True Rake Angle

$$\tan T = \tan R \times \cos C + \tan A \times \sin C$$

Inclination Angle

$$\tan I = \tan A \times \cos C - \tan R \times \sin C$$

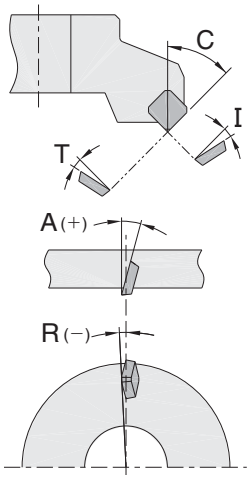
A : Axial Rake Angle A.R. [°] (-90° < A < 90°)

R : Radial Rake Angle R.R. [°] (-90° < R < 90°)

C : Approch Angle [°] (0° < C < 90°)

T : True Rake Angle [°] (-90° < T < 90°)

I : Inclination Angle [°] (-90° < I < 90°)



Ball-Nose Endmill Cutting & Revolution

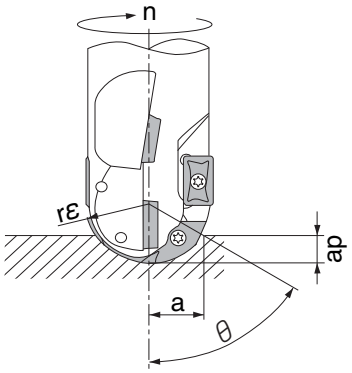
$$n = \frac{1000 \times V_a}{2 \times \pi \times \sqrt{a(2r\varepsilon - ap)}}$$

n : Revolution [min-1]

rε : Radius of Ball-Nose Endmill (Ball Part's redius [mm])

ap : Depth Of Cut [mm]

V_a : Cutting Speed at Point "a" [m/min]



Drilling

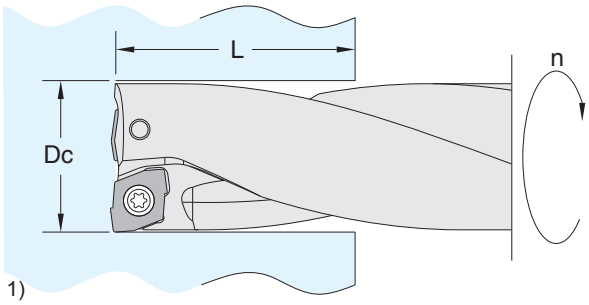
Cutting Speed

$$Vc = \frac{\pi \times Dc \times n}{1000}$$

Vc : Cutting Speed [m/min]

Dc : Drill Diameter [mm]

n : Spindle Revolution [min^{-1}]



Feed Rate (Milling)

$$Vf = fz \times Z \times n$$

Vf : Table Feed [mm/min]

fz : Feed per Tooth [mm/t]

Z : Number of Insert (Number of Insert = 1)

n : Spindle Revolution [min^{-1}]

Cutting Time

$$T = \frac{60 \times L}{f \times n} = \frac{60 \times \pi \times Dc \times L}{1000 \times Vc \times f}$$

T : Cutting Time [second]

L : Drilling Depth [mm]

f : Feed Rate [mm/rev]

n : Spindle Revolution [min^{-1}]

Dc : Drill Diameter [mm]

Vc : Cutting Speed [m/min]

Power Requirement (Reference Value)

$$Pc = \frac{Dc}{20} \times \frac{Vc}{100} \times \left(1 + \left(\frac{2.5 \times f}{0.1}\right)\right)$$

Pc : Power Requirement [kw]

Dc : Drill Diameter [mm]

Vc : Cutting Speed [m/min]

f : Feed Rate [mm/rev]