Calculation for Cutting Speed, Spindle Speed and Feed

$$\text{Cutting Speed (V)} = \frac{\pi \times D \times N}{1{,}000}$$

$$\text{Spindle Speed (N)} = V \div \pi \div D \times 1{,}000$$

$$\text{Feed (F)} = N \times fz \times Z$$

$$\text{Feed per Tooth (fz)} = \frac{F}{N \times Z}$$

V = Cutting Speed (m/min)
π = 3.14 The circular Constant
D = Diameter (mm)
N = RPM (min^{-1})
F = Feed (mm/min)
fz = Feed per Tooh (mm/tooth)
Z = Number of Flutes

Selection of Number of Flute

	2-Flutes	3-Flutes	4-Flutes	6-Flutes
Slotting	◎	◎	○	×
Side Milling	○	◎	◎	◎

Generally 2-flutes and 3-flutes are selected for slotting because of the larger chip pocket.
4-flutes and 6-flutes are recommended for side milling as no promble of chip disposal.

Cutting Speed (V)

Appropriate Cutting Speed should be decided by parameters such as tool material, diameter, length of cut, work material, cutting machine, rigidity of tool holder, machining configuration, accuracy, cutting fluid, and etc.
Generally tool material and work material are main factors to determine the Cutting Speed.

Work Materials	Cutting Speed (m/min)	
	Carbide	Coated Carbide
Carbon Steels (S50C)	20~40	40~80
Alloy Steels (SCM.SKD)	20~35	35~60
Prehardened Steels (NAK.HPM)	15~30	30~50
Stainless Steels (SUS304)	5~20	10~30
Hardened Steels (SKD61.HRC60)	-	20~40

Feed per Tooth (fz)

Feed per Tooth is an important element for efficient machining which should be determined by parameters such as tool diameter,type, work material, cutting machine, rigidity of tool holder, machining configuration, accuracy and cutting depth.

Diameter(mm)	Feed per tooth (mm/tooth)	
	2-Flutes	4-Flutes
1	0.001~0.005	
6	0.02~0.04	0.01~0.03
10	0.04~0.08	0.03~0.06
20	0.08~0.12	0.06~0.1