KTN / KTNS / SIN

Workpiece Material	Recommended Insert Grade (Vc sfm)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**GW15 (KW10)**
Carbon Steel	☆ 330-490	☆ 330-490	★ 330-490	-
Initial D.O.C. (Radial)	0.0118" or less	0.0118" or less	0.0118" or less	-
Alloy Steel	☆ 330-490	☆ 330-490	★ 330-490	-
Initial D.O.C. (Radial)	0.0118" or less	0.0118" or less	0.0118" or less	-
Stainless Steel	☆ 200-260	☆ 200-260	★ 200-260	-
Initial D.O.C. (Radial)	0.0098" or less	0.0098" or less	0.0098" or less	-
Cast Iron	-	-	-	★ 330
Initial D.O.C. (Radial)	-	-	-	0.0118" or less
Aluminum	-	-	-	★ 150~400
Initial D.O.C. (Radial)	-	-	-	0.0118" or less
Brass	-	-	-	★ 150~300
Initial D.O.C. (Radial)	-	-	-	0.0118" or less

° For 06IR/08IR, please lower it to a figure under 40% of above conditions.

★ : 1st Recommendation ☆ : 2nd Recommendation

- Coolant is recommended.
- When using cermet inserts if edge chipping occurs lightly hone cutting edge with diamond file.
- For stainless steel threading, please set smaller intial D.O.C. and two or three more passes than threading for carbon steel.

Lead Angle of Thread

Thread's Lead Angle β as shown in Fig. 1 decides from the Work Diameter (Pitch Dia.) "D" and Lead "L"(in case of Single-start Thread, it is the same as Pitch "P"). Rolling a right-angled Triangle around a Cylinder and the Angle ACB in Fig. 2 becomes the Lead Angle β. The Calculation Formula is shown as follows.

$$\tan\beta = \frac{L}{DD} = \frac{nP}{\pi D}$$

[β: Lead Angle D: Pitch Dia. n: Number of Thread (such as double-start thread) P: Pitch
L: Lead (In case of single-start thread, it is equal to P. In case of n-start thread, it is equal to nxP)]

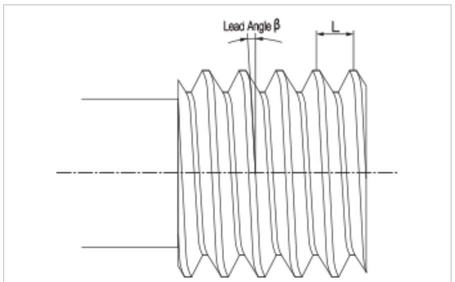

Fig. 1

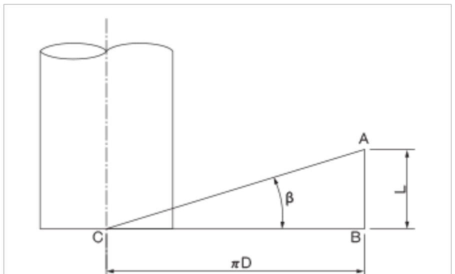

Fig. 2

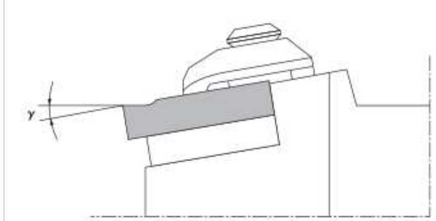

Fig. 3

Relief Angle of Thread

Against this Lead Angle, the Threading Insert needs Side Relief Angle α. TNN type Threading Insert is a negative Insert and it does not prepare the Relief Angle originally. But when installing the Insert on the Toolholder, the Edge Inclination Angle 3 is prepared as shown in Fig. 3, and it generates both the front Relief Angle and the Side Relief Angle α. This Side Relief Angle is obtained by the Formula as follows. (See Fig. 4)

$$\tan\alpha = \tan\gamma \times \tan\left(\frac{\theta}{2}\right)$$

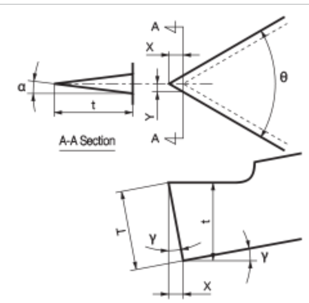

Fig. 4

Symbol	e.g.)
α: Side Relief Angle	
γ: Inclination Angle after Installing Insert	External Insert : 10° Internal Insert : 15°
θ: Insert's Thread Angle	Metric : 60° Tapered Pipe : 55° 30° Trapezoidal : 30°
T: Insert Thickness	

$$\begin{cases} X = T\sin\gamma \\ Y = X\tan(\theta/2) = t\tan\alpha \\ t = T\cos\gamma \end{cases}$$

Table 1

Inserts	Side Relief Angle α	
	External	Internal
60° Thread (M, UN, NPT)	5° 49´	8° 47´
55° Thread (W, G, PT)	5° 14´	7° 56´
30°Trapezoidal (Tr)	2° 43´	5° 7´

See table 1 for the Side Relief Angle depending on the insert.
However, the Side Relief Angle for 1°is set by the toolholder itself, and the actual Side Relief Angle becomes α + 1°.