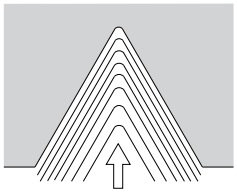
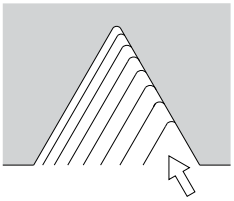
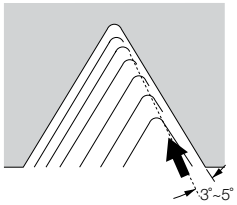
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Infeed Methods

Infeed Methods	Features
 Radial Infeed	• The cutting edge moves toward the center of the workpiece every pass. • Suitable for relatively small pitch size threading. • V-shape chips are generated and chip control may be difficult depending on workpiece material. • Chips prevent coolant from reaching tool tip causing poor tool life.
 Flank Infeed	• Used for large pitch size threading. • No DOC on right side of the figure causes insert wear and on materials that work harden will cause hardening of this surface. • Chips flow to one side.
 Flank Compound Infeed	• Recommended method to reduce work hardening and improve insert life. • 3-5 degrees for steel and up to 12 degrees for stainless materials. • Chips flow to one side allowing coolant to reach insert tip. • This method is recommended to threading by 2-thread insert.

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)]

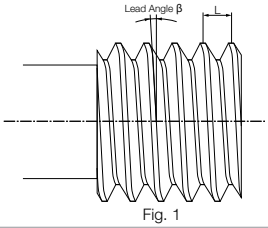


Fig. 1

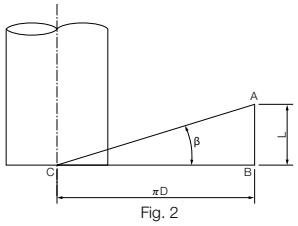


Fig. 2

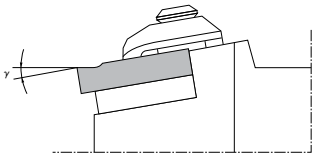


Fig. 3

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)

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

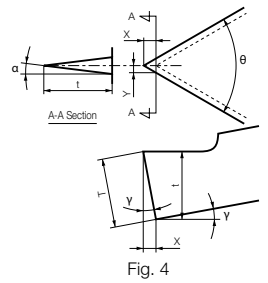


Fig. 4

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°.

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