

Basic Formulas

Milling

Cutting Speed

$$V_c = \frac{\pi \times D_s \times n}{1000}$$

V_c : Cutting Speed [m/min]

D_s : Cutter Diameter [mm]

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

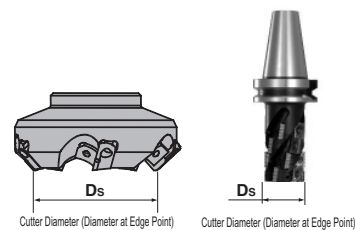


Table Feed & Feed per Tooth

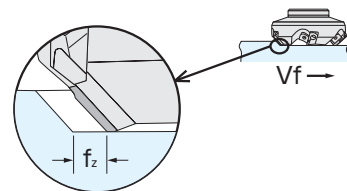
$$f_z = \frac{V_f}{Z \times n}$$

f_z : Feed per Tooth [mm/t]

V_f : Table Feed [mm/min]

Z : Number of Inserts

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



Power Requirement

$$P_c = \frac{K_s \times Q}{6120 \times \eta} = \frac{K_s \times a_e \times V_f \times a_p}{6120000 \times \eta}$$

$$= \frac{K_s \times a_e \times f_z \times Z \times n \times a_p}{6120000 \times \eta}$$

$$P_{HP} = \frac{6120}{4500} \times P_c$$

P_c : Power Requirement [kW]

P_{HP} : Power Requirement (Horse Power) [HP]

a_e : Width of Cut [mm]

V_f : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : Number of Inserts

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

a_p : Depth Of Cut [mm]

K_s : Specific Cutting Resistance [kgf/mm²]

η : Mechanical Efficiency (0.7 ~ 0.8)

Ks Figure	
Low Carbon Steel	190
Medium Carbon Steel	210
High Carbon Steel	240
Low Alloy Steel	190
High Alloy Steel	245
Cast Iron	93
Malleable Cast Iron	120
Bronze, Brass	70

Chip Removal Volume

$$Q = \frac{a_e \times V_f \times a_p}{1000} = \frac{a_e \times f_z \times Z \times n \times a_p}{1000}$$

Q : Chip Removal Volume [cm³/min]

a_e : Width of Cut [mm]

V_f : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : Number of Inserts

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

a_p : Depth Of Cut [mm]

Cutting Time

$$T = \frac{60 \times L'}{V_f} = \frac{60 \times L'}{f_z \times Z \times n}$$

T : Cutting Time [second]

L' : Total Table Transfer Length [mm]

$(=L + D_s + 2\alpha)$

L : Work Length [mm]

D_s : Cutter Diameter [mm]

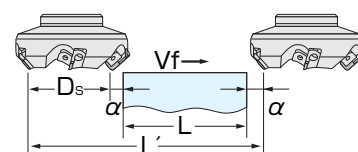
α : Idling Distance [mm]

V_f : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : Number of Inserts

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



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Technical
Information