

Milling – Cutting data

Nomenclature and formula

RPM

$$n = \frac{v_c \cdot 12}{\pi \cdot D} \quad (\text{rev/min})$$

Cutting speed

$$v_c = \frac{n \cdot \pi \cdot D}{12} \quad (\text{ft/min})$$

Feed speed

$$v_f = n \cdot z \cdot f_z \quad (\text{inch/min})$$

$$v_f = n \cdot K \cdot f_z \quad (\text{inch/min})$$

Feed per revolution

$$f = z \cdot f_z \quad (\text{inch/rev})$$

$$f = K \cdot f_z \quad (\text{inch/rev})$$

Metal removal rate

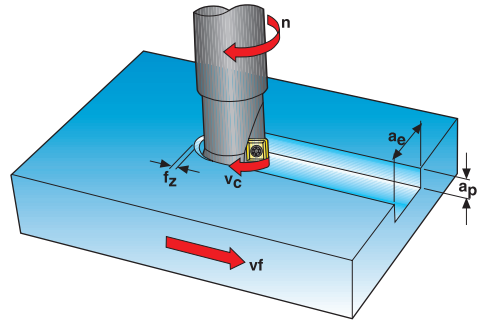
$$Q = a_e \cdot a_p \cdot v_f \quad (\text{inch}^3/\text{min})$$

Cutting speed and RPM for copying

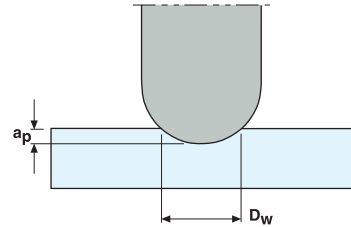
$$v_c = \frac{n \cdot \pi \cdot D_w}{12} \quad (\text{ft/min})$$

$$n = \frac{v_c \cdot 12}{\pi \cdot D_w} \quad (\text{RPM})$$

$$D_w = 2 \cdot \sqrt{R^2 - (R - a_p)^2} \quad (\text{inch})$$

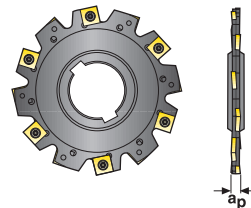


D = Cutter diameter
z = No of teeth
K = Effective No. of teeth for calculation of feed speed or feed per rev (see below)
v_c = Surface footage/min.
n = Rev./min. RPM
v_f = Table travel (in./min.)
f_z = Feed per tooth
f = Feed per revolution
Q = Metal removal rate in. ³/min.
a_e = Width of cut/radial depth of cut
a_p = Depth of cut/axial depth of cut
R = Cutter radius
D_w = Working diameter



Effective No. of teeth (K)

The effective No. of teeth (K) is used to calculate the feed speed (v_f) and the feed per revolution (f). For most of the cutters the effective No. of teeth (K) is equal to the No. of teeth in the cutter (z), but for some of the cutters K is less than z.



Example: Disc mill 335.19

Total No. of teeth (z) = 12

Effective No. of teeth (K) = 6

Explanation: 6 inserts on one side of the cutter and 6 overlapping inserts on the other side are used to get the full width (a_p), which means K = 6.