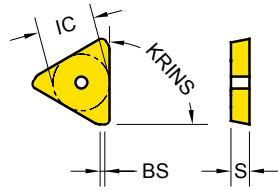


Milling - Shoulder Milling - Inserts

**TPKN / KR / CN** - Shoulder Milling Positive (3 Corner ISO)



Series	KRINS	IC	S
TP** 1603	90°	9.53	3.18
TP** 2204	90°	12.70	4.76

**EDP 1200..**

●: Stock item ○: Order made item

P25	P30	P20	P30	P40	K15	K15
M30				M40	H15	K15
K30	K30					
S20						











TPKR	TPKN	TPCN	Designation	RE (mm)	Fz (mm/tooth)	BS (mm)	YG602	YG622	YG712	YG713	YG613	YG501	YG5020	
<b>TPKR</b> General			TPKR 1603 PDTR		0.15 ~ 0.28	1.2	● 0060				● 0690			
			TPKR 1603 PDTR -PW		0.11 ~ 0.20	1.2	● 0300							
			TPKR 2204 PDTR		0.18 ~ 0.35	1.7	● 0061					● 0715		
			TPKR 2204 PDTR -PW		0.18 ~ 0.35	1.7	● 0301							
<b>TPKN</b> Hard Materials			TPKN 1603 PDTR		0.15 ~ 0.30	1.2	● 0062							
			TPKN 1603 PDTR -GW		0.15~0.30	1.6	● 0306							
			TPKN 1603 PDTR -PW		0.15~0.28	1.2	● 0302							
			TPKN 2204 PDTR		0.17 ~ 0.30	1.7	● 0063							
			TPKN 2204 PDTR -GW		0.24~0.40	2.5	● 0307							
<b>TPCN</b> Ground insert			TPCN 2204 PDSR -M		0.05 ~ 0.20	1.76			● 0180					
			TPCN 2204 PDSR -MR		0.05 ~ 0.20	1.76			● 0202					

- PW : for Improved Surface Roughness
- GW : Ground Wiper
- M : for Mold & Die
- MR : for Mold & Die Roughing



Cutting Speed			Vc (m/min.)													
ISO	VDI	Sub Group	YG602		YG622		YG712		YG713		YG613		YG501		YG5020	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
P	1~5	Non-Alloyed Steel	180	380	140	400	170	300	200	300	100	210	-	-	-	-
	6~9	Low-Alloyed Steel	120	300	120	320	180	250	170	270	70	180	-	-	-	-
	10~11	High-Alloyed Steel	70	150	70	170	100	140	85	145	40	90	-	-	-	-
M	12~13	Ferritic & Martensitic	120	200	-	-	-	-	-	-	70	180	-	-	-	-
	14	Austenitic Stainless Steel	130	250	-	-	-	-	-	-	70	200	-	-	-	-
K	15~16	Grey Cast Iron	120	250	120	270	-	-	-	-	-	-	160	300	200	350
	17~18	Nodular Cast Iron	130	220	130	240	-	-	-	-	-	-	130	210	150	300
N	21~30	Non-Ferrous Metals (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	31~37	Superalloys & Titanium	25	45	-	-	-	-	-	-	-	-	-	-	-	-
H	38~41	Hard Materials	40	80	40	100	-	-	-	-	-	-	-	-	-	-

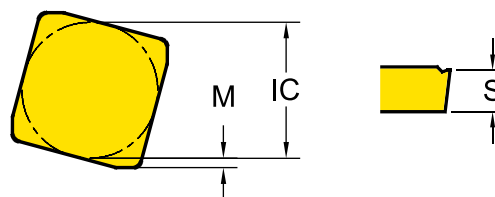
<b>1</b> <b>A</b> Shape	<b>2</b> <b>P</b> Relief Angle (AN)	<b>3</b> <b>K</b> Tolerance	<b>4</b> <b>T</b> Clamping & Chipbreaker	<b>5</b> <b>16</b> Insert Size	<b>6</b> <b>04</b> Insert Thickness (S)	<b>7</b> <b>08</b> CornerRadius
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**1 - Shape**

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

**2 - Relief Angle (AN)**

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








**3 - Tolerance Class**

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

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

**4 - Clamping & Chipbreaker**

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

**5 - Insert Size**

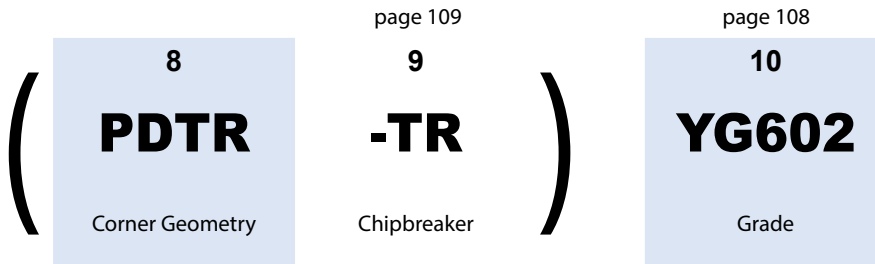
\* No Standard for milling insert size

**6 - Insert Thickness**

\* No Standard for milling insert thickness

# Milling - Code System

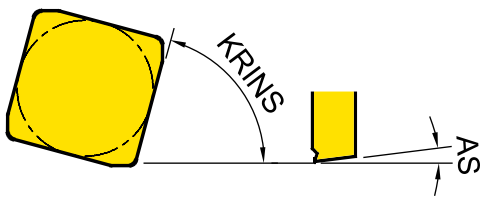
## Insert ISO Code System



### 7 - Corner Radius (RE)

Symbol	Thickness - S (mm)	Symbol	Thickness - S (mm)
<b>04</b>	0.4	<b>16</b>	1.6
<b>08</b>	0.8	<b>20</b>	2.0
<b>12</b>	1.2	<b>24</b>	2.4

### 8 - Corner Geometry



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

\*Refer to page. 109 for -AL, -ST, -TR... types

#### 8-1 - Cutting Edge Angle (KRINS)

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

#### 8-3 - Edge Condition

Symbol	Edge Condition
<b>F</b>	Sharp
<b>E</b>	Rounded
<b>T</b>	Chamfered
<b>S</b>	Chamfered and Rounded

#### 8-2 - Wiper Edge Clearance (AS)

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

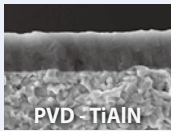
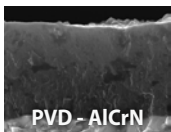
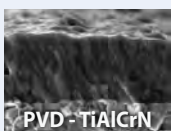
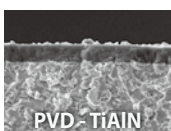
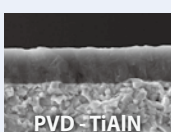
#### 8-4 - Feed Direction

Symbol	Feed Direction
<b>R</b>	Right-hand Insert
<b>N</b>	Neutral Insert
<b>L</b>	Left-hand Insert

# Milling Grades and Chipbreakers

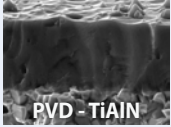
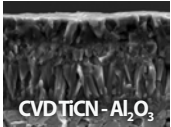
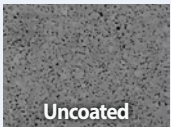
## Milling Grades

Milling Grades	P Steel					M Stainless steel				K Cast iron				N Non-ferrous				S Superalloys				
	P05	P15	P25	P35	P45	M05	M15	M25	M35	K05	K15	K25	K35	N05	N15	N25	N35	S05	S15	S25	S35	
PVD	YG602		602				602				602								602			
	YG622		622								622											
	YG712		712																			
	YG713		713																			
	YG613			613				613														
	YG501										501											
CVD	YG5020									5020												
Uncoated	YG50													50								






<p><b>YG602</b></p> <p>P20 - P35    M20 - M40</p> <p>K20 - K40    S15 - S25</p>	 <p>PVD - TiAlN</p>	<p><b>Universal grade for General Milling Application</b></p> <ul style="list-style-type: none"> <li>• Ultra Dense PVD Coating with optimal thermal resistance &amp; strength</li> <li>• Sub-Micron substrate designed for demanding application</li> </ul>
<p><b>YG622</b></p> <p>P20 - P40</p> <p>K20 - K40</p>	 <p>PVD - AlCrN</p>	<p><b>Optimized Grade for High Alloyed or Prehardened Steel</b></p> <p>Excellent hot hardness and oxidation resistance at high speed</p>
<p><b>YG712</b></p> <p>P10 - P30</p>	 <p>PVD - TiAlCrN</p>	<p><b>Milling Grade for Medium of Steel Application</b></p> <ul style="list-style-type: none"> <li>• Superior wear resistance and excellent toughness in high speed machining</li> <li>• Coating layer with high hardness and oxidation resistance</li> </ul>
<p><b>YG713</b></p> <p>P15 - P25</p>	 <p>PVD - TiAlN</p>	<p><b>Milling Grade for General Steel Application</b></p> <ul style="list-style-type: none"> <li>• Multi-layer TiAlN structure realizes stronger crater and flank wear resistance</li> <li>• Fine-grained carbide and balanced substrate</li> </ul>
<p><b>YG613</b></p> <p>P30 - P50</p> <p>M30 - M40</p>	 <p>PVD - TiAlN</p>	<p><b>Milling Grade for Stainless Steel Application</b></p> <ul style="list-style-type: none"> <li>• New coating layer with high toughness and lubrication on ultra fine grain substrate with high toughness.</li> <li>• The toughest substrates provides excellent cutting performance in stainless steel</li> </ul>

# Milling Grades and Chipbreakers

## Milling Grades

<p><b>YG501</b> K05 - K25 H05 - H25</p>	 <p>PVD - TiAlN</p>	<p><b>Hard Milling grade for Cast Iron</b></p> <ul style="list-style-type: none"> <li>• Substrate especially designed for high wear resistance</li> <li>• Excellent wear resistance in cast iron milling application</li> </ul>
<p><b>YG5020</b> K01 - K30</p>	 <p>CVD TiCN - Al<sub>2</sub>O<sub>3</sub></p>	<p><b>CVD Milling grade for Cast Iron</b></p> <ul style="list-style-type: none"> <li>• CVD coating for Excellent wear resistance</li> <li>• Improved Toughness for chipping resistance</li> </ul>
<p><b>YG50</b> N05 - N20</p>	 <p>Uncoated</p>	<p><b>Uncoated Milling Grade for Aluminium</b></p> <ul style="list-style-type: none"> <li>• Submicron carbide substrate for high wear resistance</li> <li>• Preventing built up edge with shining surface</li> </ul>

## Milling Chipbreakers

<p><b>-AL</b></p>		<ul style="list-style-type: none"> <li>• For Aluminum</li> <li>• Very Sharp Geometry</li> </ul>
<p><b>-ST</b></p>		<ul style="list-style-type: none"> <li>• For Stainless Steel, Super Alloy</li> <li>• Sharp Geometry</li> </ul>
<p><b>General Inserts</b> (No Description)</p>		<ul style="list-style-type: none"> <li>• First Choice for General Application</li> </ul>
<p><b>-TR</b></p>		<ul style="list-style-type: none"> <li>• For Hardened Steels</li> <li>• Reinforced Geometry</li> </ul>
<p><b>...W / ...N</b></p>		<ul style="list-style-type: none"> <li>• For Hardened Material and Cast Irons</li> </ul>