

YU-TU19

INCH



TURNING

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YG
TURN

ISO Turning
Parting & Groove Turn



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ISO TURNING

- Product Overview
- Application Guide
- Turning Inserts Overview
- Turning Inserts

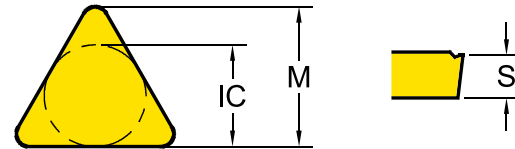
Insert ISO Code System

*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
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 (inch)	Nose Height M (inch)	Thickness S (inch)
E	±.001	±.0010	±.001
G	±.001	±.0010	±.005
K*	±.002~.006*	±.0005	±.005
M*	±.002~.006*	±.003~.010*	±.005
U*	±.003~.010*	±.005~.015*	±.005

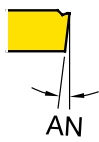
*Tolerance is different by insert IC size. Please see ISO 1832

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



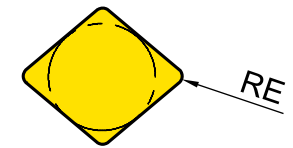
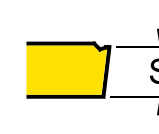
Insert ISO Code System

*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 (inch)	Inch
06	11	06	07	11			1/4	2
07							5/16	2.5
09	16	09	11	16	06	09 (00)	3/8	3
12	22	12	15	22	08	12 (00)	1/2	4
15		16					5/8	5
		19					3/4	6
						06 (M0)	.236	
						08 (M0)	.315	
						10 (M0)	.394	
						12 (M0)	.472	
						16 (M0)	.630	



6 - Insert Thickness (S)

Metric	Thickness - S (inch)	Inch
T1	5/64	1.2
02	3/32	1.5
03	1/8	2
T3	5/32	2.5
04	3/16	3
05	7/32	3.5
06	1/4	4
07	5/16	5

7 - Corner Radius (RE)

Metric	Corner Radius - RE (inch)	Inch
01	.004	0
02	.008	0.5
04	1/64	1
08	1/32	2
12	3/64	3
16	1/16	4
20	5/64	5
24	3/32	6

Product Overview

Turning Grades

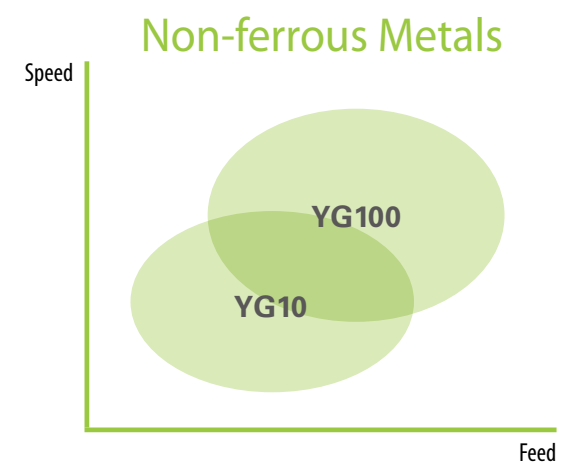
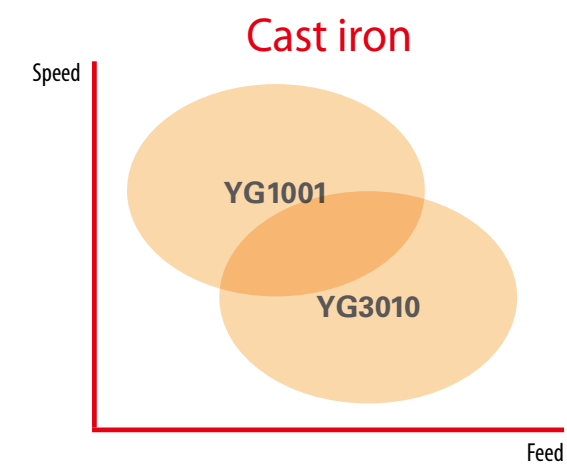
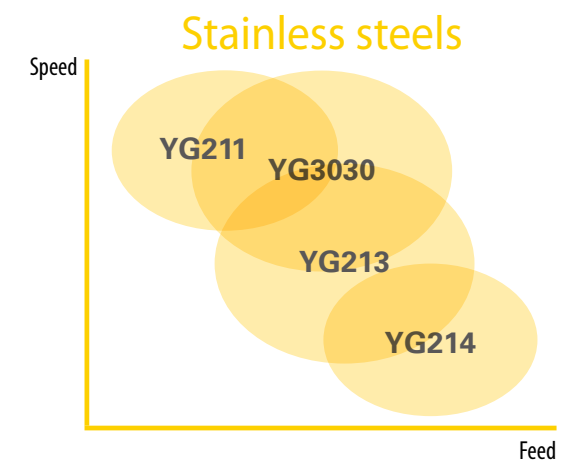
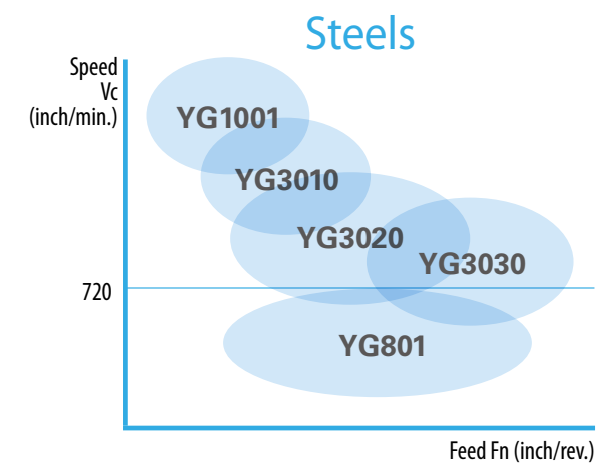
Turning Grades		P Steel				M Stainless steel			K Cast iron			N Non-ferrous		S Superalloys	
		P10	P20	P30	P40	M10	M20	M30	K10	K20	K30	N10	N20	S10	S20
CVD	YG1001	1001							1001						
	YG3010	3010							3010						
	YG3020		3020												
	YG3030			3030		3030									
PVD	YG801		801												
	YG211					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 - 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 - 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 - 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 - Heavy interrupted cut for Steel - High cutting speed for Stainless steel
YG801 P10 - P30		for Carbon Steel with Low cutting speed - 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 - 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 - Substrate consisted of submicron carbide for high wear resistance - Shining surface to prevent built up edge

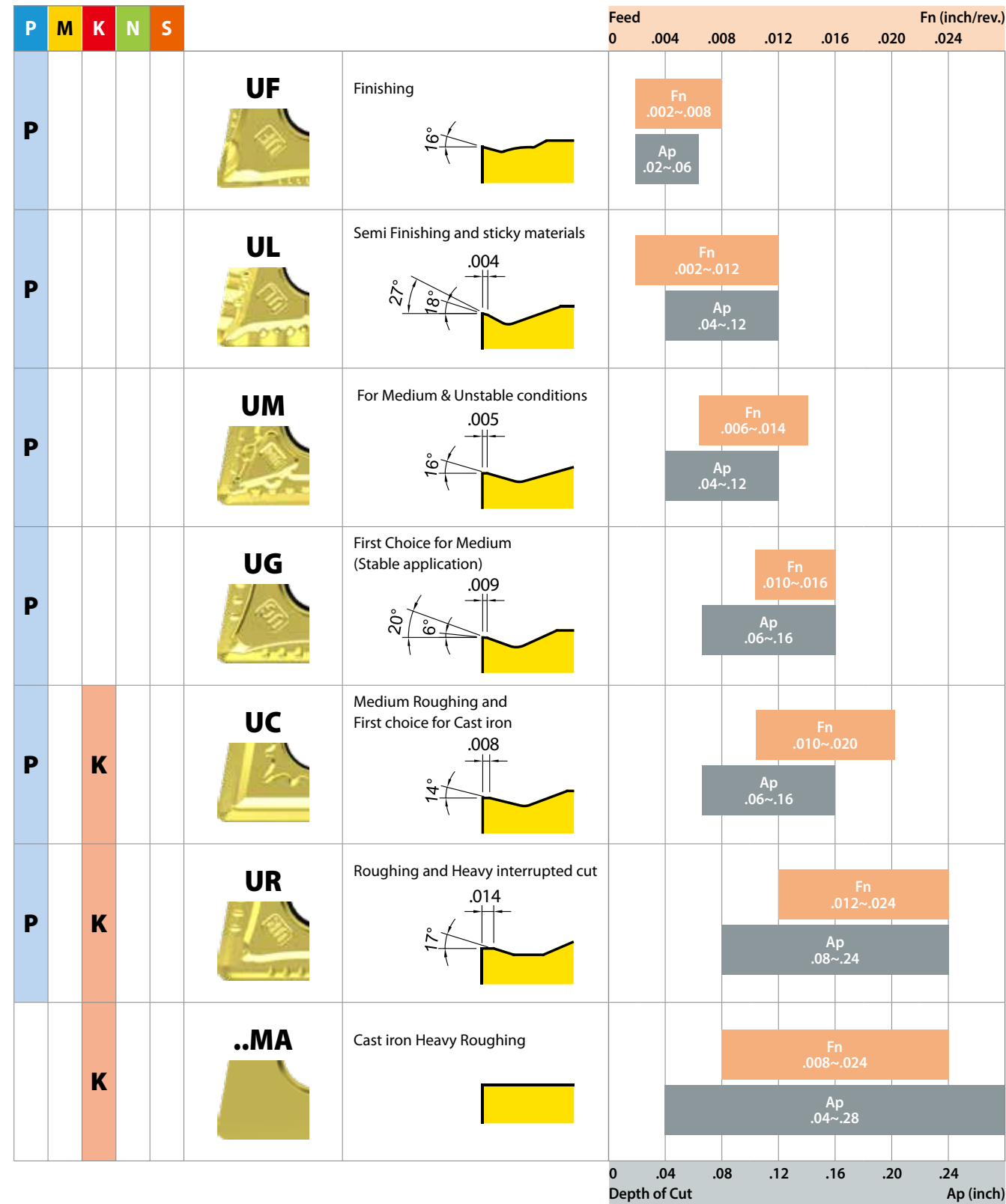
Product Overview

Turning Grade Map

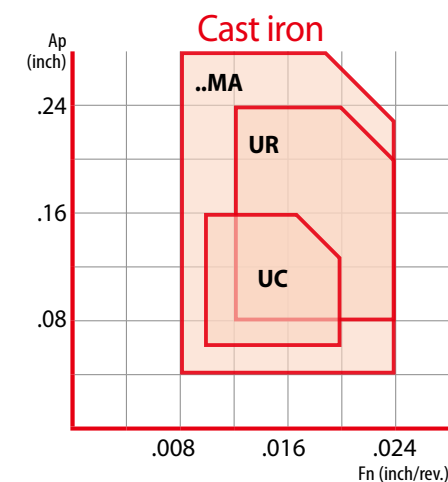
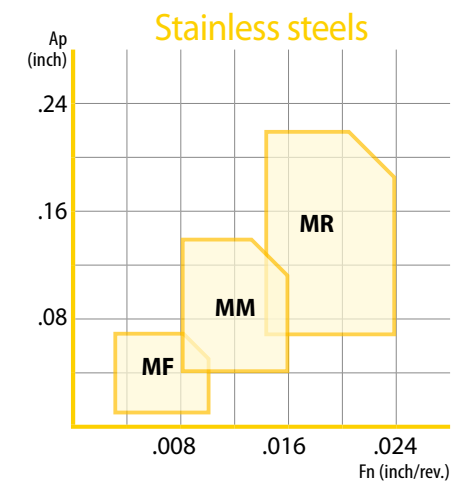
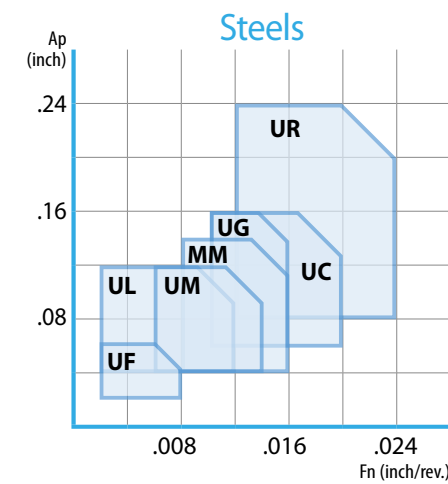
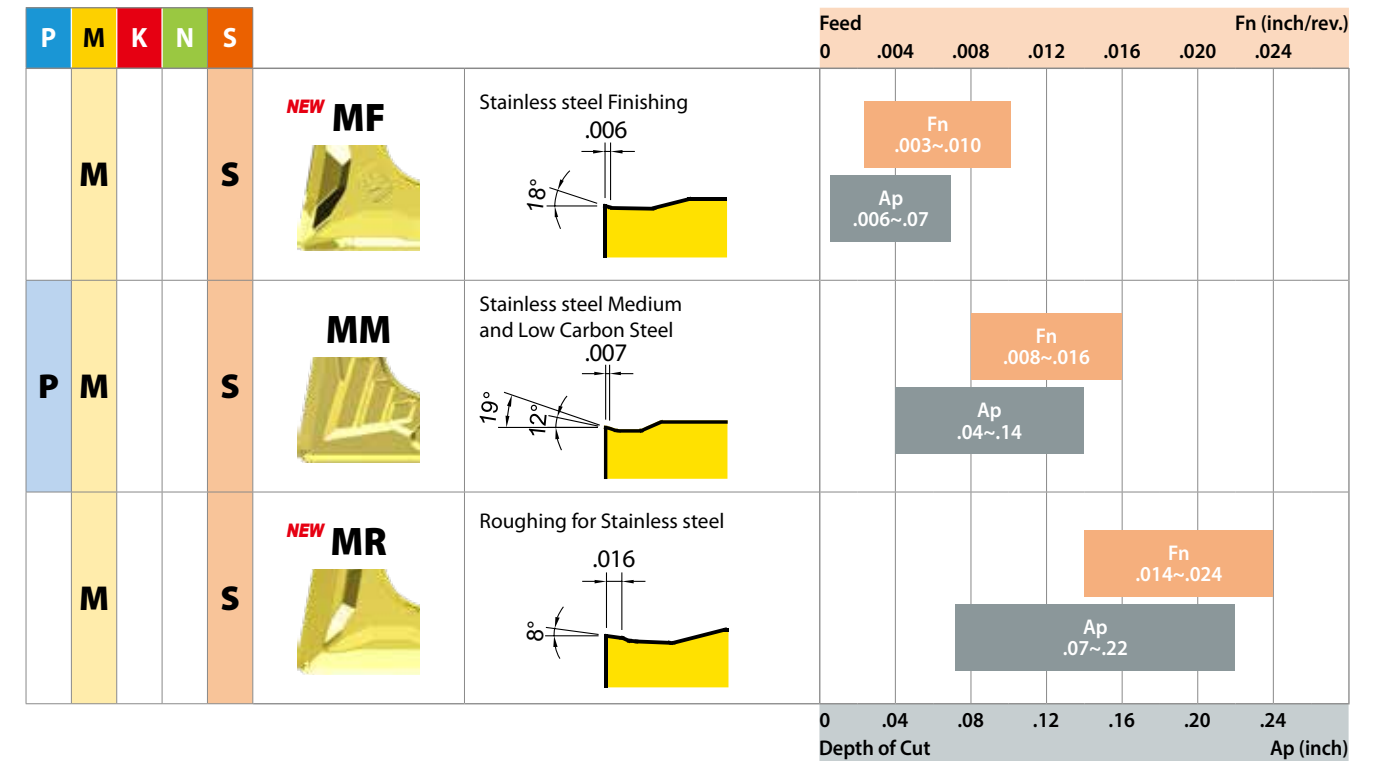
NEW YG211 M05 - M25 S05 - S20		High wear resistance grade for Super alloys and Stainless steel - Finishing Stainless steel - Finishing Super alloys and Titanium
NEW YG213 M20 - M35 S15 - S25		First Choice Grade on low cutting speed of Stainless steel - First choice on Stainless steel for Low cutting speed - For Medium to low cutting speed
NEW YG214 M30 - M40 S25 - S30		Heavy Interrupted cut for Stainless steel - For Heavy Interrupted cut on Stainless steel - Minimize risk of Mechanical fracture or Chipping



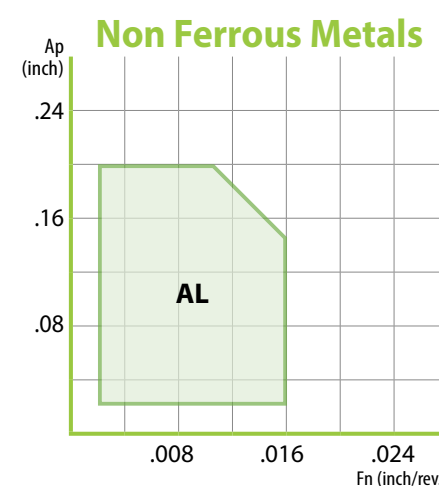
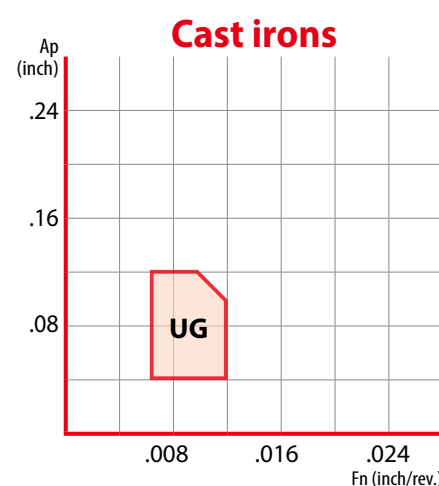
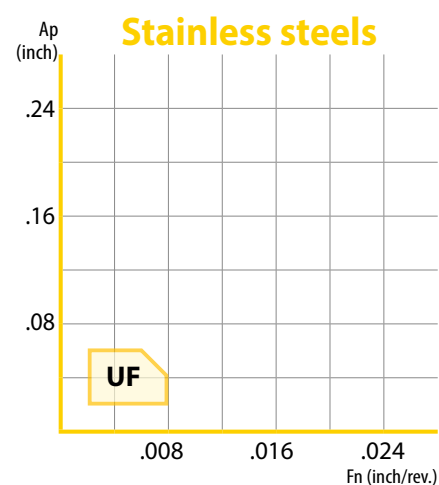
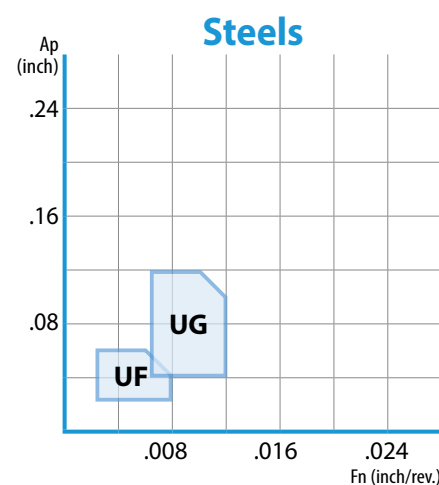
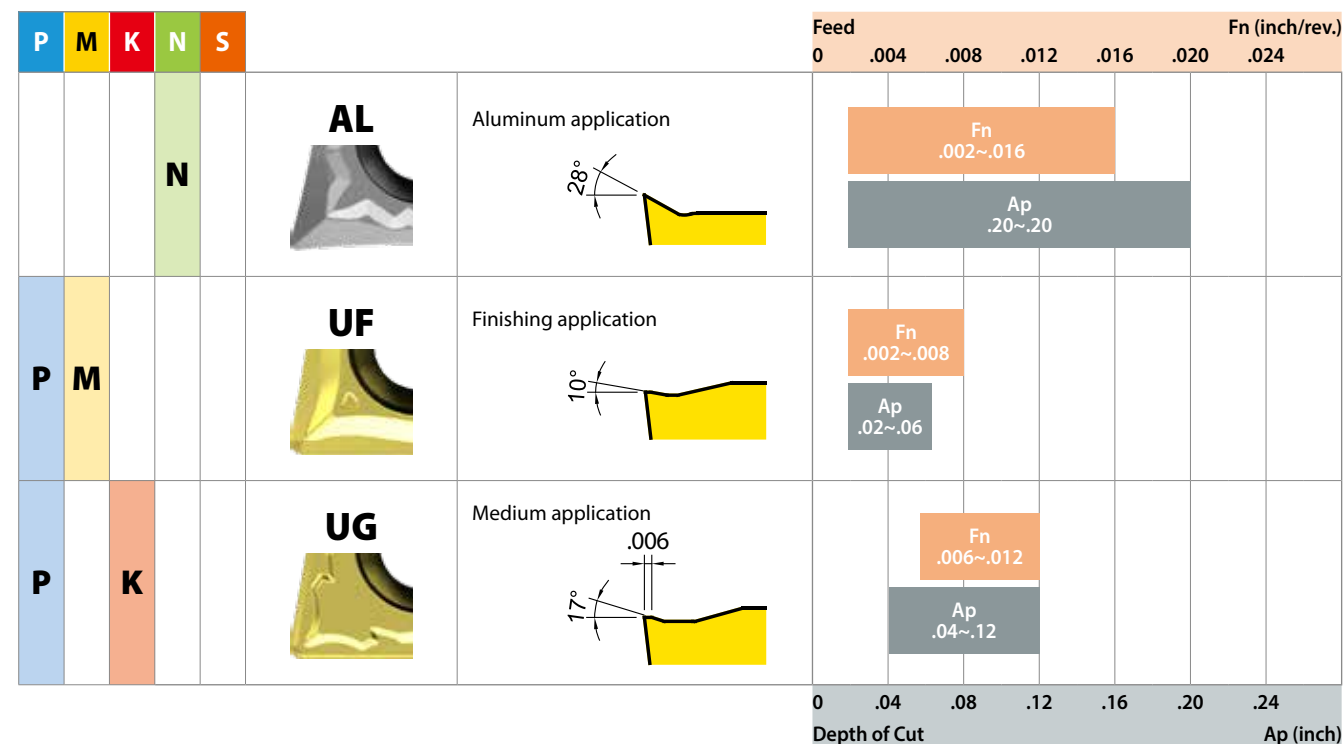
Turning Chipbreakers - Negative



Turning Chipbreakers - Negative

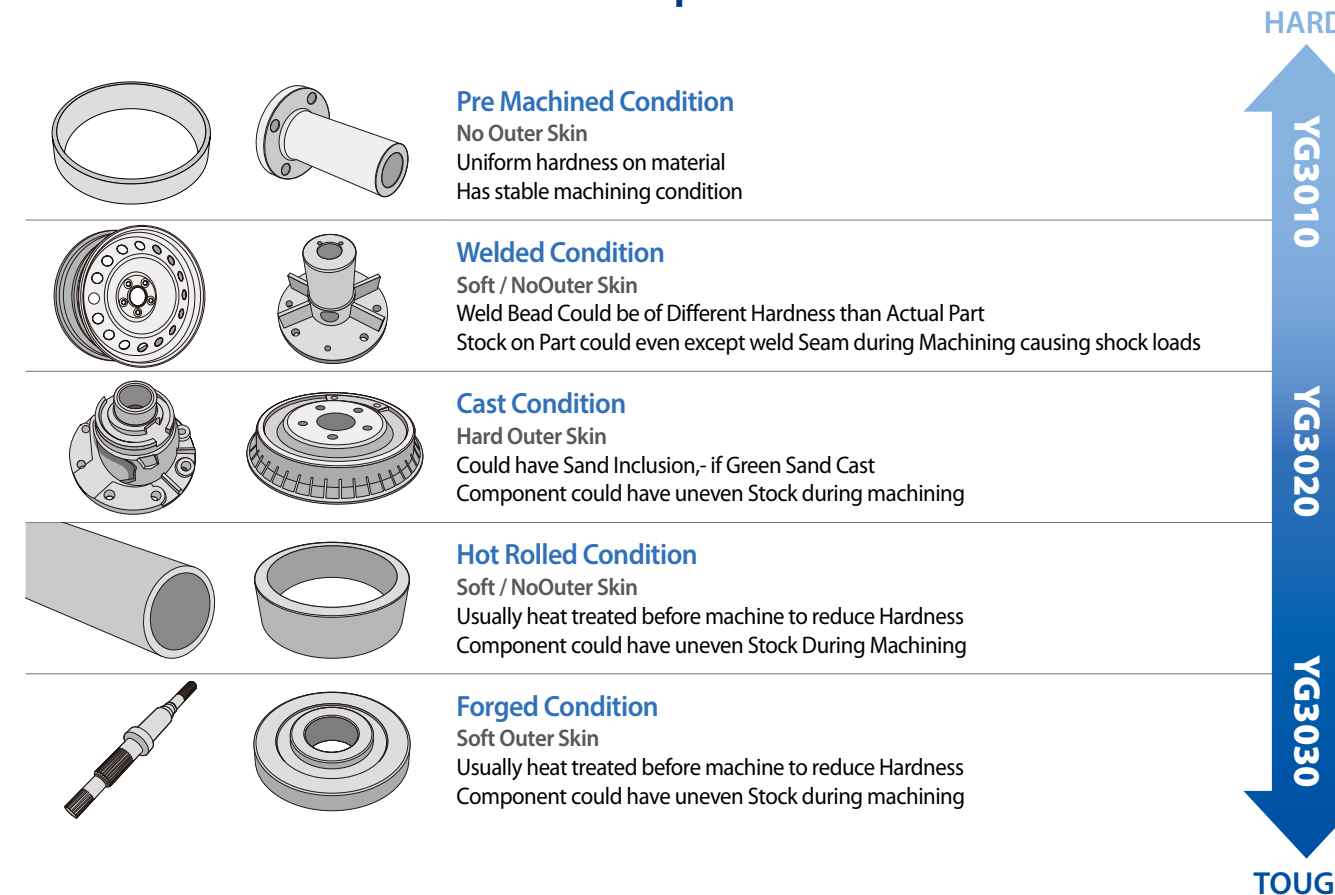


Turning Chipbreakers - Positive

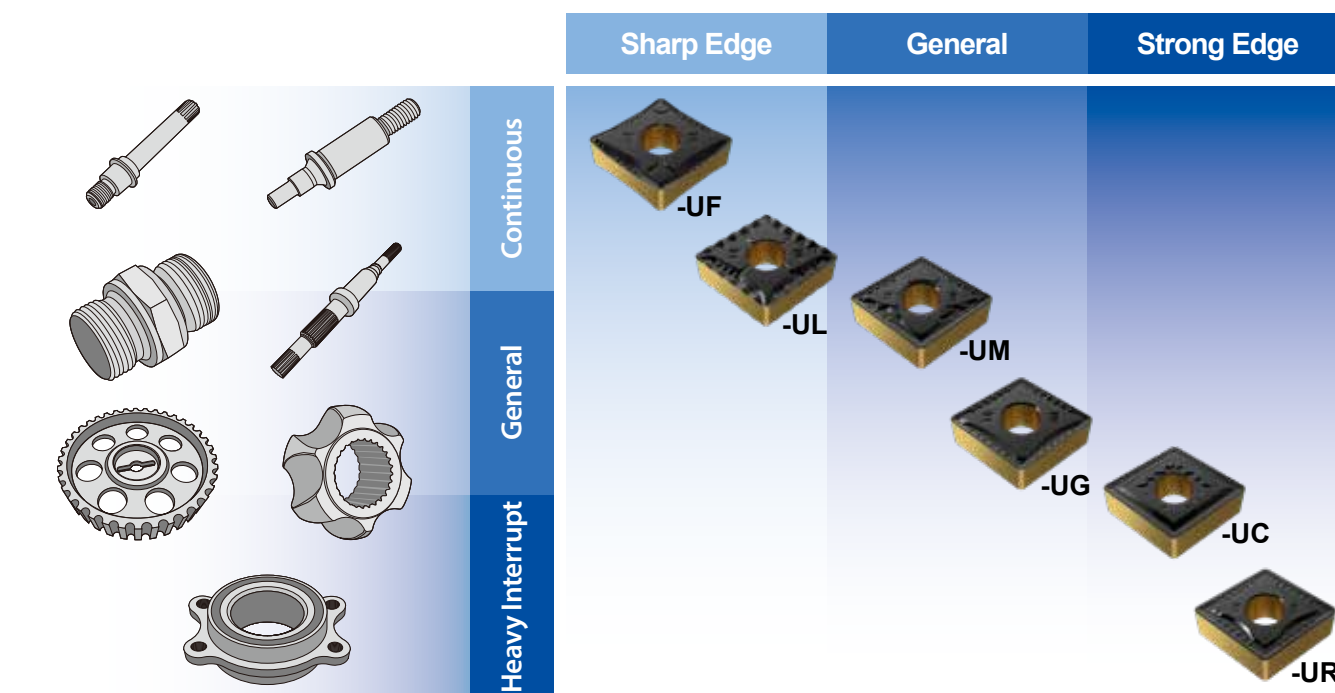


Steel Guide

Grade Recommendation based on Workpiece Material Condition



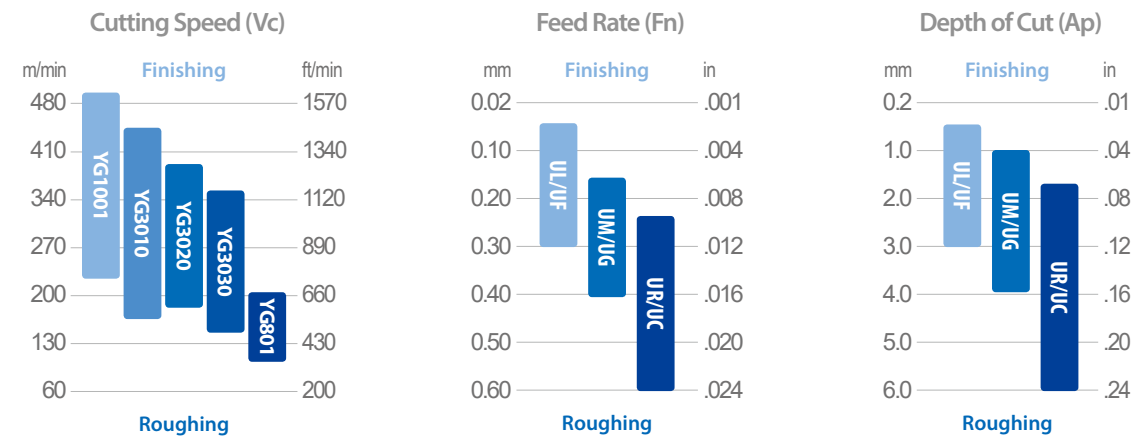
Chipbreaker, Feed Rate and Depth of Cut



Application Guide

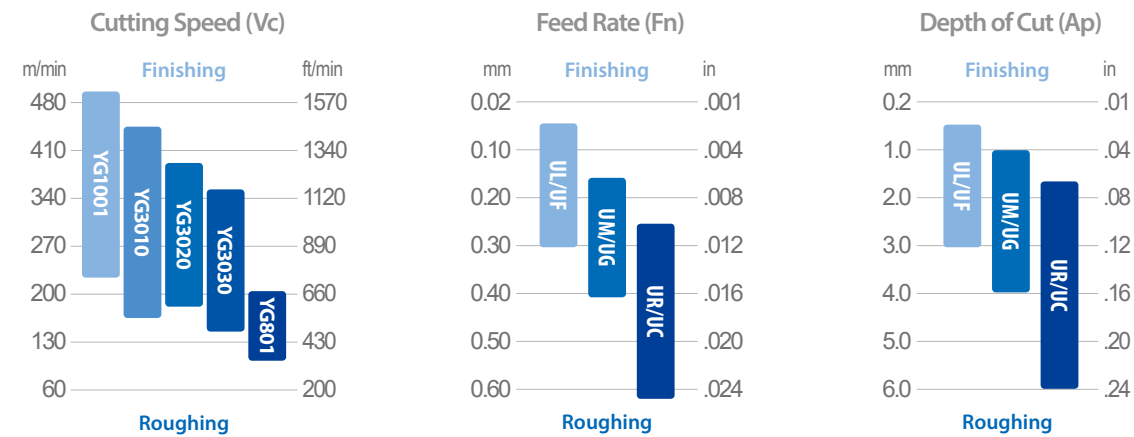
Steel Guide

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)

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

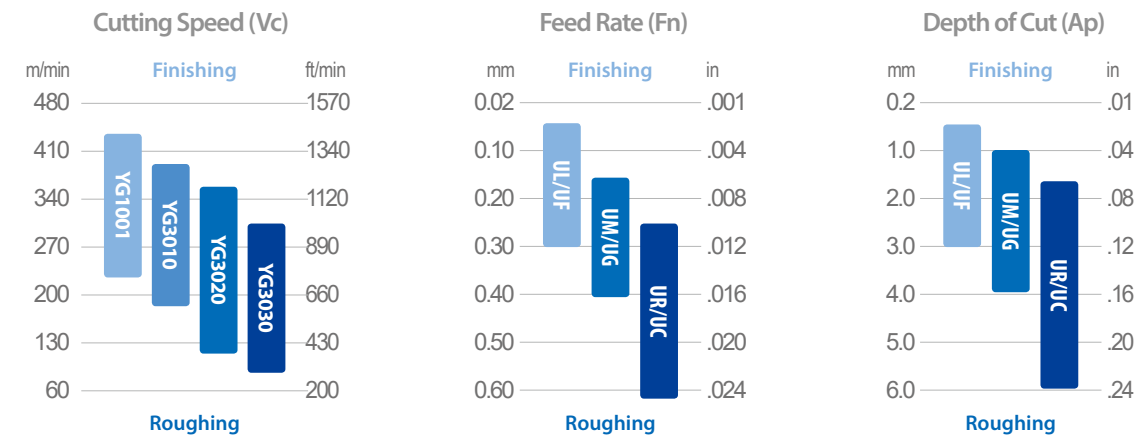


First Choice Grade and Value
 YG3010 - Vc 330m/min (1,080ft/min)
 YG801 - Vc 170m/min (560ft/min)

Application Guide

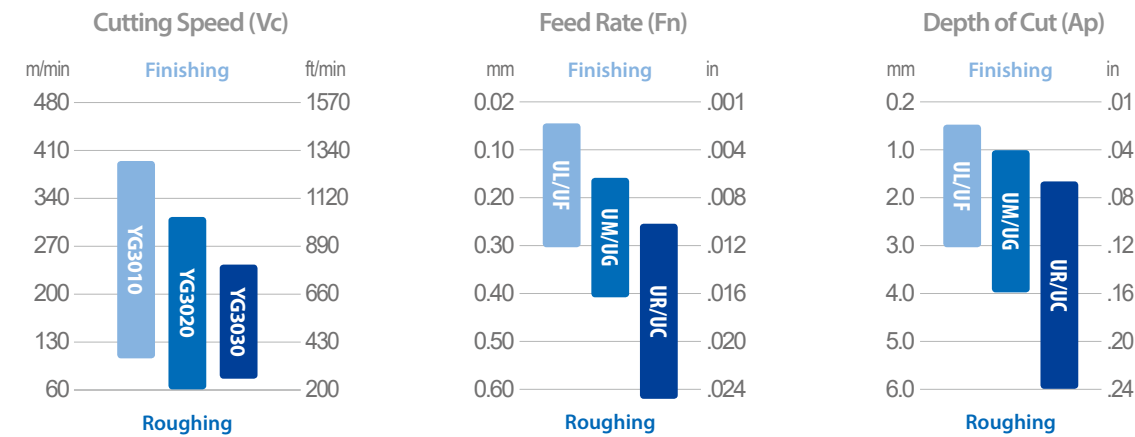
Steel Guide

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)

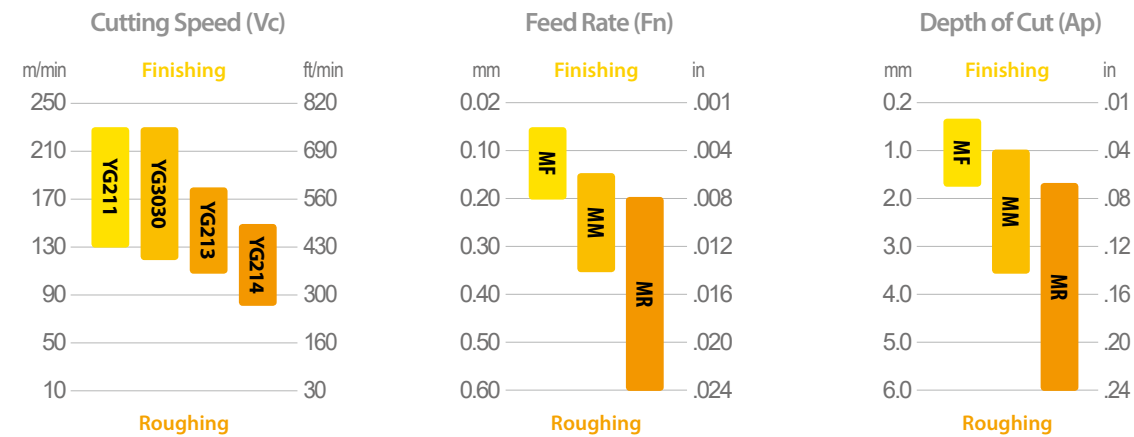
P	High Alloyed Steel, and Tool Steel									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
10~11	SKD11	X155CrVMo121	1.2379	D2	2310	Z160CDV12	X165CrMoW12KU	F.5318	BD2	KH12MF



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)

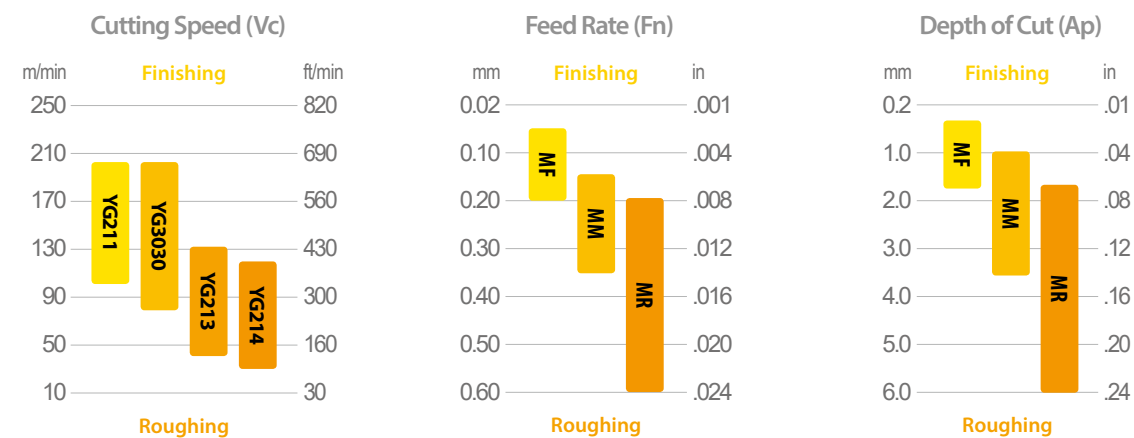
YG213 - Vc 160m/min (520ft/min)

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



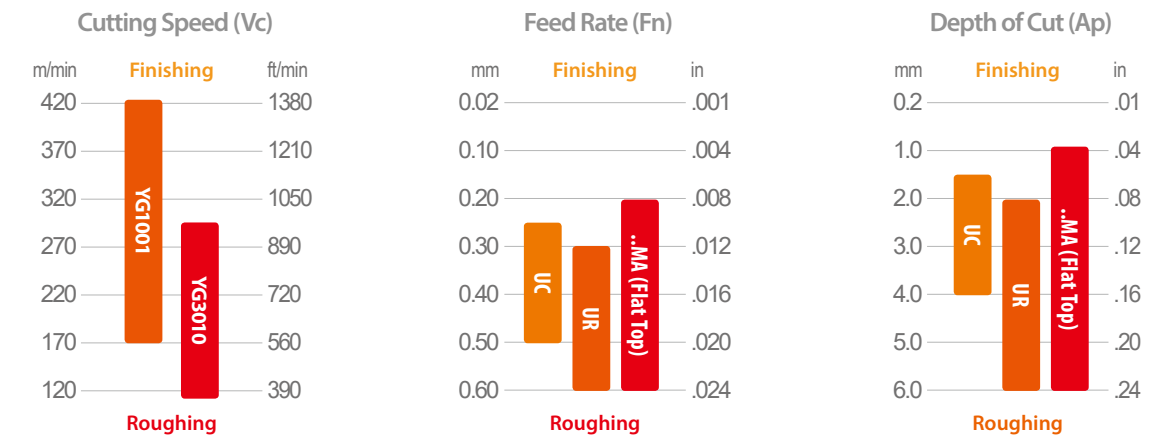
First Choice Grade and Value

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

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

Application Guide Cast iron Guide

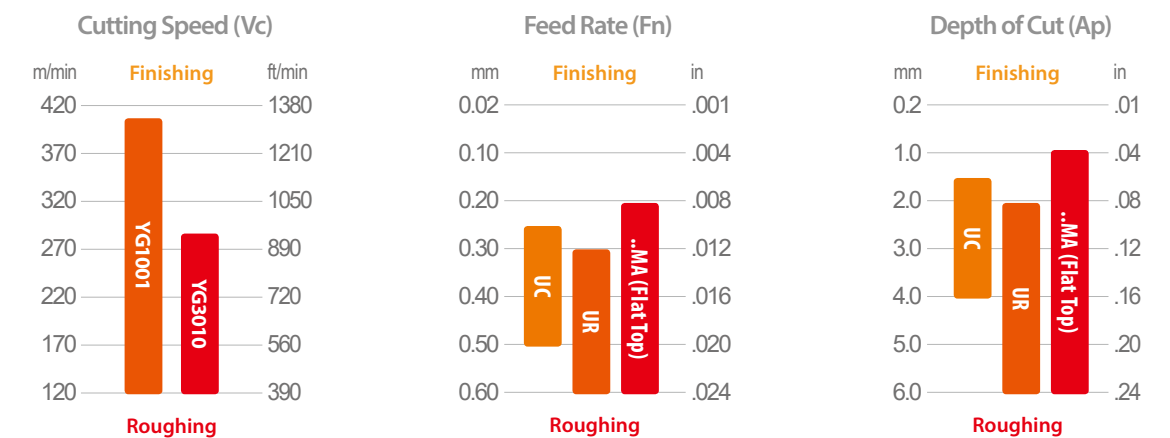
K	Grey cast iron									
VDI	JIS	DIN	Mat'l No.	AISI/ASTM	SS	AFNOR	UNI	UNE	BS	GOST
15~16	FC250	GG25	0.6025	A48 40 B	0125	Ft 25 D	G25	FG25	Grade 260	Sc 25



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	FG E50-7	SNG 500-7	Vc 50-2



First Choice Grade and Value

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

Application Guide

Turning Formulas

Formulas

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

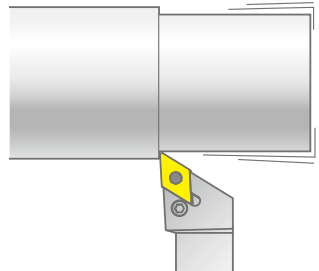
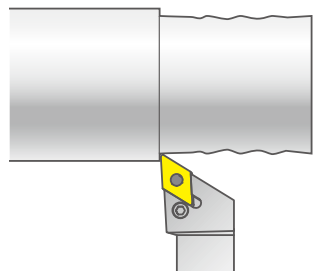
Terms

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)

Application Guide

Surface Roughness Guide

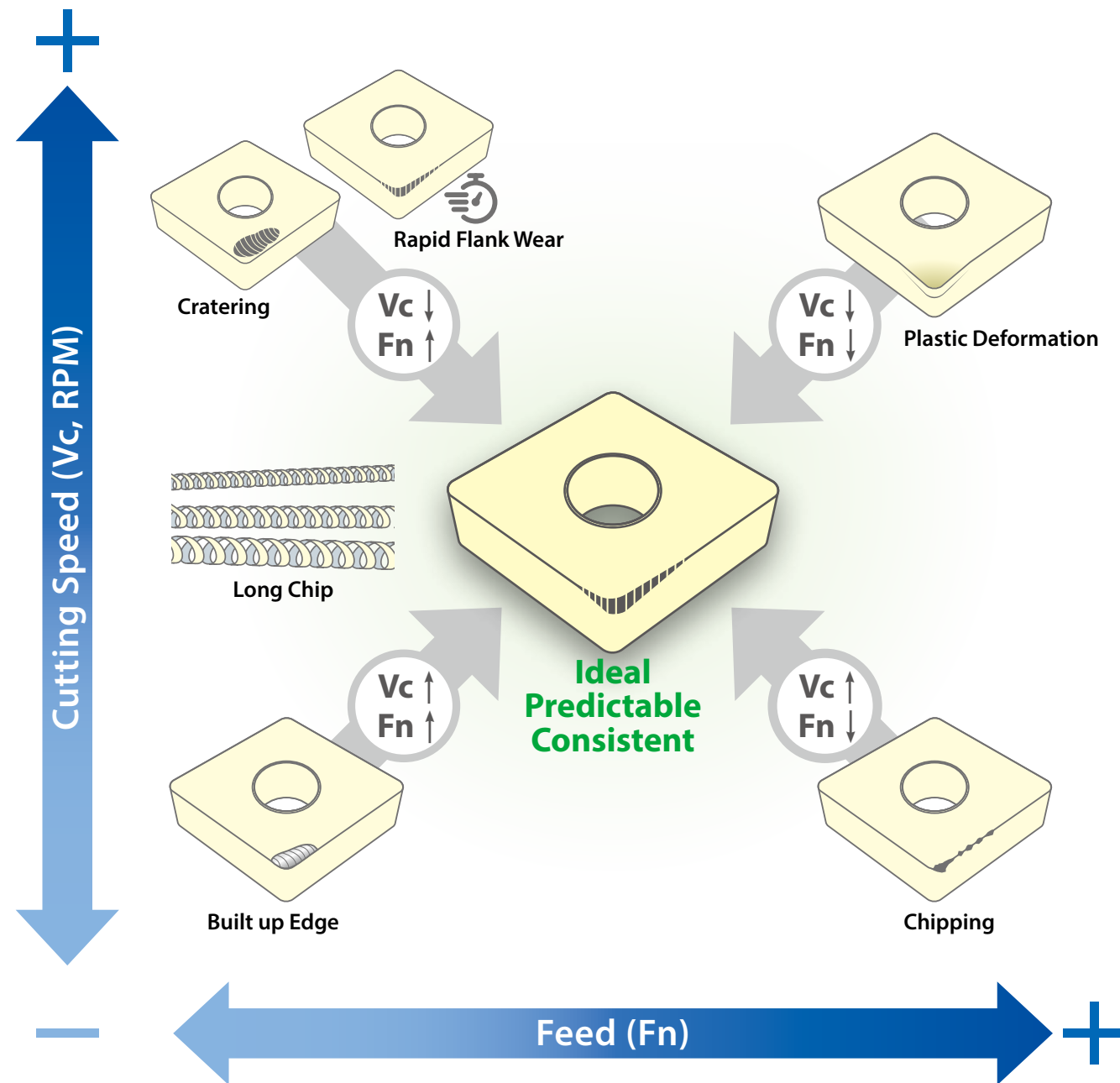
Trouble Shooting

Pattern	Reasons	Solutions
Vibration 	- High radial or tangential force - Unstable condition	- 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 	- Work material is damaged by chips - Feed is too high for corner radius	- 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)

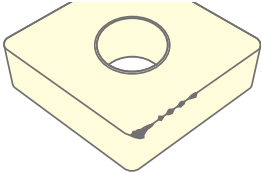
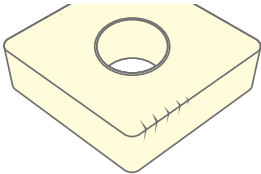
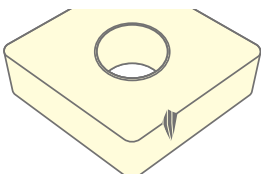
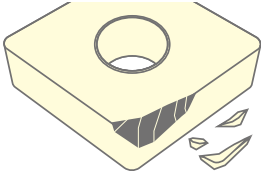
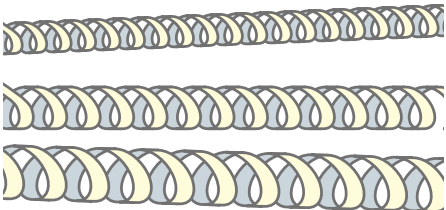
Trouble Shooting Guide map



Pattern	Reasons	Solutions
General Flank Wear Flank face near by corner is abraded	- The most ideal wear - Consistent and predictable - General wear behavior when machining condition is normal	
Rapid Flank Wear Looks same as general flank wear, but happens quickly	Grade - Not enough wear resistance - Too tough grade Heat - Cutting speed is too high - Not enough coolant	- More wear resistant grade - Reduce the cutting speed (V_c, SFM, RPM or SFPM) - Optimize coolant - Increase Feed (F_n) if feed is low
Plastic Deformation Deformed Edge	- Excess thermal load - Excess mechanical load	- Reduce cutting temperature - More wear resistant grade - Reduce the cutting speed (V_c, SFM, RPM or SFPM) - Lower feed (F_n) - Lower depth of cut (a_p) - Optimize coolant
Built up Edge Workpiece material is welded on the cutting edge	- Sticky materials (low carbon steel, Stainless steel, non-ferrous metal, heat resistant super alloys) - Too low cutting speed	- Increase cutting speed - Lower feed rate - Sharper chipbreaker & geometry - Use high pressure coolant - Use PVD grade - Use Positive Insert
Cratering 	Heat - Cutting speed is too high - Too tough grade	- Reduce cutting temperature - Lower cutting speed (V_c, SFM, RPM or SFPM) - Adjust Feed (F_n) - Harder grade

Application Guide

Trouble Shooting

Pattern	Reasons	Solutions
Chipping		
	- Unstable machining condition (Vibration) - Grade is too hard / brittle - Grade is too sharp	- Focus on stabilizing cutting condition - Reduce overhang (shorter and bigger tool) - Tougher grade - Tougher chipbreaker
Thermal Crack		
	- Thermal stress due to rapid change of temperature	- Tougher grade - Lower cutting speed (Vc, SFM, RPM or SFPM) - Lower feed (Fn) - Sharper chipbreaker - Change coolant / dry cut
Notching		
	- Improved edge strength work piece has hardened skin	- 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)		
	- 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	- 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		
	- Feed is too low for chipbreaker - Depth of cut is too shallow for corner radius - Chip area (Fn x Ap) too low	- Higher feed - Sharper chipbreaker - Higher depth of cut - Select a smaller corner radius

Turning Inserts Overview

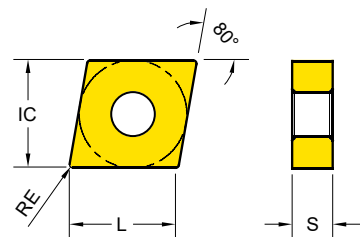
Negative Inserts

Shape	Series	Size				Page
C	CNMA	4	5	6		22
	CNMG	4		6		
D	DNMA		44			25
	DNMG	43	44			
K	KNUX	16				27
S	SNMA	4				28
	SNMG	4				
T	TNMA	3				30
	TNMG	3	4			
	TNUX	3				32
V	VNMG	3				33
W	WNMA		4			35
	WNMG	3	4			

Positive Inserts

Shape	Series	Size				Page
C	CCGT		3	4		38
	CCMT	2	3	4		
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)



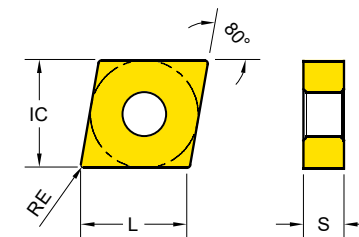
Series	L	IC	S
CNM□ 43	.472	1/2	3/16
CNM□ 54	.630	5/8	1/4
CNM□ 64	.748	3/4	1/4

● : Stock item ○ : Order made item

CNMA CNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA  Cast iron	CNMA 431	1/64	.006~.014	.02~.10	●	●								
	CNMA 432	1/32	.008~.016	.04~.14	●	●								
	CNMA 433	3/64	.008~.020	.06~.20	●	●								
	CNMA 543	3/64	.012~.020	.06~.20	●	●								
	CNMA 544	1/16	.012~.020	.08~.20	●	●								
	CNMA 644	1/16	.006~.039	.12~.39	●	●								
-UF  Finishing	CNMG 431 - UF	1/64	.002~.008	.02~.06		●	●	●	●					
	CNMG 432 - UF	1/32	.004~.010	.04~.10		●	●	●						
-UL  Light Machining and Sticky Material	CNMG 431 - UL	1/64	.002~.010	.02~.08		●	●							
	CNMG 432 - UL	1/32	.004~.012	.04~.12		●	●	●						
	CNMG 433 - UL	3/64	.004~.012	.06~.14		●	●	●						
-UM  Medium Machining Unstable condition	CNMG 431 - UM	1/64	.006~.010	.02~.06		●	●	●						
	CNMG 432 - UM	1/32	.006~.012	.02~.08	●	●	●	●						

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



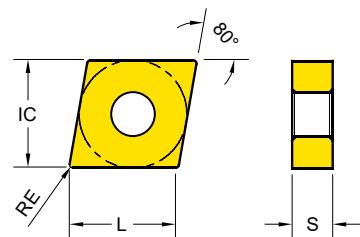
Series	L	IC	S
CNM□ 43	.472	1/2	3/16
CNM□ 54	.630	5/8	1/4
CNM□ 64	.748	3/4	1/4

● : Stock item ○ : Order made item

CNMA CNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UG  Medium Machining at stable condition	CNMG 431 - UG	1/64	.008~.012	.02~.08		●	●	●						
	CNMG 432 - UG	1/32	.008~.016	.04~.12	●	●	●	●	●					
	CNMG 433 - UG	3/64	.008~.018	.06~.16		●	●	●						
	CNMG 543 - UG	3/64	.012~.020	.06~.20		●	●	●						
	CNMG 544 - UG	1/16	.012~.020	.07~.20		●	●	●						
-UC  Cast iron and Medium roughing	CNMG 431 - UC	1/64	.010~.014	.02~.10	●	●	●	●						
	CNMG 432 - UC	1/32	.010~.018	.04~.16	●	●	●	●						
	CNMG 433 - UC	3/64	.012~.022	.06~.18	●	●	●	●						
-UR  Roughing	CNMG 432 - UR	1/32	.010~.022	.04~.16		●	●	●						
	CNMG 433 - UR	3/64	.012~.024	.06~.20		●	●	●	●					
	CNMG 434 - UR	1/16	.012~.024	.08~.20			●							
	CNMG 543 - UR	3/64	.012~.020	.06~.20		●	●	●						
	CNMG 544 - UR	1/16	.012~.020	.08~.20		●	●	●						
	CNMG 643 - UR	3/64	.012~.031	.12~.35	●	●								

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



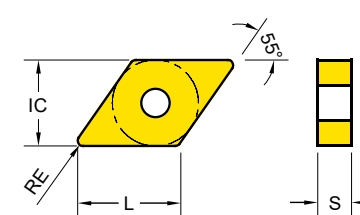
Series	L	IC	S
CNM□ 43	.472	1/2	3/16
CNM□ 54	.630	5/8	1/4
CNM□ 64	.748	3/4	1/4

● : Stock item ○ : Order made item

CNMA CNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-MF  Stainless steel Finishing	CNMG 431 - MF	1/64	.003~.010	.01~.06						●	●			
	CNMG 432 - MF	1/32	.003~.010	.01~.06						●	●	●		
-MM  Stainless steel Medium	CNMG 431 - MM	1/64	.008~.012	.02~.12						●	●			
	CNMG 432 - MM	1/32	.008~.014	.04~.14			●	●	○	●	●	●		
	CNMG 433 - MM	3/64	.008~.016	.06~.14				●		●	●	●		
-MR  Stainless steel Roughing	CNMG 432 - MR	1/32	.012~.020	.05~.22				●		●	●	●		
	CNMG 433 - MR	3/64	.014~.024	.06~.22						●	●	●		

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



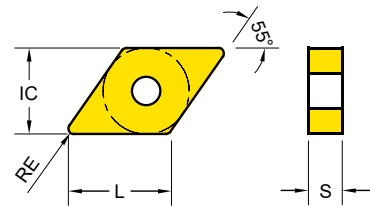
Series	L	IC	S
DNM□ 43	.551	1/2	3/16
DNM□ 44	.551	1/2	1/4

● : Stock item ○ : Order made item

DNMA DNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA  Cast iron	DNMA 432	1/32	.006~.014	.04~.12	●	●								
	DNMA 433	3/64	.010~.018	.06~.16	●	●								
	DNMA 442	1/32	.006~.014	.04~.12	●									
	DNMA 443	3/64	.010~.018	.06~.16	●									
-UF  Finishing	DNMG 431 - UF	1/64	.002~.006	.02~.06		●	●	●	●					
	DNMG 441 - UF	1/64	.002~.008	.04~.08		●	●	●	●					
	DNMG 442 - UF	1/32	.004~.010	.06~.14		●	●	●						
-UL  Light Machining and Sticky Material	DNMG 441 - UL	1/64	.002~.010	.02~.08		●	●							
	DNMG 442 - UL	1/32	.006~.012	.06~.12		●	●	●						
-UM  Medium Machining Unstable condition	DNMG 433 - UM	3/64	.006~.014	.06~.16		●								
	DNMG 442 - UM	1/32	.006~.014	.02~.08		●	●	●						

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



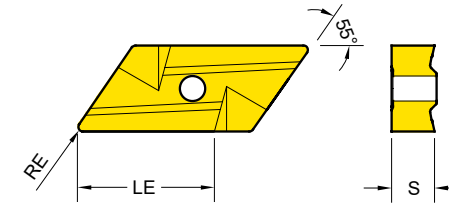
Series	L	IC	S
DNM□ 43	.551	1/2	3/16
DNM□ 44	.551	1/2	1/4

● : Stock item ○ : Order made item

DNMA DNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UG  Medium Machining at stable condition	DNMG 432 - UG	1/32	.008~.014	.04~.10	●	●	●	●	●					
	DNMG 433 - UG	3/64	.008~.014	.06~.12			●							
	DNMG 441 - UG	1/64	.008~.012	.02~.08		●	●	●						
	DNMG 442 - UG	1/32	.008~.014	.04~.12	●	●	●	●	●					
	DNMG 443 - UG	3/64	.008~.016	.06~.14	●	●	●	●						
-UC  Cast iron and Medium roughing	DNMG 432 - UC	1/32	.010~.016	.04~.12	●	●								
	DNMG 433 - UC	3/64	.010~.018	.06~.14	●	●								
	DNMG 442 - UC	1/32	.010~.016	.04~.12	●	●	●	●						
	DNMG 443 - UC	3/64	.010~.018	.06~.14	●	●	●	●						
-UR  Roughing	DNMG 432 - UR	1/32	.012~.020	.04~.14		●								
	DNMG 433 - UR	3/64	.012~.020	.06~.16		●								
	DNMG 443 - UR	3/64	.012~.020	.06~.16		●	●	●	●					
-MM  Stainless steel Medium	DNMG 431 - MM	1/64	.008~.012	.02~.12				●		●	●			
	DNMG 432 - MM	1/32	.008~.014	.04~.14				●		●	●			
	DNMG 433 - MM	3/64	.008~.016	.06~.14				●		●	●			
	DNMG 441 - MM	1/64	.008~.012	.02~.12				●		●	●			
	DNMG 442 - MM	1/32	.008~.014	.04~.14				●		●	●			
	DNMG 443 - MM	3/64	.008~.016	.06~.14				●		●	●			

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



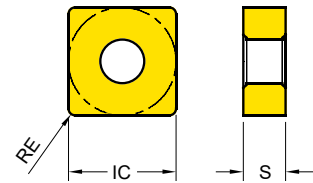
Series	LE	S
KNUX 1604	.591	3/16

● : Stock item ○ : Order made item

KNUX	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..UX Left 	KNUX 160405L	.020	.004~.016	.02~.24		●	●	●	●					
..UX Right 	KNUX 160405R	.020	.004~.016	.02~.24		●	●	●	●					

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



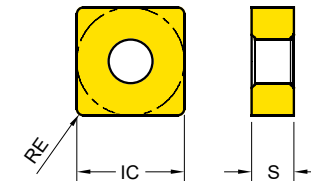
Series	IC	S
SNM□ 43	1/2	3/16

● : Stock item ○ : Order made item

SNMA SNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA Cast iron	SNMA 432	1/32	.008~.016	.04~.14	●									
	SNMA 433	3/64	.008~.020	.06~.20	●									
-UF Finishing	SNMG 431 - UF	1/64	.002~.008	.02~.06					●					
-UL Light Machining and sticky material	SNMG 432 - UL	1/32	.004~.012	.04~.12		●	●	●						
-UG Medium Machining at stable condition	SNMG 432 - UG	1/32	.008~.016	.04~.12		●	●	●	●					
	SNMG 433 - UG	3/64	.008~.018	.06~.16		●	●	●						
-UC Cast iron and Medium roughing	SNMG 432 - UC	1/32	.010~.018	.04~.16	●	●	●	●						
	SNMG 433 - UC	3/64	.012~.022	.06~.18	●									

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



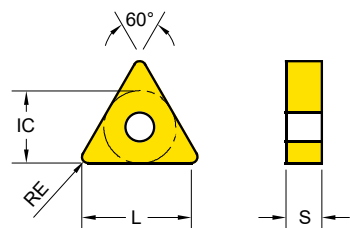
Series	IC	S
SNM□ 43	1/2	3/16

● : Stock item ○ : Order made item

SNMA SNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UR Roughing	SNMG 432 - UR	1/32	.012~.022	.04~.18		●	●	●						
	SNMG 433 - UR	3/64	.012~.024	.06~.20			●	●	●					
-MF Stainless steel Finishing	SNMG 432 - MF	1/32	.003~.010	.01~.06						○	○			
	SNMG 433 - MF	3/64	.006~.012	.01~.06						○	○			
-MM Stainless steel Medium	SNMG 432 - MM	1/32	.008~.014	.04~.14						○	○			
	SNMG 433 - MM	3/64	.008~.018	.06~.14						○	○			
-MR Stainless steel Roughing	SNMG 432 - MR	1/32	.014~.020	.01~.22						○	○			
	SNMG 433 - MR	3/64	.016~.024	.01~.22						○	○			

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative TNMG / TNMA (60° Negative)



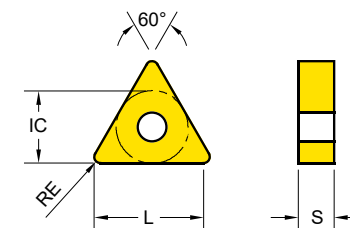
Series	L	IC	S
TN□□ 33	.618	3/8	3/16
TN□□ 43	.827	1/2	3/16

● : Stock item ○ : Order made item

TNMA TNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA Cast iron	TNMA 332	1/32	.006~.014	.04~.12	●									
	TNMA 333	3/64	.010~.018	.06~.16	●									
-UF Finishing	TNMG 331 - UF	1/64	.002~.008	.04~.08		●	●	●	●					
	TNMG 332 - UF	1/32	.004~.010	.06~.14		●	●	●						
	TNMG 333 - UF	3/64	.004~.010	.06~.14			●							
	TNMG 431 - UF	1/64	.002~.008	.04~.16		●			●					
-UL Light Machining and sticky material	TNMG 332 - UL	1/32	.004~.010	.04~.12		●	●	●						
	TNMG 333 - UL	3/64	.004~.010	.06~.14			●							
-UM Medium Machining Unstable condition	TNMG 332 - UM	1/32	.006~.014	.02~.08		●	●	●						
	TNMG 333 - UM	3/64	.004~.010	.06~.14	●	●	●							

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative TNMG / TNMA (60° Negative)



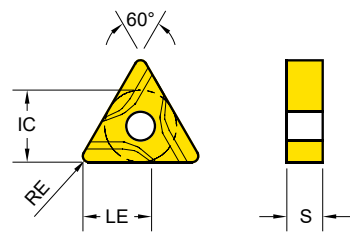
Series	L	IC	S
TN□□ 33	.618	3/8	3/16
TN□□ 43	.827	1/2	3/16

● : Stock item ○ : Order made item

TNMA TNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UG Medium Machining at Stable condition	TNMG 331 - UG	1/64	.008~.012	.02~.08	●	●	●	●						
	TNMG 332 - UG	1/32	.008~.014	.04~.12	●	●	●	●	●					
	TNMG 333 - UG	3/64	.008~.014	.06~.12	●	●	●							
	TNMG 432 - UG	1/32	.008~.012	.04~.16		●	●	●	●					
-UC Cast iron and Medium roughing	TNMG 331 - UC	1/64	.010~.016	.02~.10	●	●	●	●						
	TNMG 332 - UC	1/32	.010~.016	.04~.12	●	●	●	●						
	TNMG 333 - UC	3/64	.010~.018	.06~.14	●									
-UR Roughing	TNMG 333 - UR	3/64	.012~.020	.06~.12	●	●	●	●	●					
	TNMG 433 - UR	3/64	.012~.020	.06~.16	●	●	●	●	●					
	TNMG 434 - UR	1/16	.012~.020	.08~.16	●	●								
-MF Stainless steel Finishing	TNMG 332 - MF	1/32	.003~.010	.01~.06						●				
-MM Stainless steel Medium	TNMG 331 - MM	1/64	.008~.012	.02~.12						○	○			
	TNMG 332 - MM	1/32	.008~.014	.04~.14						●	●			
	TNMG 333 - MM	3/64	.008~.016	.06~.14						●	●			

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative TNUX (60° Negative)

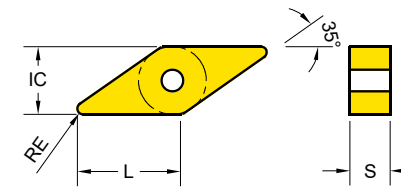


Series	LE	IC	S
TNUX 33	.370	3/8	3/16

● : Stock item ○ : Order made item

TNUX	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..UX Left	TNUX 331 L	1/64	.004~.012	.02~.16		●	●		●					
	TNUX 332 L	1/32	.004~.016	.02~.24		●	●		●					
..UX Right	TNUX 331 R	1/64	.004~.012	.02~.16		●	●		●					
	TNUX 332 R	1/32	.004~.016	.02~.24		●	●		●					

Turning Inserts - Negative VNMG (35° Negative)



Series	L	IC	S
VNMG 33	.622	3/8	3/16

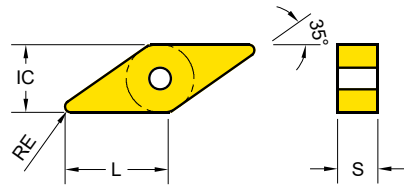
● : Stock item ○ : Order made item

VNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA Cast iron	VNMA 332	1/32	.006~.014	.04~.12	●									
-UF Finishing	VNMG 331 - UF	1/64	.002~.006	.02~.08		●	●	●	●					
	VNMG 332 - UF	1/32	.002~.010	.04~.10		●	●	●						
-UL Medium Machining and sticky material	VNMG 332 - UL	1/32	.004~.010	.04~.10		●	●							
-UG Medium Machining at stable condition	VNMG 332 - UG	1/32	.008~.012	.04~.12	●	●	●	●	●					

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative VNMG (35° Negative)



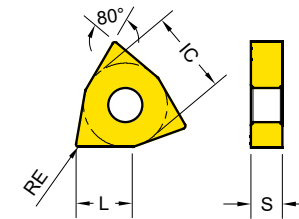
Series	L	IC	S
VNM□ 33	.622	3/8	3/16

● : Stock item ○ : Order made item

VNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UC  Cast iron and Medium roughing	VNMG 331 - UC	1/64	.010~.016	.02~.10		●								
	VNMG 332 - UC	1/32	.010~.016	.04~.12	●	●	●	●						
-UR  Roughing	VNMG 333 - UR	3/64	.010~.014	.05~.12		●	●	●	●					
-MM  Stainless steel Medium	VNMG 331 - MM	1/64	.008~.012	.02~.12						○	○			
	VNMG 332 - MM	1/32	.008~.014	.04~.14						○	○			

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



Series	L	IC	S
WNM□ 33	.224	3/8	3/16
WNM□ 43	.307	1/2	3/16

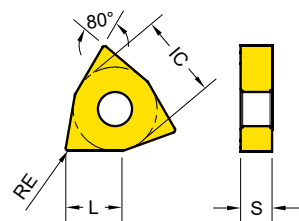
● : Stock item ○ : Order made item

WNMA WNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
..MA  Cast iron	WNMA 431	1/64	.006~.014	.02~.10	●									
	WNMA 432	1/32	.008~.016	.04~.14	●	●								
	WNMA 433	3/64	.008~.020	.06~.20	●	●								
-UF  Finishing	WNMG 331 - UF	1/64	.002~.008	.02~.06		●	●	●	●					
	WNMG 431 - UF	1/64	.002~.008	.02~.08		●	●	●	●					
	WNMG 432 - UF	1/32	.004~.010	.04~.10		●	●	●						
-UL  Light Machining and sticky material	WNMG 332 - UL	1/32	.004~.012	.04~.10		●	●	●						
	WNMG 432 - UL	1/32	.004~.012	.04~.12		●	●	●						
-UM  Medium Machining at unstable condition	WNMG 332 - UM	1/32	.006~.008	.04~.08		●	●							
	WNMG 432 - UM	1/32	.006~.012	.04~.12	●	●	●	●						
	WNMG 433 - UM	3/64	.006~.012	.06~.12			●							
	WNMG 434 - UM	1/16	.006~.012	.08~.14			●							

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative

WNMG / WNMA (80° Trigonal Negative)



Series	L	IC	S
WNM□ 33	.224	3/8	3/16
WNM□ 43	.307	1/2	3/16

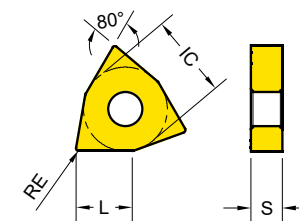
● : Stock item ○ : Order made item

WNMA WNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UG 	WNMG 332 - UG	1/32	.008~.016	.04~.10			●		●					
	WNMG 431 - UG	1/64	.008~.012	.06~.10		●	●	●						
	WNMG 432 - UG	1/32	.008~.016	.04~.14	●	●	●	●	●					
	WNMG 433 - UG	3/64	.008~.016	.06~.14	●	●	●							
	WNMG 434 - UG	1/16	.008~.016	.08~.16			●							
-UC 	WNMG 431 - UC	1/64	.010~.016	.02~.14	●	●	●	●						
	WNMG 432 - UC	1/32	.010~.018	.04~.16	●	●	●	●						
	WNMG 433 - UC	3/64	.012~.022	.06~.18	●	●	●	●						
-UR 	WNMG 432 - UR	1/32	.012~.024	.05~.20	●	●	●	●						
	WNMG 433 - UR	3/64	.012~.024	.06~.20	●	●	●	●	●					
	WNMG 434 - UR	1/16	.012~.024	.08~.20	●	●								

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Negative

WNMG / WNMA (80° Trigonal Negative)



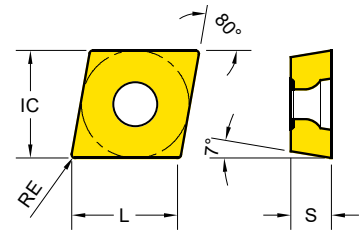
Series	L	IC	S
WNM□ 33	.224	3/8	3/16
WNM□ 43	.307	1/2	3/16

● : Stock item ○ : Order made item

WNMA WNMG	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-MF 	WNMG 431 - MF	1/64	.003~.010	.01~.06						○	○			
	WNMG 432 - MF	1/32	.003~.010	.01~.06						○	○			
-MM 	WNMG 431 - MM	1/64	.008~.012	.02~.12						●	●			
	WNMG 432 - MM	1/32	.008~.014	.04~.14			●			●	●			
	WNMG 433 - MM	3/64	.008~.016	.06~.14						●	●			
-MR 	WNMG 333 - MR	3/64	.008~.012	.05~.16						●				
	WNMG 432 - MR	1/32	.012~.020	.05~.20						○	○			
	WNMG 433 - MR	3/64	.012~.024	.06~.20						○	○			

Cutting Speed			Vc (ft/min)											
ISO	VDI	Sub Group	YG1001 Min Max	YG3010 Min Max	YG3020 Min Max	YG3030 Min Max	YG801 Min Max	YG211 Min Max	YG213 Min Max	YG214 Min Max	YG100 Min Max	YG10 Min Max		
P	1~5	Non-alloyed steel	720 1570	560 1480	590 1250	490 1150	390 660	- -	- -	- -	- -	- -		
	6~9	Low-alloyed steel	720 1380	590 1250	360 1150	300 980	230 660	- -	- -	- -	- -	- -		
	10~11	High-alloyed steel	- -	330 1080	200 980	230 820	- -	- -	- -	- -	- -	- -		
M	12~13	Ferritic & martensitic	- -	- -	- -	390 750	- -	430 750	360 590	260 490	- -	- -		
	14	Austenitic stainless steel	- -	- -	- -	260 660	- -	330 660	130 430	100 390	- -	- -		
K	15~16	Grey cast iron	560 1380	390 980	- -	- -	- -	- -	- -	- -	- -	- -		
	17~18	Nodular cast iron	390 1340	390 920	- -	- -	- -	- -	- -	- -	- -	- -		
N	21~30	Non-ferrous metals (al)	- -	- -	- -	- -	- -	- -	- -	- -	1150 3940	820 2620		
S	31~37	Superalloys & Titanium	- -	- -	- -	110 260	- -	100 300	70 130	70 130	- -	- -		
H	38~41	Hard materials	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		

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



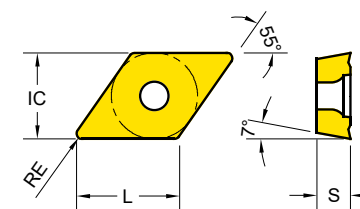
Series	L	IC	S
CCMT 21.5	.244	1/4	3/32
CCMT 32.5	.362	3/8	5/32
CCMT 43	.488	1/2	3/16

● : Stock item ○ : Order made item

CCGT CCMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-AL  Aluminum	CCGT 32.50.5 - AL	1/128	.001~.003	.02~.04									●	●
	CCGT 32.51 - AL	1/64	.002~.010	.02~.08									●	●
	CCGT 32.52 - AL	1/32	.004~.014	.04~.12									●	●
	CCGT 430.5 - AL	1/128	.002~.006	.00~.04									●	●
	CCGT 431 - AL	1/64	.002~.008	.01~.06									●	●
	CCGT 432 - AL	1/32	.002~.008	.02~.10									●	●
-UF  Finishing	CCMT 21.51 - UF	1/64	.002~.006	.02~.06		●	●							
	CCMT 32.51 - UF	1/64	.002~.008	.02~.08		●	●							
-UG  General	CCMT 21.51 - UG	1/64	.002~.010	.02~.08		●			●					
	CCMT 21.52 - UG	1/32	.006~.010	.03~.08		●			●					
	CCMT 32.51 - UG	1/64	.006~.008	.02~.08		●	●		●					
	CCMT 32.52 - UG	1/32	.006~.012	.03~.10	●	●	●	●	●					
	CCMT 431 - UG	1/64	.008~.010	.02~.10		●	●							
	CCMT 432 - UG	1/32	.008~.014	.03~.14		●	●	●	●					
	CCMT 433 - UG	3/64	.008~.014	.05~.14		●								

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



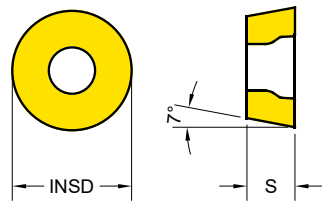
Series	L	IC	S
DCMT 21.5	.295	1/4	3/32
DCMT 32.5	.441	3/8	5/32

● : Stock item ○ : Order made item

DCGT DCMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-AL  Aluminum	DCGT 32.50.5 - AL	1/128	.001~.003	.02~.04									●	●
	DCGT 32.51 - AL	1/64	.002~.010	.02~.08									●	●
	DCGT 32.52 - AL	1/32	.004~.012	.04~.10									●	●
-UF  Finishing	DCMT 21.51 - UF	1/64	.002~.006	.02~.06		●	●							
	DCMT 32.51 - UF	1/64	.002~.008	.02~.08		●	●							
	DCMT 32.52 - UF	1/32	.002~.010	.04~.10		●	●							
-UG  General	DCMT 21.51 - UG	1/64	.006~.010	.02~.06		●	●		●					
	DCMT 21.52 - UG	1/32	.006~.010	.03~.06		●								
	DCMT 32.51 - UG	1/64	.006~.010	.02~.08		●	●		●					
	DCMT 32.52 - UG	1/32	.008~.014	.03~.10		●	●	●	●					

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive RCMT (Round Positive)

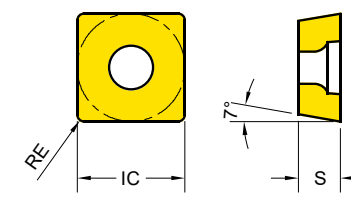


Series	INSD	S
RCMT 0602	.236	3/32
RCMT 0803	.315	1/8
RCMT 10T3	.394	5/32
RCMT 1204	.472	3/16

● : Stock item ○ : Order made item

RCMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
 General	RCMT 0602M0	.118	.002~.010	.01~.05	●	●	●		●					
	RCMT 0803M0	.157	.002~.012	.02~.06	●	●	●		●					
	RCMT 10T3M0	.197	.004~.014	.02~.10	●	●	●		●					
	RCMT 1204M0	.236	.006~.018	.02~.12	●	●	●		●					

Turning Inserts - Positive SCMT (Square Positive)



Series	IC	S
SCMT 32.5	3/8	5/32
SCMT 43	1/2	3/16

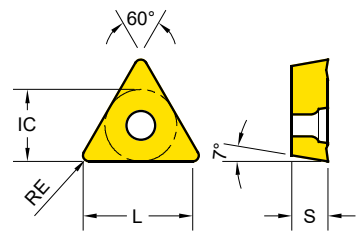
● : Stock item ○ : Order made item

SCMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
 Finishing	SCMT 32.51 - UF	1/64	.004~.010	.02~.08		●	●							
 General	SCMT 32.51 - UG	1/64	.008~.014	.04~.10	●	●			●					
	SCMT 32.52 - UG	1/32	.008~.014	.04~.10	●	●	●		●					
	SCMT 432 - UG	1/32	.008~.016	.04~.14		●	●	●						

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive TCMT / TCGT (Triangle Positive)



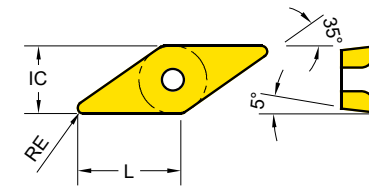
Series	L	IC	S
TCMT 21.5	.406	1/4	3/32
TCMT 32.5	.614	3/8	5/32

● : Stock item ○ : Order made item

TCGT TCMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-AL Aluminum	TCGT 32.50.5 - AL	1/128	.001~.002	.02~.04									●	●
	TCGT 32.51 - AL	1/64	.002~.010	.02~.08									●	●
	TCGT 32.52 - AL	1/32	.004~.014	.04~.12									●	●
-UF Finishing	TCMT 21.51 - UF	1/64	.002~.008	.02~.08		●	●							
	TCMT 32.51 - UF	1/64	.002~.010	.02~.12		●	●		●					
	TCMT 32.52 - UF	1/32	.002~.010	.03~.12		●	●							
-UG General	TCMT 21.51 - UG	1/64	.006~.010	.02~.06					●					
	TCMT 21.52 - UG	1/32	.006~.010	.03~.08		●								
	TCMT 32.51 - UG	1/64	.006~.010	.02~.08		●	●							
	TCMT 32.52 - UG	1/32	.008~.014	.03~.12	●	●	●	●	●					

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620	
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Inserts - Positive VBMT (35° Positive)



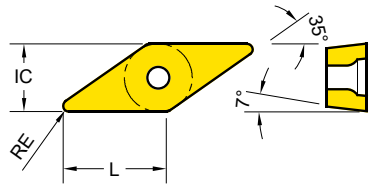
Series	L	IC	S
VBMT 33	.622	3/8	3/16

● : Stock item ○ : Order made item

VBMT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-UF Finishing	VBMT 331 - UF	1/64	.002~.008	.02~.08		●	●							
	VBMT 332 - UF	1/32	.002~.010	.02~.12		●	●							
-UG General	VBMT 331 - UG	1/64	.006~.010	.02~.10		●	●		●					
	VBMT 332 - UG	1/32	.008~.016	.04~.12		●	●	●	●					

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490	-	-	-	-
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390	-	-	-	-
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150	3940	820	2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130	-	-	-	-
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



Series	L	IC	S
VCMT 33	.622	3/8	3/16

● : Stock item ○ : Order made item

VCMT VCGT	Designation	RE	Fn (inch/rev.)	Ap (inch)	YG1001	YG3010	YG3020	YG3030	YG801	YG211	YG213	YG214	YG100	YG10
-AL  Aluminum	VCMT 330.5 - AL	1/128	.001~.002	.02~.04									●	●
	VCMT 331 - AL	1/64	.002~.010	.02~.08									●	●
	VCMT 332 - AL	1/32	.004~.014	.04~.12									●	●
-UF  Finishing	VCMT 331 - UF	1/64	.002~.010	.02~.12			●							
-UG  General	VCMT 331 - UG	1/64	.008~.016	.02~.10					●					
	VCMT 332 - UG	1/32	.008~.016	.04~.12			●		●					



PARTING & GROOVE TURN

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

Cutting Speed			Vc (ft/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	720	1570	560	1480	590	1250	490	1150	390	660	-	-	-	-	-	-
	6~9	Low-alloyed steel	720	1380	590	1250	360	1150	300	980	230	660	-	-	-	-	-	-
	10~11	High-alloyed steel	-	-	330	1080	200	980	230	820	-	-	-	-	-	-	-	-
M	12~13	Ferritic & martensitic	-	-	-	-	-	-	390	750	-	-	430	750	360	590	260	490
	14	Austenitic stainless steel	-	-	-	-	-	-	260	660	-	-	330	660	130	430	100	390
K	15~16	Grey cast iron	560	1380	390	980	-	-	-	-	-	-	-	-	-	-	-	-
	17~18	Nodular cast iron	390	1340	390	920	-	-	-	-	-	-	-	-	-	-	-	-
N	21~30	Non-ferrous metals (al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1150 3940	820 2620
S	31~37	Superalloys & Titanium	-	-	-	-	-	-	110	260	-	-	100	300	70	130	70	130
H	38~41	Hard materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	

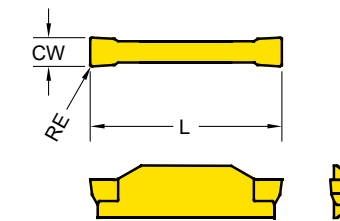
Parting & Groove Turn Inserts

	TD. Series	Inserts	2, 3, 4
		TDN TDP TDY	

Parting & Groove Turn Chipbreakers

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

Parting & Groove Turn Inserts (TD.)



Series	L	CW
TD□2	.787	.079
TD□3	.787	.118
TD□4	.787	.157

● : Stock item ○ : Order made item

TD.	Designation	RE	Parting & Grooving		Groove Turn		YG602	YG602G
			Fn (inch/rev.)	Tmax (inch)	Fn (inch/rev.)	Ap (inch)		
TDP Parting & Grooving (Positive)	TDP 2002	.008	.002~.005	.75	-	-	○	●
	TDP 3002	.008	.002~.006	.75	-	-	○	●
	TDP 4003	.012	.002~.007	.75	-	-	○	●
TDN Parting & Grooving (General)	TDN 2002	.008	.002~.007	.75	-	-	○	●
	TDN 3002	.008	.003~.009	.75	-	-	○	●
	TDN 4003	.012	.003~.010	.75	-	-	○	●
TDY Groove Turn	TDY 3 E - 0.4	.016	.004~.008	.75	.004~.015	.020~.087		●
	TDY 4 E - 0.4	.016	.006~.010	.75	.004~.016	.020~.110		●

Cutting Speed			Vc (ft/min)	
ISO	VDI	Sub Group	YG602G (YG602)	
			Min.	Max.
P	1~5	Non-alloyed steel	300	590
	6~9	Low-alloyed steel	260	390
	10~11	High-alloyed steel	260	360
M	12~13	Ferritic & martensitic stainless steel	230	520
	14	Austenitic stainless steel	180	460
K	15~16	Grey cast iron	360	610
	17~18	Nodular cast iron	360	460
N	21~30	Non-ferrous metals (al)	820	1440
S	31~37	Superalloys & Titanium	80	150
H	38~41	Hard materials	80	160

Technical Information
ISO 13399 Terms

AN	Clearance angle major	INSL	Insert diameter
APMX	Depth of cut maximum	KAPR	Tool cutting edge angle
AS	Clearance anger 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**

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

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		Annealed	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		Annealed	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		
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, AICuMg 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	Copper and copper alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110		CuZn36Pb 3, 2.0375	
	27		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		Hardened	550	55	SK3	67
	39			Hardened	630	60		
	40	Chilled cast iron		Cast	400	42		
	41	Hardened cast iron		Hardened	550	55		

Technical Information
Material Groups

P		VDI 3323 1	Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.15% C, Annealed					HB 125	HRC
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0037	STKM 12 C	St 37-2	-	4360 40 B	S235JR	E24-2	1311	Fe 360 B			16D	
1.0038	STKM 12 A	St 37-3	A570.36	4360 40 C	S275J2G3	E28-3	1312	Fe 360 D FF			ST14KP	
1.0045	SM 490 YA	S 355 JR	-	-	S 1207	E36-2	-	Fe 510 BFN				
1.0050	SS 50	St 50-2	A570 Gr. 50	4360 50 B	E 295	A50-2	2172	Fe 490			ST5PS	
1.0060	SM 58	St 60-2	A572 Gr. 65	4360 55 E	-	A60-2	1650	Fe 60-2			ST6PS	
1.0114		S 235 J0	-	En 40C	S 235 J0	E24-3		Fe 360 CFN				
1.0143		S 275 J0	-	-	S 275 J0	E28-3	1414	Fe 430 C				
1.0144	SM41C, SM400	St 44-3 N	A573 Gr. 81	4360 43C	S 275 J2 G3	E28-3	1412	Fe 430 D FF			ST14KP	
1.0149		Ro St 44-2	-	43C	S 275 J0 H	-	1412	Fe430C				
1.0301	S10C	C10	1010	045M10	C10	34C10, XC10		C10	F.1511	G10100	10	
1.0330	SPCC	St 12	-	DC 01	Fe P01	DC 01/Fe P01	1142	Fe P01			15KP	
1.0335	SPHE	D D 13 (StW 24)	A622(1008)	H S 3	D D 13	3C		FeP13			08KP	
1.0338	SPCE	St 4	A620(1008)	14491CR	Fe P04	Fe 14	1147	DC04/FeP04			08JU	
1.0345	SPV 50	P235 GH	A516 Gr. 65	P 235 GH	P 235 GH	A 37 CP	1330	Fe E 235		K02503		
1.0401	S15C	C15	1015	080M15	-	C18RR, XC18	1350	C15, C16	F.1110	G10170	15	
1.0402	S20C	C22	1020	050 A 20	1 C 22	C20	1450	C 20	F.1120	G10200	20	
1.0425	SPV315	P265GH/HII				A42CP	1430	Fe4101KW		K02801	16K	
1.0443	SC 450	GS-45	A2765-35	A1		E23-45M	1305					
1.0539		S355NH				TSE355-4	2134	Fe510B				
1.0545		S355N		4360-50E		E355R	2334	FeE355KG				
1.0546		S355NL		4360-50EE		E355FP	2135	FeE355KT				
1.0547		S355J0H		4360-50C		TSE355-3	2172	Fe510C				
1.0549		S355NLH					2135	Fe510D				
1.0553	SM 520 M	St52-3U	A14880-40	4360-50C		320-560M	1606	Fe510C				
1.0562	SM490A	St E 355	A633 Gr. C	P 355 N		FeE355KGN	2132	Fe E 355 KG		K12000	15GF	
1.0565		W St E 355		P 355 NH		P 355 NH	2106	Fe E 355 KW		K01600		
1.0566	SLA 37	T St E 355		P 355 NL1		P 355 NL1	2107	Fe E 355 KT				
1.0570	SM 50 YA	St 52-3	1	4360-50 C	S355JR	E36-3	2172	Fe 510 B			17G15	
1.0715	SUM22	9SMn28	1213	230M07		S250	1912	CF5Mn28	F.2111	G12130		
1.0718	SUM22L	9SMnPb28	12L13			S250Pb	1914	CF95MnPb28	F.2112	G12134		
1.0721		10S20	1108	10S20		10S20		CF10S20	F.2121	G11080		
1.0722		10SPb20	11L08			10PbF2		CF10SPb20		G11084		
1.0736	SUM25	9SMn36	1215			S300		CF9Mn36	F.2113	G12150		
1.0737		9SMnPb36	12L14			S300Pb	1926	CF95MnPb36	F.2114	G12144		
1.0972		S315MC		1501-40F30		E315D						
1.0976		S355MC		1501-43F35		E355D	2642	FeE355TM				
1.0982		S460MC		1501-50F45								
1.0984		S500MC				E490D	2662	FeE490TM				
1.0986		S500MC		1501-60F55		E560D		FeE560TM				
1.1121	S10C	Cl10	1010	040A10		XC10	1265	C10	F.1510	G10100	10	
1.1141	S15	Cl15	1015	040A15	32C	XC15	1370	C15	F.1110	G10150	15	
1.1151	S20C	C22E	1020	055M15		2C22	1450	C20	F.1120	G10230	20	
1.8900	S25C	StE380	A572-60	436055E			2145	FeE390KG				
		St44-2	A36	436043A		NFA35-501E28	1411					
		StE320-3Z		1501160			1421					

Technical Information
Material Groups

P		VDI 3323 2	Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.45% C, Annealed					HB 190	HRC 13
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0501	S35C	C35	1035	080A32		1C35	1572	C35	F.113	G10350	35	
1.0503	S45C	C45	1045	060A47		XC42H1TS	1672	C45	F.114	G10450	45	
1.0511	S40C	C40	1040	080M40		1C40		C40	F.114.A	G10400	40	
1.0540	S 50 C	C50					1674	C50		G10500		
1.0551		GS-52	A2770-36	A2		280-480M	1505					
1.0553	SM 520 M	St52-3U	A14880-40	4360-50C		320-560M	1606	Fe510C				
1.0577		S355 J 2 G 4	A738	Fe 510 D 2 FF		A52EP	2107					
1.0726		35S20	1140	212M36	8M	35MF6	1957			G11400	40	
1.0727		45S20	1146			45MF4	1973			G11460		
1.1157		40Mn4	1039	150M36	15	40M5				G10390	40G	
1.1158	S25C	C25E	1025	070M25		XC25		C25	F.1120	G10250	25	
1.1166	SMn433H	34Mn5	1536						T0.B	G15360		
1.1167	SMn438(H)	36Mn5	1335	150M36		40M5	2120	36Mn6	F.1203	G13350	35G2	
1.1170	SCMn1	28Mn6	1330	150M28	14A	20M5		C28Mn	28Mn6	G13300	30G	
1.1178	S 30 C	C30E		080M30		XC32		C30	2C30	G10300		
1.1180		C35R	1035	080A35		3C35	1572		F.1135	G10350		
1.1181	S35C	C35E	1035	080A35		XC38	1572	C36	F.1130	G10340	35	
1.1191	S45C	Cl45	1045	080A46		XC45	1672	C45	F.1140		45	
1.1206	S 50 C	C50E	1050	080M50		2C50	1674	C50		G10500	50	
1.1213	S50C	Cl53	1050	070M55		XC48HTS	1674	C53		G10500	50	

P		VDI 3323 3	Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.45% C, Annealed					HB 250	HRC 25
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0481	SG365	17 Mn 4/P 295 GH	A516 Gr. 70	224-460B	P 295 GH	A 48 CP	2102	Fe E 295	A47RCI	K03501	14G2	
1.0501	S35C	C35	1035	080A32		1C35	1572	C35	F.1130	G10350	35	
1.0503	S45C	C45	1045	060A47		XC42H1TS	1672	C45	F.1140	G10450	45	
1.0614		C76D	1074			XC75				G10750		
1.0616		C86D	1086			XC80		C85		G10860		
1.0618		C92D	1095			XC90				G10950		
1.0726		35S20	1140	212M36	8M	35MF6	1957			G11400	40	
1.1157		40Mn4	1039	150M36	15	40M5				G10390	40G	
1.1165	SMn433H	30Mn5	1036	120M36		35M5		30Mn5	F.8211	K13300	30G2	
1.1167	SMn438(H)	36Mn5	1335	150M36		40M5	2120	36Mn6	F.1203	G13350	35G2	
1.1186	S40C	C40E	1040	060A40		2C40		C40		G10400		
1.1191	S45C	Cl45	1045	080M46		2C45	1672	C45	F.1140		45	
1.1201	S50C	C45R	1049	080M46		3C45	1660	C45	F.1145		38HM	
1.1213	S50C	Cl53	1050	070M55		XC48HTS	1674	C53		G10500	50	
1.7242	SCM 418 H	18CrMo4										
1.7337		16CrMo4-4	A387 Gr.12					A18CrMo45KW		K11564	15C M	
1.7362	SCMV 6	12CrMo195		3606-625		Z10CD5-05		16CrMo205		K41545		
		17MnV6	A572-60	436055E		NFA35-501E36	2142					

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Material Groups

P		VDI 3323 4	Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.75% C, Annealed					HB 270	HRc 28
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0603	S 70 C -CSP	C67	107	080A67		XC65		C67		G10700		
1.0605		C75	1075	144980HS				C75		G10740	75	
1.1203	S55C	CK55	1055	060A57		2C55	1655	C55	F.1150	G10550	55	
1.1209		C55R	1055	070M55		3C55		C55	F.1155	G10550		
1.1221	S58C	CK60	1060	060A62	43D	2C60	1678	C60	F.1150	G10640	60	
1.1231	S 70 C -CSP	C67E	1070	060A67		XC68	1770	C70	F.5103	G10700	65GA	
1.1248	C 75	C75E	1074	060A78		XC75	1774	C75	F.5107	G10800	75(A)	
1.1269	SK 5 -CSP	C85E	1086			XC90		C90		G10900	85(A)	
1.1274	SUP4	CK 101	1095	060 A 96	C 100S	XC100	1870	C100	F.5117	G10950		
1.1545	SK 3	C 105 W1	W1	BW 2	C 105U	Y1 105	1880	C 100 KU	F.5118		U10A	
1.1663	SK 2	C125W	W112			Y2120					U13	

P		VDI 3323 5	Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.75% C, Quenched & Tempered					HB 300	HRc 32
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0070		St 70-2	1055	Fe690-2FN	-	A70-2	1655	Fe 690	F.1150		55	
1.0535	S55C	C55	1055	070M55		1C55	1655	C55		J05000	55	
1.0601	S58C	C60	1060	060A62	43D	1C60		C60		G10600	60(G)	
1.1203	S55C	CK55	1055	060A57		2C55	1655	C55	F.1150	G10550	55	
1.1221	S58C	CK60	1060	060A62	43D	2C60	1678	C60	F.1150	G10640	60	
1.1274	SUP4	CK 101	1095	060 A 96	C 100S	XC100	1870	C100	F.5117	G10950		
1.1545	SK 3	C 105 W1	W1	BW 2	C 105U	Y1 105	1880	C 100 KU	F.5118		U10A	
1.1663	SK 2	C125W	W112			Y2120					U13	
1.5120		38MnSi4										
1.5710	SNC236	36NiCr6	3135	640A35	111A	35NC6						
1.7701		51CrMoV4						51CrMoV4				

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P		VDI 3323 6	Material Description Low-alloyed Steel			Composition / Structure / Heat Treatment Annealed					HB 180	HRc 10
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0116		St 37-3	A570 Gr. 36	4360-40C	S 235 J2 G3	E24-3	1312	Fe 360 D1(2)	AE235D		ST3KP	
1.0904	SKH 1, SKT 4	55Si7	9255	250A53	45	55S7	2085	55Si8	56Si7	G92550	55S2	
1.0961	SUP 7	60SiCr7	9262			60SC6		60SiCr8	60SiCr8	G92620		
1.2067		100Cr6	L3	BL3		Y100C6			100Cr6			
1.2108		90CrSi5	L1				2092	105WCr5				
1.2210		115CrV3	L2			100C3		107CrV3KU	F.520L		11KHF	
1.2241		51CrV4										
1.2330	SCM435TK	35CrMo4	4135	708A37		34CD4	2234	35CrMo4			35KHM	
1.2419	SKS31	105WCr6		105WC13		105WC13	2140	10WCr6			CWG	
1.2510	SKS3	100MnCrW4	01	B01		90 MNCV 5	2140	95 MnWCr 5 KU	F.5220		9KHHV	
1.2542		45WCrV7	S1	BS1			2710	45WCrV8KU			5CW2SF	
1.2550		60WCrV7	S1			55WC20	2710	58WCr9KU			5KHV2SF	
1.2713	SKT4	55NiCrMoV6	L6			55NCDV7			F.520S		5C NM	
1.2721		50NiCr13	L6			55NCV6	2550		F.528			
1.2842		90MnCrV8	02	B02		90MV8				T31502	9G2F	
1.3501		100Cr2	E50100									
1.3505	SUJ2	100Cr6	52100	25135	31	100C6	2258	100Cr6	F.1310		5C C 15	
1.5024		46Si7				45S7		46Si7	F.1451			
1.5025		51Si7	9259H		50Si7	51S7	2090	50Si7	F.1450			
1.5026		55Si7			56Si7	55S7	2085	55Si7	F.1440	G92550	55S2	
1.5027		60Si7	9260	251A60	60Si7	60S7		60Si7	F.1441	G92600	60S2	
1.5028	SUP7	65Si7	9260H									
1.5415	STFA 12	15Mo3	A204Gr.A	1503-243B		15D3	2912	16Mo3(KG)	F.2601	K11820		
1.5419	SCPH11	20Mo4	4419	1503-243-430			2512	G20Mo5		G44190		
1.5423	SB450M	16Mo5	4520	1503-245-420				16Mo5(KG)	F.2602	K11522		
1.5622		14Ni6	A350-LF5			16N6		14Ni6(KG)	F.2641			
1.5732	SNC415(H)	14NiCr10	3415			14NC11		16NiCr11				
1.5752	SNC815(H)	14NiCr14	3310	655M13	36A	12NC15					20X2H4A	
1.6511	SUP10	36CrNiMo4	9840	816M40	110	40NCD3		36NiCrMo4(KB)			40C N2MA	
1.6523	SNCM220(H)	21NiCrMo2	8620	805M20	362	20NCD2	2506	20NiCrMo2			20C GNM	
1.6546	SNCM240	40NiCrMo2-2	8740	311-Tyre7				40NiCrMo2(KB)			38C GNM	
1.6566		17NiCrMo6-4										
1.6587		17CrNiMo6		820A16		18NCD6		14NiCrMo13				
1.6657		10NiCrMo13-4						14NiCrMo131				
1.7015	SCr415(H)	10Cr3	5015	523M15		12C3				G50150	15C	
1.7033	SCr430(H)	34Cr4	5132	530A32	18B	32C4		34Cr4(KB)		G51300	35C	
1.7035	SCr440(H)	41Cr4	5140	530M40	18	42C4	2245	41Cr4		G51400	40H	
1.7131	SCR 415	16MnC5	5115	527M17		16MCS	2511	16MnCr5		G51150	12KHN2	
1.7139		16MnCr55					2127				18HG	
1.7176	SUP9(A)	55Cr3	5155	527A60	48	55C3	2253	55Cr3			50C GA	
1.7218	SCM420	25CrMo4	4130	CDS110		25CD4	2225	25CrMo4(KB)			20C M	
1.7220	SCM432	34CrMo4	4135	708 A 37		35CD4	2234	34CrMo4			35C M	
1.7223	SNB22-1	41CrMo4	4142					41CrMo4			40C FA	
1.7225	SCM 440 (H)	42CrMo4	4140	708 M 40	42 CrMo 4	42 CD 4	2244	42 CrMo 4	F.1252		38HM	
1.7228		55NiCrMoV6G		823M30	33		2512	653M31				
1.7262	SCM415(H)	15CrMo5				12CD4	2216	12CrMo4				
1.7321		20mOcr4					2625					
1.7335	SCM415(H)	13CrMo4-4	A182-F11	1501-620		15CD4-5	2216	14CrMo45			12C M	
1.7361		32CrMo12		722M24	40B	30CD12	2240	30CrMo12	F.124A			
1.7380		10CrMo9-10	A182F22	1501-622		12CD9-10	2218	12CrMo9			12KH8	

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P	VDI 3323 6		Material Description Low-alloyed Steel			Composition / Structure / Heat Treatment Annealed					HB 180	HRC 10	
	Mat'l No.	JIS	DIN	AISI/ASTM/ SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.7715		14MoV6-3			1503-660-440				13MoCrV6				
1.8159	SUP 10	50CrV4	6150	735A50	47	50CrV4	2230		50CrV4		G61500	50C GFA	
1.8161		58CrV4											
1.8509	SACM 645	41CrAlMo7	A355A	905M39	41B	40CAD6-12	2940		41CrAlMo7				
1.8523		39CrMoV13-9		897M39	40C				36CrMoV12				

P		VDI 3323 7	Material Description Low-alloyed Steel			Composition / Structure / Heat Treatment Quenched & Tempered					HB 275	HRC 29
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.5415	STFA 12	15Mo3	A204GrA	1503-243B		15D3	2912	16Mo3(KG)	F.2601	K11820		
1.5423	SB450M	16Mo5	4520	1503-245-420				16Mo5(KG)	F.2602	K11522		
1.5622		14Ni6	A350-LF5			16N6		14Ni6(KG)	F.2641			
1.5732	SNC415(H)	14NiCr10	3415			14NC11		16NiCr11				
1.5752	SNC815(H)	14NiCr14	3310	655M13	36A	12NC15					20X2H4A	
1.5755	SNC236	31NiCr14		653M31		18NC13	2534		F.1270			
1.6565	SNCM447	40NiCrMo6	4340	817M40	24	35NCD6	2541	35NiCrMo6(KB)			38C 2N2MA	
1.6587		17CrNiMo6		820A16		18NCD6		14NiCrMo13				
1.6657		10NiCrMo13-4						14NiCrMo131				
1.6957		26NiCrMoV14-5										
1.7015	SCr415(H)	10Cr3	5015	523M15		12C3				G50150	15C	
1.7262	SCM415(H)	15CrMo5				12CD4	2216	12CrMo4				
1.7335	SCM415(H)	13CrMo4-4	A182-F11	1501-620		15CD4-5	2216	14CrMo45			12C M	
1.7380		10CrMo9-10	A182F22	1501-622		12CD9-10	2218	12CrMo9			12KH8	
1.7715		14MoV6-3		1503-660-440				13MoCrV6				
1.7733		24CrMoV55				20CDV6		21CrMoV511				
1.7755		GS-45CrMoV10-4										
1.8070		21CrMoV511						35NiCr9				

P		VDI 3323 8	Material Description Low-alloyed Steel			Composition / Structure / Heat Treatment Quenched & tempered					HB 300	HRC 32
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.1730		C45W3	C45W			XC48						
1.2332	SCM(440)	47CrMo4	4142	708M40	19A	42CD4	2244	42CrMo4				
1.5736	SNC 631 (H)	36NiCr10	3435			30NC11						
1.6523	SNCM220(H)	21NiCrMo2	8620	805M20	362	20NCD2	2506	20NiCrMo2			20C GNM	
1.7033	SCr430(H)	34Cr4	5132	530A32	18B	32C4		34Cr4(KB)		G51300	35C	
1.7218	SCM420	25CrMo4	4130	CDS110		25CD4	2225	25CrMo4(KB)			20C M	
1.8515		32CrMo12		722M24	40B	30CD12	2240	32CrMo12	F.124A			

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P		VDI 3323 9	Material Description Low-alloyed Steel			Composition / Structure / Heat Treatment Quenched & Tempered					HB 350	HRC 38
Mat'l No.	JIS	DIN	AISI/ASTM/ SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0904	SKH 1, SKT 4	55Si7	9255	250A53	45	55S7	2085	55Si8		G92550	55S2	
1.0961	SUP 7	60SiCr7	9262			60SC6		60SiCr8		G92620		
1.2067		100Cr6	L3	BL3		Y100C6		100Cr6				
1.2419	SKS31	105WCr6		105WC13		105WC13	2140	10WCr6			CWG	
1.2542		45WCrV7	S1	BS1			2710	45WCrV8KU			5CW25F	
1.2713	SKT4	55NiCrMoV6	L6			55NCDV7			F.5205		5C NM	
1.4882		X50CrMnNiNbN219				Z50CMNNb21-09						
1.5120		38MnSi4										
1.5710	SNC236	36NiCr6	3135	640A35	111A	35NC6						
1.5755	SNC236	31NiCr14		830m31		18NC13	2534		F.1270			
1.6511	SUP10	36CrNiMo4	9840	816M40	110	40NCD3		36NiCrMo4(KB)			40C N2MA	
1.6546	SNCM240	40NiCrMo2-2	8740	311-Tyre7				40NiCrMo2(KB)			38C GNM	
1.7035	SCr440(H)	41Cr4	5140	530M40	18	42C4	2245	41Cr4		G51400	40H	
1.7176	SUP9(A)	55Cr3	5155	527A60	48	55C3	2253	55Cr3			50C GA	
1.7220	SCM432	34CrMo4	4135	708Aa37		35CD4	2234	34CrMo4			35C M	
1.7223	SNB22-1	41CrMo4	4142					41CrMo4			40C FA	
1.7225	SCM 440 (H)	42CrMo4	4140	708 M 40	42 CrMo 4	42 CD 4	2244	42 CrMo 4	F.1252		38HM	
1.7361		32CrMo12		722M24	40B	30CD12	2240	30CrMo12	F.124A			
1.8159	SUP 10	50CrV4	6150	735A50	47	50CrV4	2230	50CrV4	51CrV4	G61500	50C GFA	
1.8161		58CrV4										
1.8509	SACM 645	41CrAlMo7	A355A	905M39	41B	40CAD6-12	2940	41CrAlMo7				
1.8523		39CrMoV13-9		897M39	40C			36CrMoV12				

P	VDI 3323 10		Material Description High-alloyed steel, and tool steel			Composition / Structure / Heat Treatment Annealed					HB 200	HRC 15	
	Mat'l No.	JIS	DIN	AISI/ASTM/ SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0347	SPCD	RR St 3	A619	CR 3	Fe P03	F 13			DC03/FeP03			08JU	
1.0723	SUM32	15S22		210A15				1922		F.210F			
1.2080	SKD1	X210Cr12	D3	BD3	X210Cr12	Z200C12			X205Cr12KU		T30403	KH12	
1.2162	SCR 420 H	21MnCr5				20MCS							
1.2311		40CrMnMo7				40CMD8			35CrMo8KU				
1.2312		40CrMnMoS8.6	P20+S			40CMD8S							
1.2316		X36CrMo17			X38CrMo16								
1.2343	SKD 6	X38CrMoV5-1	H11	BH11		Z38CDV5			X37CrMoV51KU		T20811	4C 5MFS	
1.2344	SKD61	X40CrMoV5-1	H13	BH13		Z40CDV5	2242		X40CrMoV511KU	F.5318	T20813	4C 5MF1S	
1.2363	SKD12	X100CrMoV5-1	A2	BA2		Z100CDV5	2260		X100CrMoV51KU	F.5227		9KH5VF	
1.2379	SKD11	X155CrVMo121	D2	BD2		Z160CDV12	2310		X165CrMoW12KU		T30402	KH12MF	KRUPP2379
1.2436	SKD 2	X210CrW12	D4(D6)	BD6		Z200CD12	2312		X215CrW121KU	F.5213		KH12	

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P		VDI 3323 10	Material Description High-alloyed steel, and tool steel			Composition / Structure / Heat Treatment Annealed					HB 200	HRC 15
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.2510	SK53	100MnCrW4	01	B01		90 MWCV 5	2140	95 MnWCr 5 KU	F.5220		9KHVG	
1.2581	SKD5	X30WCrV9-3	H21	BH21		Z30WCV9		X30WCrV93KU	F.526	T20821	3C 2W8F	
1.2601		X165CrMoV12					2310	X160CrMoV12			KH12MF	
1.2606	SKD 62	X37CrMoW51	H12	BH12		Z35CWdV5		X35CrMoW05KU	F.537	T20812	5C NM	
1.2764		X19NiCrMo4										
1.2767		X45NiCrMo4				45NCD16		40NiCrMoV8KU				
1.2842		90MnCrV8	02	B02		90MV8		90MnVCr8KU		T31502	9G2F	
1.3243	SKH55	S6-5-2-5	T15			KCV06-05-05-04-02	2723	HS6-5-2-5			R6M5K5	
1.3249	SKH 3	S18-1-2-5	T4	BT4		Z80WKCV18-05-04					R18K5F2	
1.3343	SKH51, SKH9	S6-5-2	M2	BM2		Z85WDCV	2722	HS652	F.5604		R6M5	
1.3348	SKH 58	S2-9-2	M7			Z100DCWV09-04-02	2782	HS292	F.5607			
1.3355	SKH 2	S18-0-1	T1	BT1		Z80WCV18-4-01					R18	
1.4718	SUH1	X45CrSi9-3	HNv3	401S45	52	Z45CS9		X45CrSi8	F.322		40C 9S2	
1.5662	SL9N60(53)	X8Ni9	ASMA353	502-650		9Ni		X10Ni9	F.2645			
1.5680		12Ni19	2515	12Ni19		Z18N5						

P		VDI 3323 11	Material Description High-alloyed steel, and tool steel			Composition / Structure / Heat Treatment Quenched & Tempered					HB 325	HRC 35
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.2080	SKD1	X210Cr12	D3	BD3	X210Cr12	Z200C12		X205Cr12KU		T30403	KH12	
1.2344	SKD61	X40CrMoV5-1	H13	BH13		Z40CDV5	2242	X40CrMoV511KU	F.5318	T20813	4C 5MF1S	
1.2363	SKD12	X100CrMoV5-1	A2	BA2		Z100CDV5	2260	X100CrMoV51KU	F.5227		9KH5VF	
1.2436	SKD 2	X210CrW12	D4(D6)	BD6		Z200CD12	2312	X215CrW121KU	F.5213		KH12	
1.2581	SKD5	X30WCrV9-3	H21	BH21		Z30WCV9		X30WCrV93KU	F.526	T20821	3C 2W8F	
1.2601		X165CrMoV12					2310	X160CrMoV12			KH12MF	
1.2714	SKT 4	S5NiCrMoV7	6F3/L6			S5NiCrMoV7			F.5205		5KHNV	
1.3202		S12-1-4-5		BT15				HS12-1-5-5				
1.3207		S10-4-3-10		BT42		Z130WKCDV						
1.3243	SKH55	S6-5-2-5	T15			KCV06-05-05-04-02	2723	HS6-5-2-5			R6M5K5	
1.3246		S7-4-2-5	M35			Z110WKCDV07-05-04		HS7-4-2-5				
1.3247	SKH 51	S2-10-1-8	M42	BM42		Z110DKCWV09-08-04		HS2-9-1-8			R2AM9K5	
1.3255	SKH 3	S18-1-2-5	T4	BT4		Z80WKCV18-05-04					R18K5F2	
1.3343	SKH51, SKH9	S6-5-2	M2	BM2		Z85WDCV	2722	HS652	F.5604		R6M5	
1.3348	SKH 58	S2-9-2	M7			Z100DCWV09-04-02	2782	HS292	F.5607			
1.3355	SKH 2	S18-0-1	T1	BT1		Z80WCV18-4-01					R18	
1.4718	SUH1	X45CrSi9-3	HNv3	401S45	52	Z45CS9		X45CrSi8	F.322		40C 9S2	
1.4935	SUH 616	X20CrMoWV121	422							S42200		
1.5680		12Ni19	2515	12Ni19		Z18N5						

Technical Information
Material Groups

M		VDI 3323 12	Material Description Stainless steel			Composition / Structure / Heat Treatment Ferritic / Martensitic, Annealed					HB 200	HRC 15
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.4000	SUS403	X6Cr13	403	403S17		Z6C13	2301	X6Cr13	F.3110	S40300	08C 13	ATI 410S
1.4001		X7Cr14	410 S	403S7		Z8C13	2301		F.8401		08C 13	
1.4002	SUS 405	X6CrAl13	405	405S17		Z6CA13	2302	X6CrAl13		S40500		
1.4005	SUS416	X12CrS13	416	416S21		Z11CF13	2380	X12CrS13	F.3411	S41600		ATI 416
1.4006	SUS410	X12Cr13	410	410S21	56A	Z10C13	2302	X12Cr13	F.3401	S41000	12C 13	ATI 410
1.4016	SUS430	X6Cr17	430	430S15	X8Cr17	Z8C17	2320	X8Cr17	F.3113	S43000	12C 17	ATI 430
1.4027	SCS 2	GX20Cr14		420C29		Z20C13M					20C 13L	
1.4028	SUS420J2	X30Cr13	420	420S45		Z30C13	2304			S42020	20C 13	
1.4034	SUS420J2	X46Cr13		420S45		Z40C14		X40Cr14	F.3405			
1.4057	SUS431	X19CrNi17-2	431	431S29	57	Z15CN16-02	2321	X16CrNi16	F.3427	S43100	20C 17N2	431 (HT)
1.4086		GX120Cr29		452C11								
1.4104	SUS430F	X12CrMoS17	430F	420S37		Z10CF17	2383	X10CrS17	F.3117	S43020		
1.4112	SUS 440 B	X90CrMoV18	440B							S44003	95KH18	
1.4113	SUS434	X6CrMo17	434	434S17		Z8CD17-01	2325	X8CrMo17		S43400		AL 434
1.4313	SCS5	X3CrNi13-4	CA6-NM	425C11		Z4CND13-04M	2385	(G)X6CrNi304		J91540		
1.4340		GX40CrNi274								J92615		
1.4417		X2CrNiMoSi195	S31500				2376			S39215		
1.4418		X4CrNiMo165				Z6CND16-04-01	2387					APX4
1.4510	SUS430LX	X6CrTi17	XM8			Z4CT17		X6CrTi17	F.3115	S43035	08C 17T	430 Ti
1.4511	SUS430LK	X6CrNb17				Z4CNb17		X6CrNb17	F.3122			AXC525
1.4512	SUH409	X6CrTi12	409	LW19		Z3CT12		X6CrTi12		S40900		
1.4720		X20CrMo13										
1.4724	SUS 405	X10CrAl113	405	403S17		Z10C13		X10CrAl112	F.311		10C 13SJU	
1.4742	SUS430	X10CrAl118	430	439S15	60	Z10CAS18		X8Cr17	F.3113	S43000	15C 13SJU	
1.4747	SUH4	X80CrNiSi20	HNv6	443S65	59	Z80CSN20-02		X80CrSiNi20	F.320B	S65006		
1.4749		X18CrN28	446								15KH28	
1.4762	SUH446	X10CrAl124	446			Z10CAS24	2322	X16Cr26		S44600		
1.4871	SUH35,SUH36	X53CrMnNiN21-9	EV8	349S54		Z52CMN21-09		X53CrMnNiN219		S63008	55C 20G9AN4	
		X10CrNi15	429									
		X12CrNi18-9	302	302S31		Z10CN18-09	2330					

M		VDI 3323 13	Material Description Stainless steel			Composition / Structure / Heat Treatment Martensitic, Quenched & Tempered					HB 240	HRC 23
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.4000	SUS403	X6Cr13	403	403S17		Z6C13	2301	X6Cr13	F.3110	S40300	08C 13	ATI 410S
1.4001		X7Cr14	410 S	403S7		Z8C13	2301		F.8401		08C 13	
1.4006	SUS410	X12Cr13	410	410S21	56A	Z10C13	2302	X12Cr13	F.3401	S41000	12C 13	ATI 410
1.4016	SUS430	X6Cr17	430	430S15	X8Cr17	Z8C17	2320	X8Cr17	F.3113	S43000	12C 17	ATI 430
1.4021	SUS 420I1	X20Cr13	420	420S37		Z20C13	2303	14210	F.5261	S42000	20C 13	ATI 420
1.4027	SCS 2	GX20Cr14		420C29		Z20C13M					20C 13L	
1.4031	SUS 420J2	X40Cr13	420			Z40C14	-2304		F.3404	S42080	40C 13	
1.4034	SUS420J2	X46Cr13		420S45		Z40C14		X40Cr14	F.3405			
1.4057	SUS431	X19CrNi17-2	431	431S29	57	Z15CN16-02	2321	X16CrNi16	F.3427	S43100	20C 17N2	431 (HT)
1.4104	SUS430F	X12CrMoS17	430F	420S37		Z10CF17	2383	X10CrS17	F.3117	S43020		
1.4113	SUS434	X6CrMo17	434	434S17		Z8CD17-01	2325	X8CrMo17		S43400		AL 434
1.4313	SCS5	X3CrNi13-4	CA6-NM	425C11		Z4CND13-04M	2385	(G)X6CrNi304		J91540		
1.4544		A 700	321	S.524		Z 10 CNT 18 11		X6CrNiTi1811		J92630	08C 18N12T	
1.4546		X5CrNiNb18-10	348	347S31				X6CrNiNb1811		J92640		ATI 348
1.4871	SUH35,SUH36	X53CrMnNiN21-9	EV8	349S54		Z52CMN21-09		X53CrMnNiN219		S63008	55C 20G9AN4	
1.4922		X20CrMnV12-1					2317	x20CrMnOn1201				
1.4923		X22CrMoV121										Jethete X20

Technical Information

Material Groups

M		VDI 3323 14	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Stainless steel			Austenitic					180	10
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.4301	SUS 304	X5CrNi18-10	304	304S15		Z5CN18-09	2332		F.3551	S30409	08C 18N10	
1.4305	SUS303	X10CrNiS18-10	303	303S21	58M	Z8CNF18-09	2346	X10CrNiS18.09	F.3508	S30300	30C 18N11	ATI 303
1.4306	SCS19	X2CrNi1911	304L	304C12	X3CrNi1810KD	Z2CN18-09	2352	GX2CrNi1910	F.3503	S30403	03KH18N11	ATI 304L
1.4308	SUS304L	GX6CrNi18-9	CF-8	304C15	58E	Z6CN18-10M	2333					CF-8
1.4310	SUS 301	X10CrNi18-8	301	301S21		Z12CN17-07	2331	X2CrNi1807	F.3517	S30100	07KH16N6	ATI 301
1.4311	SUS304LN	X2CrNi18 10	304LN	304S62		Z2CN18-10	2371	X2CrNiN1810	F.3541	S30453	03KH18N11	
1.4312	SCS12	GX10CrNi188	305	302C25		Z10CN18-9M					10C 18N9L	ATI 305
1.4350	SUS304	X5CrNi18-9	304	304S15	58E	Z6CN18-09	2332	X5CrNi1810	F.3551	S30400		ATI 304
1.4362		X2CrNiN234	S32304			Z2CN23-04AZ	2327			S32304		ATI 2304TM
1.4371		X3CrMnNiN18887	202	284S16		Z8CMN18-08-05						
1.4401	SUS316	X5CrNiMo17-12-2	316	316S13		Z3CND17-11-01	2347	X5CrNiMo17 12 2	F.3534	S31600	08KH17H13M2T	ATI 316
1.4404	SUS316L	X2CrNiMo17-13-2	316L	316S11		Z2CND17-12	2348	X2CrNiMo1712	F.3533	S31603		ATI 316L
1.4406	SUS316LN	X2CrNiMoN17122	316LN	316S61		Z2CND17-12AZ		X2CrNiMoN1712	F.3542	S31653	07C 18N	ATI 316LN
1.4408	SCS14	GX6CrNiMo18-10	CF-8M	316C16			2343	X7CrNiMo2010	F.8414	J92900	10G2S2MSL	
1.4410	SCS 14 A	GX10CrNiMo18-9				Z5CND20-12M	2328			S32750		
1.4429	SUS316LN	X2CrNiMoN17-13-3	316Ln	316S62		Z2CND17-13AZ	2375	X2CrNiMoN17133	F.3543		03KH16N15M3	
1.4435	SUS316L	X2CrNiMo18143	316L	316S11		Z3CND17-12-03	2375	X2CrNiMo17 13 2	F.3533	S31603	03C 17N14M3	
1.4436	SUS316	X3CrNiMo17-13-3	316	316S19		Z6CND18-12-03	2343	X5CrNiMo17 12 2	F.3543	S31600		
1.4438	SUS317L	X2CrNiMo18164	317L	317S12		Z2CND19-15-04	2367	X2CrNiMo18 16 4	F.3539	S31703		ATI 317L
1.4439		X2CrNiMoN17135	(s31726)			Z3CND18-14-06AZ						
1.4440		X2CrNiMo18-16										
1.4449	SUS317	X5CrNiMo17133	317	317S16				X5CrNiMo1815		S31700		ATI 317
1.4460	SUS 329 J1	X8CrNiMo275	329				2324			S32900		10RES1
1.4462	SUS329J3L	X2CrNiMoN2253		318S13		Z3CND22-05AZ	2377			S31803		ATI 2205TM
1.4500		X7NiCrMoCuNb2520				Z3NCDU25-20M				J95150		
1.4521	SUS444	X2CrMoTi18-2	443444				2326	X2CrMoTiNb 18 2	F.3123			
1.4539		X1NiCrMoCuN25205				Z2NCDU25-20	2562			N08904		ATI 904L
1.4541	SUS321	X14CrNiTi18-10		321S31		Z6CNT18-10	2337	X6CrNiTi18 11	F.3523	S32100	06C 18N10T	ATI 321
1.4542	SUS630	X5CrNiCuNb174		630		Z7CNU15-05						UGIMA 4542
1.4545		Z7CNU15.05	15-SPH							S15500		ATI 15-5
1.4547		X1CrNiMoN20187	S31254				2378			S31254		Uranus B25 6Mo
1.4550	SUS347	X6CrNiNb18-10	347	347S17	58F	Z6CNNb18-10	2338	X6CrNiNb18 11	F.3552	S34700	08C 18N12B	ATI 347
1.4552	SCS 21	GX7CrNiNb18-9				Z4CNNb19-10M				J92710		
1.4568	SUS 631	X 7 C r N i A I 17 7		316S111		Z 9 C A N 17-7	2388	Z8CNA17-07		S17700	09C 17N1U1	17-7PH
1.4571	SUS 316Ti	X6CrNiMoTi17-12-2	316Ti	320S31	58J	Z6NDT17-12	2350	X6CrNiMoTi17 12	F.3535		10C 17N13M2T	ATI 316Ti
1.4581	SCS 22	GX5CrNiMoNb18		318C17		Z4CNDNb18-12M						
1.4583		X6CrNiMoNB18-12	318	303S21		Z15CNS20-12		X15CrNiSi2 12				
1.4585		GX7CrNiMoCuNb1818						X6CrNiMoTi17 12		J94651		
1.4821		X20CrNiSi254				Z20CNS25-04				S44635		
1.4823		GX40CrNiSi274								J92605		
1.4828	SCS17	X15CrNiSi20-12	309	309S24	58C	Z15CNS20-12			F.8414	S30900	20C 20N14S2	ATI 309
1.4833	SUS 309 S	X6CrNi2213	309S	309S13		Z15CN24-13				J93400		
1.4845	SUH310	X12CrNi25-21	310S	310S24		Z12CN25-20	2361	X6CrNi2520	F.331	S31008	20C 23N18	ATI 310S
1.4878	SUS321	X12CrNiTi18-9	321	321S20	58B	Z6CNT18-12(B)	2337	X6CrNiTi1811	F.3553	S32100		ACX315
1.4891		X5CrNiNb18-10	S30415				2372					
1.4893		X8CrNiNb11	S30815				2368					
1.4948		X6CrNi1811	304H	304S51		Z5CN18-09	2333			S30480		
1.4980		X5NiCrTi2515	660				2570			S66286		Incoloy A 286
		X5NiCrN3525										
		X2CrNiMoN18134	S31753									
		X2CrNiMoN25227										

Technical Information

Material Groups

K		VDI 3323 15	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Grey cast iron			Pearlitic / Ferritic					180	10
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
0.6010	FC100	GG10	A48 20 B	Grade 100	GJL-100	Ft 10 D	0100	G10	FG10		Sc 10	
0.6015	FC150	GG15	A48 25 B	Grade 150	GJL-150	Ft 15 D	0115	G15	FG15		Sc 15	
0.6020	FC200	GG20	A48 30 B	Grade 220	GJL-200	Ft 20 D	0120	G20	FG20	W06020	Sc 20	
0.6025	FC250	GG25	A48 40 B	Grade 260	GJL-250	Ft 25 D	0125	G25	FG25		Sc 25	
0.6660		GGL-NiCr 20 2	1050/700/7	Grade F2	GJLA-XNiCr 20-2	L-NC 202	0523	-		F41002		Ni-Resist 2
1.4449	SUS317	X5CrNiMo17133	317	317S16				X5CrNiMo1815		S31700		ATI317

K		VDI 3323 16	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Grey cast iron			Pearlitic (Martensitic)					260	26
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
0.6025	FC250	GG25	A48 40 B	Grade 260	GJL-250	Ft 25 D	0125	G25	FG25		Sc 25	
0.6030	FC300	GG30	A48 45 B	Grade 300	GJL-300	Ft 30 D	0130	G30	FG30		Sc 30	
0.6035	FC350	GG35	A48 50 B	Grade 350	GJL-350	Ft 35 D	0135	G35	FG35		Sc 35	
0.6040	FC400	GG40	A48 60 B	Grade 400	GJL-400	Ft 40 D	0140	G40	FC40		Sc 40	

K		VDI 3323 17	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Nodular cast iron			Ferritic					160	3
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
0.7033	FCD350-22L	GGG35.3	-	350/22L40	GJS-350-22-LT	FGS 370-17	0717-15	-				
0.7040	FCD400	GGG40	60-40-18	SNG 420-12	GJS-400-15	FCS 400-12	0717-02	GS 400-12	FG E38-17	F32800	Vc 42-12	
0.7043	FCD 370	GGG40.3	60-40-18	SNG 370-17	GJS-400-18-LT	FGS 370-17	0717-12	GS0 42-17			Vc 42-12	
0.6040	FC400	GG40	A48 60 B	Grade 400	GJL-400	Ft 40 D	0140	G40	FC40		Sc 40	

K		VDI 3323 18	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Nodular cast iron			Pearlitic					250	25
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
0.7050	FCD500	GGG50	80-55-06	SNG 500-7	GJS-500-7	FGS 500-7	0727-02	GS 500-7	FG E50-7	F33100	Vc 50-2	
0.7060	FCD600	GGG60	80-55-06	SNG 600-3	GJS-600-3	FGS 600-3	0732-03	GS 600-3	FG E60-2		Vc 60-2	
0.7070	FCD700	GGG70	100-70-03	SNG 700-2	GJS-700-2	FGS 700-2	0737-01	GS 700-2	FG S70-2	F34800	Vc 70-2	
0.7652	FCD A-NiMn 13 7	GGG NiMn 13-7	-	Grade S6	GJSA-XNiMn 13-7	FGS Ni13 Mn7	0772	-				Nodumag
0.7660		GGG NiCr 20-2	A436 D2	Grade S2	GJSA-XNiCr 20-2	FGS Ni20 Cr2	0776	-				Ni-Resist D-2

Technical Information
Material Groups

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

K		VDI 3323 20		Material Description			Composition / Structure / Heat Treatment					HB	HRc
				Malleable cast iron			Pearlitic					230	21
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
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

N		VDI 3323 21		Material Description			Composition / Structure / Heat Treatment					HB	HRc
				Aluminum-wrought alloy			Not Curable					60	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
3.0205		Al99	Al99										
3.0255	(A1050)	Al99.5	1000	L31		A59050C					D1		
3.3315		AlMg1											

N		VDI 3323 22		Material Description			Composition / Structure / Heat Treatment					HB	HRc
				Aluminum-wrought alloy			Curable, Hardened					100	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
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		

N		VDI 3323 23		Material Description			Composition / Structure / Heat Treatment					HB	HRc
				Aluminum-cast, alloyed			≤ 12% Si, Not Curable					75	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
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			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

N		VDI 3323 24	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Aluminum-cast, alloyed			≤ 12% Si, Curable, Hardened					90	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.1871		G-AlCu4TiMg										
3.1754		G-AlCu5Ni1,5										
3.2371		G-AlSi7Mg	4218B								AK8	
3.2373	C4BS	G-AlSi9MgWA	SC64D			A-S7G	4251				AK9	
3.2381		G-AlSi10Mg									AK12	
3.5106		G-MgAg3SE2Zr1	QE22	mag12								
		G-ALMG5	GD-AISI112	LMS		A-SU12	4252					

N		VDI 3323 26	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Copper and Copper Alloys (Bronze / Brass)			Cutting alloys, PB>1%					110	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.0375		CuZn36Pb3									LS60-2	
2.1090		G-CuSn75pb	C93200			U-E7Z5pb4						
2.1096		G-CuSn5ZnPb	c83600	LG2								
2.1098		G-CuSn2Znpb	C83600									
2.1182		G-CuPb15Sn	C23000	LB1		U-pb15E8						

N		VDI 3323 27	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Copper and copper alloys (Bronze / Brass)			CuZn, CuSnZn (Brass)					90	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.0240	C2300	CuZn15									L90	
2.0321		CuZn37	C27200	c2108		CuZn36,CuZn37		C2700			L63	
2.0590		G-CuZn40Fe										
2.0592		G-CuZn35Al1	C86500	U-Z36N3		HTB1						
2.0596		G-CuZn34Al2	C86200	HTB1		U-Z36N3					LI523AD	
2.1293		CuCrZr	C18200	CC102		U-Cr0-8Zr						

N		VDI 3323 28	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Copper and copper alloys (Bronze / Brass)			CuSn, lead-free copper and electrolytic copper					100	
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.0060		E-Cu57										
2.0966		CuAl10Ni5Fe4	C63000	Ca104		U-A10N					BrAD	
2.0975		G-CuAl10Ni	B-148-52									
2.1050		G-CuSn10	c90700	CT1								
2.1052		G-CuSn12	C90800	pb2		UE12P						
2.1292		G-CuCrF35	C81500	CC1-FF								

Technical Information
Material Groups

S		VDI 3323 31	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Heat resistant super alloys			Fe Based, Annealed					200	15
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.4558	NCF 800TB	X2NiCrAlTi3220	N08800	NA15								
1.4562		X1NiCrMoCu32287	N08031									
1.4563		X1NiCrMoCuN31274	N08028			Z1NCDU31-27-03	2584				EK77	
1.4864	SUH330	X12NiCrSi36-16	330	NA17		Z12NCS37-18				N08330		
1.4865	SCH15	GX40NiCrSi38-18		330C40				XG50NiCr3919		J94605		
1.4958		X5NiCrAlTi3120										

S		VDI 3323 32	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Heat resistant super alloys			Fe Based, Aged					280	30
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.4977		X40CoCrNi2020				Z42CNKDOWNb						

S		VDI 3323 33	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Heat resistant super alloys			Ni or Co Based, Annealed					250	25
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.4360		NiCu30Fe		NA13		NU30				N04400		Monel400
2.4603		NiCr 30 FeMo	5390A			NC22FeD						Hastelloy G-30
2.4610		NiMo16Cr16Ti								N26455		HastelloyC-4
2.4630		NiCr20Ti		HRS,203-4		NC20T				N06075		Nimonic75
2.4631	NCF 80A	NiCr20TiAl		Hr40		NC20TA				N07080	KHN77TYuR	Nimonic 80A
2.4642	NCF 690	NiCr29Fe				Nnc30Fe				N06690		Inconel 690
2.4856		NiCr22Mo9Nb		NA21		NC22FeDNb				N06625		Inconel 625
2.4858		NiCr21Mo		NA16		NC21FeDU				N08825	KHN38VT	Incoloy 825

S		VDI 3323 34	Material Description			Composition / Structure / Heat Treatment					HB	HRc
			Heat resistant super alloys			Ni or Co Based, Aged					350	38
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
2.4375		NiCu30Al	4676	NA18		NU30AT				N05500		MonelK500
2.4662		NiFe35Cr14MoTi	5660			ZSNCDT42				N09901		Incoloy 901
2.4668		NiCr19Fe19NbMo	5383	HR8		NC19eNB				N07718		Inconel 718
2.4670		S-NiCr13A16MoNb	5391	Mar-46		NC12AD						Nimocast 713
2.4694		NiCr16Fe7TiAl								N07751		Inconel 751
2.4955		NiFe25Cr20NbTi										
2.4964		CoCr20W15Ni	5772			KC20WN						Haynes 25
		CoCr22W14Ni	AMS 5772			KC22WN						

Technical Information
Material Groups

S		VDI 3323 35	Material Description Heat resistant super alloys			Composition / Structure / Heat Treatment Ni or Co Based, Cast					HB 320	HRc 34
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
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

S		VDI 3323 36	Material Description Titanium alloys			Composition / Structure / Heat Treatment Pure Titanium					HB 400 Rm	HRc
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
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		

S		VDI 3323 37	Material Description Titanium alloys			Composition / Structure / Heat Treatment Alpha + Beta Alloys, Hardened					HB 1050 Rm	HRc
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
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

H		VDI 3323 38	Material Description Hardened steel			Composition / Structure / Heat Treatment Hardened					HB 550	HRc 55
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
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 105W1	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	

H		VDI 3323 40	Material Description Chilled cast iron			Composition / Structure / Heat Treatment Cast					HB 400	HRc 42
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
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		GX300CrNMoz71	-	Grade 3 E		-	-	-			20C 25N20S2	
1.4841	SUH 310	X15CrNiSi25-20	310	314S31	X 15 CrNiSi 25 20	Z15CNS25-20	-	-		S31400		Cronifer 2520

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

Technical Information
Comparison Chart - Turning Chipbreakers

Negative Inserts

Material	YG	Sandvik	Iscar	Kenna metal	Seco	Walter	Mitsu bishi	Kyocera	Tungaloy	Sumi tomo	Taegutec	Korloy	Duracarb
STEEL	UF	PF	F3P NF	FF FN	F1 MF2	FP5	FH LP	GP PP	TF	FL SP	FG FA	VF HU	41
	UL		PP NF			FP5	FY SY	CQ VF	TSF	LU	FC FT	HC	43
	UM		TF	MN	M3	MP3	MP	HS	TM	GU UX	MC PC	VM GM	46
	UG	PM	GN M3P	MN	M3 MR3	MP5	MP MA	PS	TM	UG	MT PC	GR HR	45
	UC	PR	NR	MP RP	MR4	RP5	Standard	Standard	TH	UZ	MG-	B25	53
	UR	PR	NR R3P	UN RN MG-	MR3 MR6	RP7	RP MH RK	PT PH	THS	ME MU	RT	GR	
STAINLESS STEEL	MF	MF	SF	FF	MF1	NF4	LM	MQ	SF HRF	SU	EA ML	HA	
	MM	MM	M3M	MP	MF3 MF4	NM4	MM	MS	SM	GU	EM	GS	42
	MR	MR	F3M	RF	M5	NR4	RM	MS MU	SH	EM	ET RT	RM	
CAST IRON	UC	PR	NR	MP RP	MR4	MK5	Standard	Standard	All Round	UZ	MG-	B25	53
	UR	PR	NR R3P	UN RN MG-	MR3 MR6	RK5 RK7	RP MH RK	PT PH	CH	ME MU	RT	GR	
	..MA			RP	MR7	..MA	MG-	C	CH	GZ	..MA		53

Positive Inserts

Material	YG	Sandvik	Iscar	Kenna metal	Seco	Walter	Mitsu bishi	Kyocera	Tungaloy	Sumi tomo	Taegutec	Korloy	Duracarb
STEEL	UF	PF	PF	LF UF	MF2	PF2 FP4	FM LM LP	GQ PP	01 PSF	FP	FG	HFP	41
	UG	PM		MF	MF3	MP4 FP6	MP Standard MM MV	HQ	PS PM	MU	MT	C25	51
STAINLESS STEEL	UF	PF	PF	LF	MF2	MM4 PS5	FM LM LP	GQ PP	PM	FP	FG	HFP	41
CAST IRON	UG	PM		UF	MF3	MK4 RK4	MP Standard MM MV	HQ	CM	MU	MT	C25	51
ALUMINUM	AL		AS	MF	AL	PF2 PM2	AZ	CF CK	AL	AG	FL	AK	AU

Technical Information
Comparison Chart - Turning Grades

ISO	YG	Sandvik	Iscar	Kenna metal	Seco	Walter	Mitsu bishi	Kyocera	Tungaloy	Sumi tomo	Taegutec	Korloy	Duracarb
P10	YG3010	GC4305 GC4205 GC4315 GC4215	IC8005 IC428 IC8150 IC9015	KCP05 KC9105 KCP10 KC9110	TP0501 TP0500 TP1501 TP1500	WPP01 WPP05S WPP10S	UE6105 MC6015 UE6110	CA5505 CA510 CA515 CA5515	T9105 T9115	AC8015P AC810P	TT8115	NC3010 NC3215	DC9015
P20	YG3020 (YG801)	GC4325 GC4225	IC8250 IC9015	KCP25 KC9125	TP2501 TP2500	WPP20S	MC6025 UE6020	CA525 CA5525	T9125	AC8025P AC820P	TT8125	NC3220 NC3225 NC3120	DC9025
P30	YG3030 (YG801)	GC4335 GC4235	IC8350 IC8025	KCP30 KC9140	TP3501 TP3500	WPP30S	MC6035 UE6035 VP15TF	CA530 CA5535 CR9025	T9135	AC8035P AC830P AC630M	TT5100 TT8135	NC3030 NC5330 PC3545	DC9025 DC8035
M10	YG211	GC2015 GC1115	IC807 IC6015 IC8150	KCS10 KCM15(B) KC5010	CP200 TS2000	WSM10S	MC7015 VP10RT US7020	CA6515 PR930	T6120 AH110 AH8005 AH8015	AC610M	TT9215 TT5080	PC8105 PC8110	
M20	YG3030	GC2025 GC1125	IC3028 IC808 IC8250	KCM25(B) KCU25 KC5025	TM2000 TS2500	WMP20S WSM20S WSM21	MC7025 VP15TF VP20MF VP20RT UP20M	CA6525 PR1025 PR1125 PR1425	T6130 AH120 AH725 SH725 GH330	AC6030M AC610M AC520U	TT9225	PC8115 NC9115 PC5300	
M30	YG213	GC2035	IC6025 IC8350	KCM35(B)	CP500	WSM30S	US735 MP7035	PR1535	AH630 SH730 GH730	AC6030M AC630M AC830P	TT9235 TT9020 TT9080	NC9125 NC5330 PC9030	DC8035
M40	YG214				CP600 TM4000 TP40		US735 MP7035		AH645	AC6040M AC530U	TT9235 TT8020 TT8080	NC9135 PC5400	
K05	YG1001	GC3205	IC5005	KCK05	TK1001 TK1000	WKK10S	MC5005 UC5105	CA4505 CA4010	T5105	AC405K	TT7005	NC6205	DC820 DC610
K10	YG1001	GC3210	IC5010 IC5100	KCK15	TK1001 TK1000	WKK10S	MC5015 UC5115	CA4515 CA4115	T515	AC415K	TT7310 TT7015	NC6210	
K15	YG3010	GC3215	IC8150	KCK20	TK2001 TK2000	WKK20S WKP30S	UE6110 VP15TF	CA4120	T5125	AC420K	TT6300	NC6215	
S10	YG211	GC1105 S05F H13A	IC807 IC808	K313 K68 KCS10 KCU10 KC5010	TS2000 TS2050 TS2500 CP200	WSM10S WS10	VP05RT MP9005 VP10RT MP9015	CA6515 PR1305 PR1310	AH110 AH120 AH8005 AH8015 AH905 SH730	AC510U	TT9215 TT5080	PC8105 PC8110 PC8115	DC820 DC610
S20	YG213	GC1115	IC806	KCU25 KC5025	890 883	WSM20S WSM21	VP15TF VP20RT	CA6525 PR1125 PR1325 PR1535	AH725	AC520U	TT9225 TT9080	NC9125 NC9135 PC5300	
S30	YG214	GC1125			CP500 CP600	WSM30S		PR1125 PR1535			TT9235 TT8020 TT8080	PC5400	



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