5~2		●	●										
	SCMT 09T304 - UG	0.4	0.2~0.35	1~2.5	●	●			●								
	SCMT 09T308 - UG	0.8	0.2~0.35	1~2.5	●	●	●		●								
 General	SCMT 120408 - UG	0.8	0.2~0.4	1~3.5		●	●	●									

Cutting Speed			Vc (m/min.)																		
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10									
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max									
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-			
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-			
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-			
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (m/min.)																		
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10									
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max									
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-			
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-			
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-			
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive TCMT / TCGT (Triangle Positive)

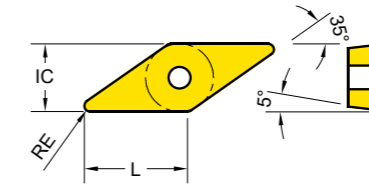


Series	L	IC	S
TCMT 1102	10.3	6.35	2.38
TCMT 16T3	15.6	9.53	3.97

● : Stock item ○ : Order made item

TCGT TCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)											
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10	
-AL Aluminum	TCGT 16T302 - AL	0.2	0.02~0.05	0.5~1										●	●
	TCGT 16T304 - AL	0.4	0.05~0.25	0.5~2										●	●
	TCGT 16T308 - AL	0.8	0.1~0.35	1~3										●	●
-UF Finishing	TCMT 110204 - UF	0.4	0.05~0.2	0.5~2		●	●								
	TCMT 16T304 - UF	0.4	0.05~0.25	0.5~3		●	●		●						
	TCMT 16T308 - UF	0.8	0.05~0.25	0.8~3		●	●								
-UG General	TCMT 110204 - UG	0.4	0.15~0.25	0.5~1.5										●	
	TCMT 110208 - UG	0.8	0.15~0.25	0.8~2		●									
	TCMT 16T304 - UG	0.4	0.15~0.25	0.5~2		●	●								
	TCMT 16T308 - UG	0.8	0.2~0.35	0.8~3	●	●	●	●	●						

Turning Inserts - Positive VBMT (35° Positive)



Series	L	IC	S
VBMT 1604	15.8	9.53	4.76

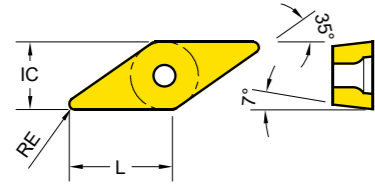
● : Stock item ○ : Order made item

VBMT	Designation	RE	Fn (mm/rev.)	Ap (mm)											
					YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10	
-UF Finishing	VBMT 160404 - UF	0.4	0.05~0.2	0.5~2		●	●								
	VBMT 160408 - UF	0.8	0.05~0.25	0.5~3		●	●								
-UG General	VBMT 160404 - UG	0.4	0.15~0.25	0.5~2.5		●	●		●						
	VBMT 160408 - UG	0.8	0.2~0.4	1~3		●	●	●	●						

Cutting Speed			Vc (m/min.)																			
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10										
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max										
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-				
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-				
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-				
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (m/min.)																			
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10										
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max										
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-	-	-	-	-				
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-	-	-	-	-				
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-	-	-	-	-				
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230	110	180	80	150	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200	40	130	30	120	-	-	-	-
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	1200	250	800
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	35	80	-	-	30	90	20	40	20	40	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive
VCMT / VCGT (35° Positive)



Series	L	IC	S
VCMT 1604	15.8	9.53	4.76

●: Stock item ○: Order made item

VCMT	Designation	RE	Fn (mm/rev.)	Ap (mm)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-AL Aluminum	VCMT 160402 - AL	0.2	0.02~0.05	0.5~1									●	●
	VCMT 160404 - AL	0.4	0.05~0.25	0.5~2									●	●
	VCMT 160408 - AL	0.8	0.1~0.35	1~3									●	●
-UF Finishing	VCMT 160404 - UF	0.4	0.05~0.25	0.5~3			●							
	VCMT 160408 - UF	0.8	0.1~0.35	1~3										
-UG General	VCMT 160404 - UG	0.4	0.2~0.4	0.5~2.5					●					
	VCMT 160408 - UG	0.8	0.2~0.4	1~3			●		●					



PARTING & GROOVE TURN

Parting & Groove Turn Overview
Parting & Groove Turn Inserts (TD.)

Cutting Speed			Vc (m/min.)											
ISO	VDI	Sub Group	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-alloyed steel	220	480	170	450	180	380	150	350	120	200	-	-
	6~9	Low-alloyed steel	220	420	180	380	110	350	90	300	70	200	-	-
	10~11	High-alloyed steel	-	-	100	330	60	300	70	250	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	120	230	-	-	130	230
	14	Austenitic stainless steel	-	-	-	-	-	-	80	200	-	-	100	200
K	15~16	Grey cast iron	170	420	120	300	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	120	410	120	280	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	350	1200
S	31~37	Superalloys & Titanium	-	-	-	-	35	80	-	-	30	90	20	40
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-

Parting & Groove Turn

Parting & Groove Turn Overview

Parting & Groove Turn Grades

Parting and Grooving Grades	P Steel				M Stainless steel			K Cast iron			N Non Ferrous		S Super Alloy	
	P10	P20	P30	P40	M10	M20	M30	K10	K20	K30	N10	N20	S10	S20
PVD YG602G (YG602)		602G			602G			602G					602G	

YG602G
(YG602)

P20 - P35 M20 - M40
K20 - K40 S15 - S25

PVD - TiAlN

Universal grade for Parting & Groove Turn

- Ultra Dense PVD Coating with optimal thermal resistance & strength
- Sub-Micron substrate designed for demanding application
- YG602G : First Choice Universal Grade for Parting & Groove Turn
- YG602 : Black version upon request

Parting & Groove Turn Inserts

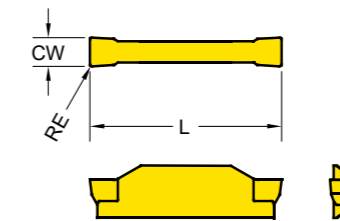
Inserts	TD. Series	2, 3, 4

Parting & Groove Turn Chipbreakers

-P TDP			• Parting & Grooving (Positive)
-N TDN			• Parting & Grooving (General)
-Y TDY			• Groove Turn

Parting & Groove Turn - Inserts

Parting & Groove Turn Inserts (TD.)

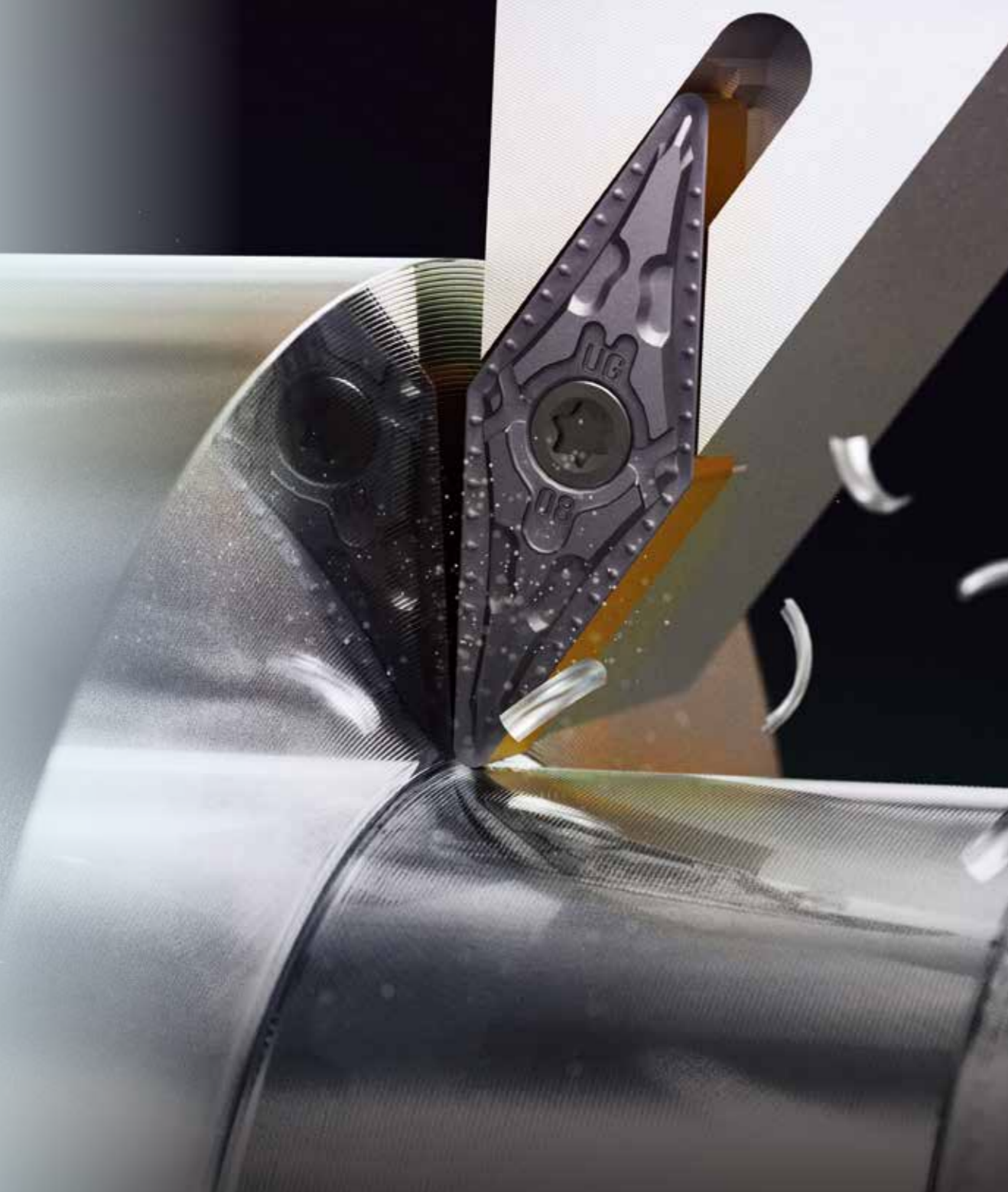


Series	L	CW
TD□2	20	2
TD□3	20	3
TD□4	20	4

● : Stock item ○ : Order made item

TD.	Designation	RE	Parting & Grooving		Groove Turn		YG602	YG602G
			Fn (mm/rev.)	Tmax (mm)	Fn (mm/rev.)	Ap (mm)		
TDP Parting & Grooving (Positive)	TDP 2002	0.2	0.04~0.12	19	-	-	○	●
	TDP 3002	0.2	0.05~0.16	19	-	-	○	●
	TDP 4003	0.3	0.06~0.18	19	-	-	○	●
TDN Parting & Grooving (General)	TDN 2002	0.2	0.06~0.18	19	-	-	○	●
	TDN 3002	0.2	0.07~0.22	19	-	-	○	●
	TDN 4003	0.3	0.08~0.25	19	-	-	○	●
TDY Groove Turn	TDY 3 E - 0.4	0.4	0.10~0.20	19	0.10~0.38	0.5~2.2		●
	TDY 4 E - 0.4	0.4	0.15~0.26	19	0.10~0.40	0.5~2.8		●

Cutting Speed			Vc (m/min.)	
ISO	VDI	Sub Group	YG602G (YG602)	
			Min.	Max.
P	1~5	Non-alloyed steel	90	180
	6~9	Low-alloyed steel	80	120
	10~11	High-alloyed steel	80	110
M	12~13	Ferritic & martensitic stainless steel	70	160
	14	Austenitic stainless steel	55	140
K	15~16	Grey cast iron	110	185
	17~18	Nodular cast iron	110	140
N	21~30	Non-ferrous metals (al)	250	440
S	31~37	Superalloys & Titanium	25	45
H	38~41	Hard materials	25	50



TECHNICAL INFORMATION

ISO 13399 Terms
 Hardness Conversion Table
 Material Groups
 Comparison Chart - Turning Grades
 Comparison Chart - Turning Chipbreakers

Technical Information ISO 13399 Terms

AN	Clearance angle major	INSL	Insert diameter
APMX	Depth of cut maximum	KAPR	Tool cutting edge angle
AS	Clearance angle wiper edge	KRINS	Cutting edge angle major
B	Shank width	KWW	Keyway width
BS	Wiper edge length	L	Cutting edge length
CBDP	Connection bore depth	LE	Cutting edge effective length
CDX	cutting depth maximum	LF	Functional length
CW	Cutting width	LH	Head length
CZC	Connection size code	LS	Shank length
DC	Cutting diameter	LU	Usable length
DCON	Connection diameter	LUX	Usable length maximum
DCSFMS	Contact surface diameter machine side	M	m-dimension
DCX	Cutting diameter maximum	OAL	Overall length
DMIN	Minimum bore diameter	RE	Corner radius
DMM	Shank diameter	RMPX	Maximum ramping angle
EPSR	Insert included angle	RPMX	Rotational speed maximum
H	Shank height	S	Insert thickness
HAND	Hand	TDZ	Thread diameter size
IC	Inscribed circle diameter	WF	Functional width
INSD	Insert length	ZEFP	Peripheral effective cutting edge count

Technical Information

Hardness Conversion Table

HB	HRC	HRB	HV	N/mm ²
199	15	93	199	667
203	16	94	201	680
208	17	95	210	696
212	18	95	218	706
216	19	96	222	716
223	20	97	227	755
229	21	98	235	775
233	22	99	241	794
240	23	100	247	824
245	24	100	252	838
250	25	101	255	853
255	26	102	258	870
262	27	103	262	880
264	28	103	271	892
271	29	104	277	941
277	30	105	285	971
290	31	106	292	990
300	32	107	303	1020
308	33	107	311	1035
314	34	108	320	1049
322	35	108	332	1089
331	36	109	342	1118
341	37	109	351	1157
348	38	110	361	1187
360	39	111	376	1236
373	40	111	388	1265
375	41	112	393	1314
388	42	113	406	1363
402	43	114	424	1390
415	44	114	438	1422
419	45	114	448	1447
430	46	115	458	1471
445	47	115	474	1520
456	48	116	490	1569
468	49	117	497	
469	50	117	505	
486	51	118	531	
504	52	118	549	
513	53	119	567	
534	54	120	589	
552	55		649	
572	56		694	
592	57		727	
601	58		746	
613	59			
627	60			
642	61			
658	62			
681	63			
695	64			
HB	HRC	HRB	HV	N/mm ²

Technical Information

Material Groups

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRC	Examples	Page
P	1	Non-alloyed steel	About 0.15% C Annealed	125		S15C, C15, 1015	52
	2		About 0.45% C Annealed	190	13	S45C, C45, 1045	
	3		About 0.45% C Quenched & tempered	250	25		
	4		About 0.75% C Annealed	270	28	SK5, Ck75, 1080	
	5		About 0.75% C Quenched & Tempered	300	32		
	6	Low-alloyed Steel		180	10	SCM440, 42CrMo4, 410	
	7		Quenched & Tempered	275	29		
	8		Quenched & Tempered	300	32		
	9		Quenched & Tempered	350	38		
	10	High-alloyed steel, and tool steel		200	15	SKD, D2	
	11		Quenched & Tempered	325	35	SKH, SUH, M42	
M	12	Stainless Steel	Ferritic / Martensitic Annealed	200	15	SUS 420, X40Cr13, 420	59
	13		Martensitic Quenched & Tempered	240	23		
	14		Austenitic	180	10	SUS 316, 316, X5CrNiMo 17 12 2	
K	15	Grey cast iron	Pearlitic / Ferritic	180	10	FC, GG, EN-GJL-250	61
	16		Pearlitic (Martensitic)	260	26		
	17	Nodular cast iron	Ferritic	160	3	FCD, GGG, EN-GJS-500-7	
	18		Pearlitic	250	25		
	19	Malleable cast iron	Ferritic	130		FCMW, FCMP, GTS, GJMB350-10	
20	Pearlitic		230	21			
N	21	Aluminum-wrought alloy	Not Curable	60		SAE 1000, AIMg 1, 3.3315	63
	22		Curable Hardened	100		SAE 7050, AlCuMg 1, 3.1325	
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75		ADC12, G-AISi12, 3.2581	
	24		≤ 12% Si, Curable Hardened	90		C4BS, G-AISi10Mg, 3.2381	
	25		> 12% Si, Not Curable	130			
	26		Cutting Alloys, PB>1%	110		CuZn36Pb 3, 2.0375	
	27	Copper and copper alloys (Bronze / Brass)	CuZn, CuSnZn (Brass)	90		CuZn 15, 2.0240	
	28		CuSn, lead-free copper and electrolytic copper	100		G-CuZn40Fe, 2.0590	
	29	Non-metallic materials	Duroplastic, Fiber Reinforced Plastic			CFRP	
	30		Rubber, Wood, etc.				
S	31	Heat resistant super alloys	Fe Based Annealed	200	15	X12 NiCrSi 36-16, 1.4864	65
	32		Aged	280	30		
	33		Annealed	250	25	Inconel 718, NiCr20TiAl, 2.4631	
	34		Ni or Co Based Aged	350	38	NiCu30Al, 2.4375	
	35		Cast	320	34	G-X120Mn12, 1.3401	
	36	Titanium alloys	Pure Titanium	400 Rm			
	37		Alpha + Beta Alloys Hardened	1050Rm		TiAl6V4, 3.7165	
H	38	Hardened steel		550	55	SK3	67
	39			630	60		
	40	Chilled cast iron		400	42		
	41	Hardened cast iron		550	55		

Technical Information Material Groups

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	HB	HRC				
															Material Description		Composition / Structure / Heat Treatment	
													K	VDI 3323 19	Malleable cast iron	Ferritic	130	
0.8135	FCMW330	GTS-35	32510	B 340-12	GJMB350-10	MN 35-10	0815	GMN 35	GTS35		Kc 35-10							

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	HB	HRC				
															Material Description		Composition / Structure / Heat Treatment	
													K	VDI 3323 20	Malleable cast iron	Pearlitic	230	21
0.8145	FCMW370	GTS-45	A220-40010	P 440-7	GJMB450-6	MN 450	0852	GMN 45										
0.8155	FCMP490	GTS-55	50005	P 510-4	GJMB-550-4	MP 50-5	0854	GMN 55			Kc 60-3							
0.8165	FCMP590	GTS-65	70003	P 570-3	GJMB-650-2	MN 650-3	0856	GMN 65										
0.8170	FCMP690	GTS-70	90001	P 690-2	GJMB-700-2	MN 700-2	0862	GMN 70			Kc 70-2							

Technical Information Material Groups

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	HB	HRC				
															Material Description		Composition / Structure / Heat Treatment	
													N	VDI 3323 21	Aluminum-wrought alloy	Not Curable	60	
3.0205		A199	A199															
3.0255	(A1050)	A199.5	1000	L31		A59050C					D1							
3.3315		AlMg1																

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	HB	HRC				
															Material Description		Composition / Structure / Heat Treatment	
													N	VDI 3323 22	Aluminum-wrought alloy	Curable, Hardened	100	
3.1325		AlCuMg1											AD35					
3.1655	A2011	AlCuSiPb																
3.2315		AlMgSi1											AK9					
3.4345		AlZnMgCu0,5	7050	L86		AZ4GU/9051		811-04										
3.4365	7075	AlZnMgCu1,5	7075	7075		7075		AlZn5.8MgCuCr			B95							

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	HB	HRC				
															Material Description		Composition / Structure / Heat Treatment	
													N	VDI 3323 23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75	
3.2163		G-AlSi9Cu3											VAL8					
3.2382		GD-AlSi10Mg																
3.2383		G-AlSi0Mg(Cu)	A360.2	LM9			4253											
3.2581		G-AlSi12																
3.3561		G-AlMg5																
3.5101		G-MgZn4sE1Zr1	ZE41	MAG5														
3.5103		MgSE3Zn27r1	EZ33	MAG6		G-TR3Z2												
3.5812		G-MgAl8Zn1	AZ81	NMAG1														
3.5912		G-MgAl9Zn1	AZ91	MAG7														
			A356-72	2789		NFA32-201												
A5052		G-AlSi12	356.1	LM25			4244					AK7						
		G-AlSi12	A413.2	LM6			4261											
ADC12		G-AlSi12(Cu)	A413.1	LM20			4260					AK12						
A6061		GD-AlSi12	A413.0				4247											
A7075		GD-AlSi8Cu3	A380.1	LM24			4250											

Technical Information Material Groups

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
S VDI 3323 35 Heat resistant super alloys Ni or Co Based, Cast HB 320 HRc 34													
2.4669		NiCr15Fe7TiAl				NC15TNbA					N07750		Inconel X750
2.4685		G-NiMo28									N10665		Hastelloy B
2.4810		G-NiMo30											Hastelloy C
2.4973		NiCr19Co11MoTi	AMS 5399			NC19KDT					VT5-1		
3.7115		TiAl5Sn2									R54520	VT1-00	ATI Grade 6

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
S VDI 3323 36 Titanium alloys Pure Titanium HB 400 Rm													
2.4674		NiCo15Cr10MoAlTi	AMS 5397								N13100		IN 100
3.7025		Ti1	R50250	2TA1							R50250		ATI 30 CP Gr. 1
3.7225		Ti1pd	R52250	TP1							R52250		

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
S VDI 3323 37 Titanium alloys Alpha + Beta Alloys, Hardened HB 1050 Rm													
3.7124		TiCu2		2TA21-24									
3.7145		TiAl6Sn2Zr4Mo2Si	R54620								R54620		
3.7165		TiAl6V4	AMS R56400	TA10-13		T-A6V						VT6	
3.7185		TiAl4Mo4Sn2		TA45-51									
3.7195		TiAl3V2.5									R56320		ATI 3-2.5
		TiAl4Mo4Sn4Si0.5											
		TiAl5Sn2.5	AMS R54520	TA14/17		T-A5E							
		Ti6Al4VELI	AMS R56401	TA11									

Technical Information Material Groups

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
H VDI 3323 38 Hardened steel Hardened HB 550 HRc 55													
1.1231	S 70 C-CSP	Ck 67	1070	060 A 67	C 67S	XC 68	1770	C 70	F.5103		70		
1.1248	C 75	Ck 75	1078, 1080	060 A 78	C 75S	XC 75	1774	C 75	F.5107		75		
1.1274	SUP 4	Ck 101	1095	060 A 96	C 100S	XC100	1870	C100	F.5117				
1.1545	SK 3	C 105 W1	W1	BW 2	C 105U	Y1 105	1880	C 100 KU	F.5118		U10A		
1.2762		75CrMoNiW67	-	-	-	-	-	-	-		-		
1.3401	SCMnH1	GX120Mn12	A128(A)			Z120M12	2183	GX120Mn12	F.8251		110G13L		
1.4021	SUS 420 J1	X 20 Cr 13	420	420 S 37	X 20 Cr 13	Z 20 C 13	2303	X 20 Cr 13	F.5261		20KH13	ATI 420	
1.4109	SUS 440 A	X 65 CrMo 14	440 A	-	X 70 CrMo 15	Z 70 D 14	-	-	-		-	ATI 440A	
1.4112	SUS 440 B	X 90 CrMoV 18	440 B	409 S 19	X 90 CrMoV 18	Z 2 CND 18 05	2327	X CrTi 12					
1.4125	SUS 440 C	X 105 CrMo 17	440 C	-	X 105 CrMo 17	Z 100 CD 17	-	X 105 CrMo 17			95KH18	ATI 440C	
1.6746		32NiCrMo14-5	-	832M31	32nicRm0145	35NCD14	-	-					
1.7176	SUP9(A)	55Cr3	5155	527A60	48	55C3	2253	55Cr3					
1.7225	SCM 440 (H)	42CrMo4	4140	708 M 40	42 CrMo 4	42 CD 4	2244	42 CrMo 4	F.1252		38HM		

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
H VDI 3323 40 Chilled cast iron Cast HB 400 HRc 42													
0.9620		GX260NiCr42	A532 IB	Grade 2 A	GJN-HV520	FB Ni4 Cr2 BC	0512	-		F45001		Ni-Hard2	
0.9625		GX330NiCr42	A532 IA	Grade 2 B	GJN-HV550	FB Ni4 Cr2 HC	0513	-		F45000		Ni-Hard1	
0.9630		GX300 CrNiSi 9 5 2	A532 ID	Grade 2 C	GJN-HV600	FB Cr9 Ni5	0457	-		F45003		Ni-Hard 4	
0.9640		GX300CrMoNi1521	-	-	-	-	-	-		F45005			
0.9650		GX260Cr27	-	Grade 3 D			0466	-					
0.9655		GX300CrNiMoZ71	-	Grade 3 E			-	-			20C 25N20S2		
1.4841	SUH 310	X15CrNiSi25-20	310	314S31	X 15 CrNiSi 25 20	Z15CrNiSi25-20	-	-		S31400		Cronifer 2520	

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS			GOST
H VDI 3323 41 Hardened cast iron Hardened HB 550 HRc 55													
0.9635		GX300 CrMo 15 3	-	-	-	-	-	-					
0.9645		GX260 CrMoNi 20 21	-	-	-	-	-	-		F45007			



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* For the more information on sales network, please contact the head office as below;

YG-1 HEAD OFFICE 211, Sewolcheon-ro, Bupyeong-gu, Incheon, South Korea
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