Milling ISO Insert Code System

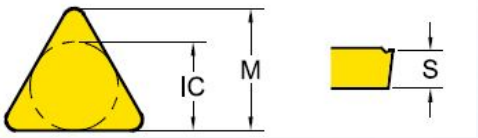
1	2	3	4	5	6	7
A	**P**	**K**	**T**	**16**	**04**	**08**
Shape	Relief Angle (AN)	Tolerance	Clamping & Chipbreaker	Insert Size	Insert Thickness (S)	CornerRadius

1 - Shape

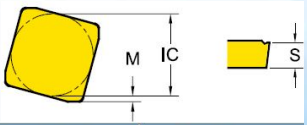
Symbol	Shape	
H	Hexagonal	
O	Octagonal	
P	Pentagonal	
S	Square	
T	Triangular	
V	Rhombic 35°	
W	Trigon	
L	Rectangular	
A	Parallelogram 80°	
R	Round	

2 - Clearance/Reflief Angle

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	



3 - Tolerance Class



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

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

4 - Clamping and Chipbreaker

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

Milling ISO Insert Code System

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Shape	Relief Angle (AN)	Tolerance	Clamping & Chipbreaker	Insert Size	Insert Thickness (S)	CornerRadius

5 - Insert Size

* No Standard for milling insert size

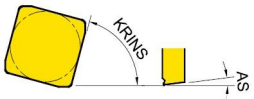
6 - Insert Thickness

* No Standard for milling insert thickness

7 - Corner Radius

Symbol	Corner Radius - RE (mm)	Symbol	Corner Radius - RE (mm)
04	0.4	**16**	1.6
08	0.8	**20**	2.0
12	1.2	**24**	2.4

(| 8 | 9 |) | 10 |
|---|---|---|---|
| **PDTR** | **-TR** | | **YG602** |
| Corner Geometry | Chipbreaker | | Grade |



8 - Corner geometry

8-1	8-2	8-3	8-4
P	**D**	**T**	**R**
Cutting Edge Angle (KRINS)	Wiper Edge Clearance (AS)	Edge Condition	Feed Direction

8-1 - Cutting edge angle

Symbol	Cutting Edge Angle (KRINS)
P	90°
A	45°
D	60°
E	75°
F	85°
Z	Special

8-3 - Edge Condition

Symbol	Edge Condition
F	Sharp
E	Rounded
T	Chamfered
S	Chamfered and Rounded

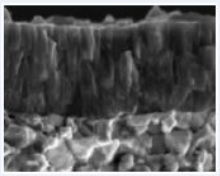
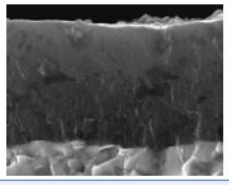
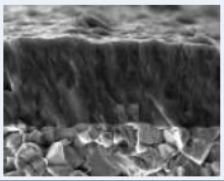
8-2 - Wiper edge clearance

Symbol	Wiper Edge Clearance (AS)
N	0°
P	11°
D	15°
E	20°
F	25°
Z	Special

8-4 - Feed Direction

Symbol	Feed Direction
R	Right-hand Insert
N	Neutral Insert
L	Left-hand Insert

YG-1 Milling Inserts Grades

YG602 P20 - P35 M20 - M40 K20 - K40 S15 - S25	PVD - TiAlN 	**Universal grade for General Milling Application** • Ultra Dense PVD Coating with optimal thermal resistance & strength • Sub-Micron substrate designed for demanding application
YG622 P20 - P40 K20 - K40	PVD - TiAlN 	**Optimized Grade for High Alloyed or Prehardened Steel** **Excellent hot hardness and oxidation resistance at high speed**
YG712 P10 - P30	PVD - AlTiCrN 	**General Milling Grade for Steel**

Milling insert Chip breakers

-AL		• For Aluminum • Very Sharp Geometry	**-TR**		• For Hardened Steels • Reinforced Geometry
-ST		• For Stainless Steel, Super Alloy • Sharp Geometry	**...W / ...N**		• For Hardened Material and Cast Irons
General Inserts (No Description)		• First Choice for General Application			

Milling insert Grades Table

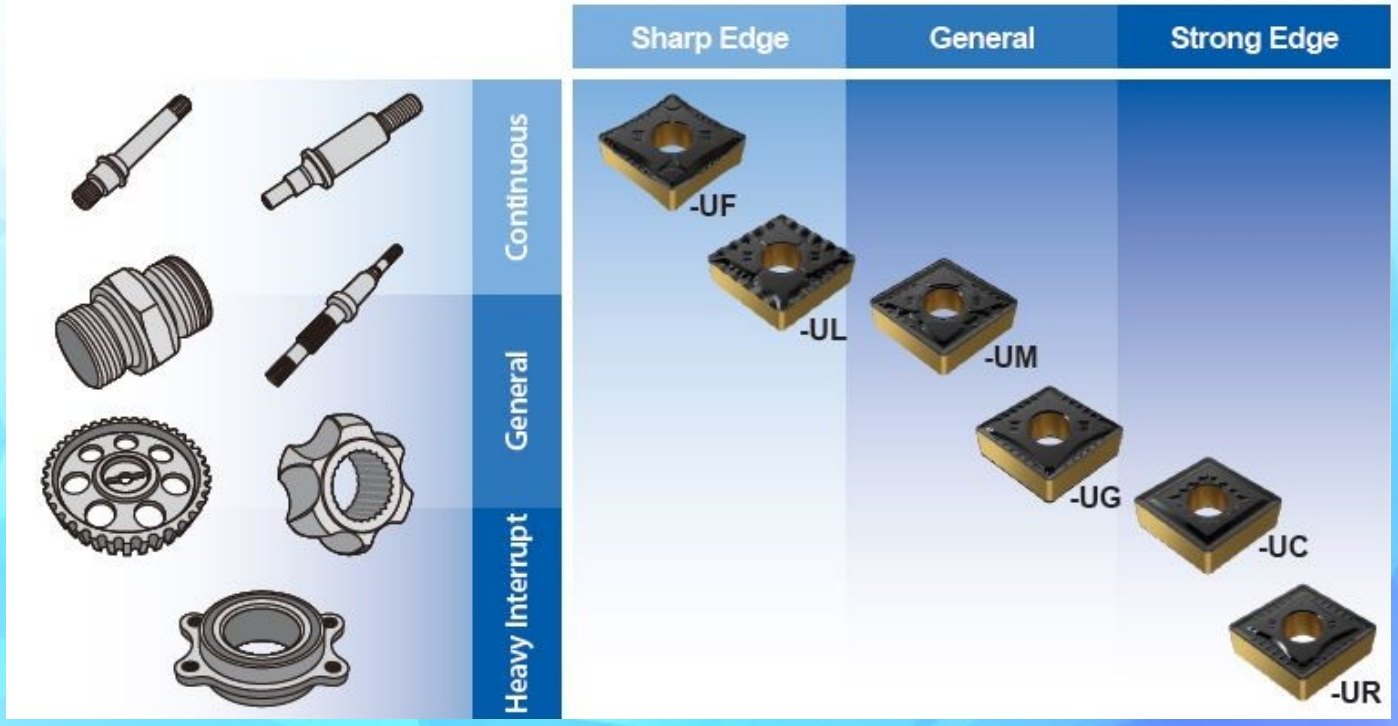
Milling Grades		P Steel P05 P15 P25 P35	M Stainless Steel M05 M15 M25 M35	K Cast Iron K05 K15 K25 K35	N Non Ferrous N05 N15 N25 N35	S Super Alloy S05 S15 S25 S35
PVD	YG602	602	602	602		602
	YG622	622		622		
	YG712	712				

Inserts application Guide

Steel Guide

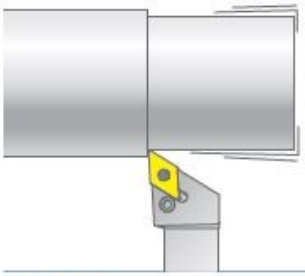
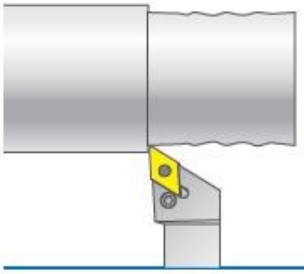
Grade Recommendation based on Workpiece Material Condition

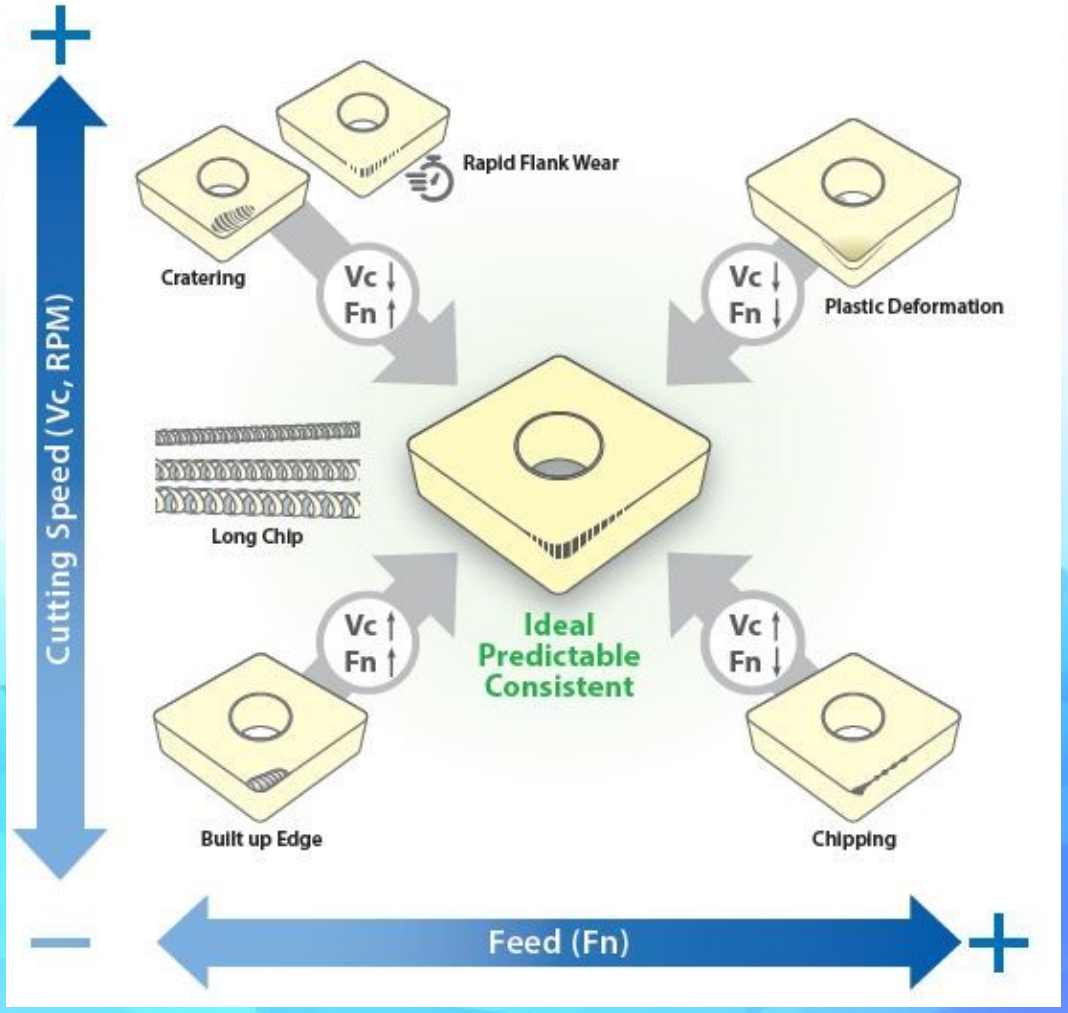
Chipbreaker, Feed Rate and Depth of Cut



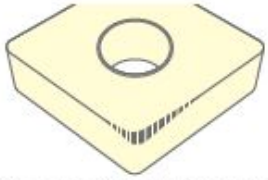
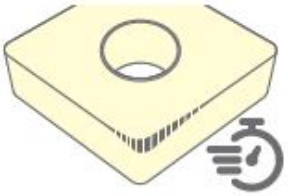
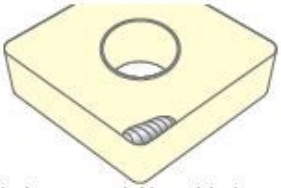
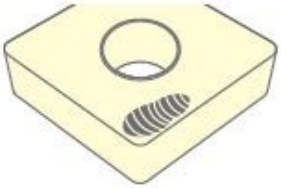
Inserts Trouble Shooting

Trouble Shooting

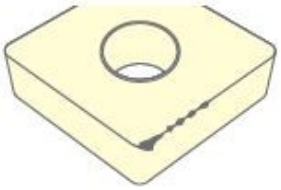
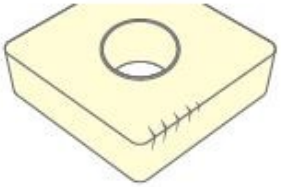
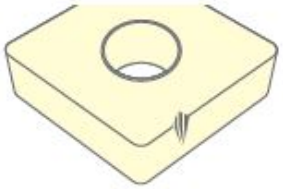
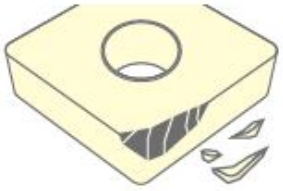
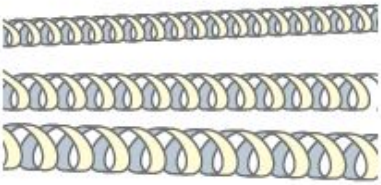
Pattern	Reasons	Solutions
Vibration		
	- High radial or tangential force - Unstable condition	- Lower depth of cut (ap) - Use sharper chipbreaker - Check stability, and position of tool and workpiece - Reduce the overhang (bigger and shorter tool)
Bad Surface		
	- Work material is damaged by chips - Feed is too high for corner radius	- Different chipbreaker - Lower depth of cut (ap) - Lower feed - Bigger corner radius



Inserts Trouble Shooting

Pattern	Reasons	Solutions
General Flank Wear  Flank face near by corner is abrased	- 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 (Vc, SFM, RPM or SFPM) - Optimize coolant - Increase Feed (Fn) 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 (Vc, SFM, RPM or SFPM) - Lower feed (Fn) - Lower depth of cut (ap) - 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 (Vc, SFM, RPM or SFPM) - Adjust Feed (Fn) - Harder grade

Inserts 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