

General Information

FORMULAE (METRIC)

DRILLING

RPM

$$n = \frac{V_c * 1000}{\pi * D}$$

n = RPM

V_c = cutting speed (m/min.)

D = diameter (mm)

Table feed

$$V_f = n * fn$$

V_f = feed rate (mm/min.)

n = r/min (RPM)

fn = feed/rev

Thrust, Axial Force

$$T = 11.4 * K * D * (100 * fn)^{0.85}$$

Power

$$P = \frac{1.25 * D^2 * K * n * (0.056 + 1.5 * fn)}{100,000}$$

To convert to HP multiply by 1.341

P = Power (kW)

K = material factor

T = thrust (N)

D = diameter (mm)

V_f = rate of feed (mm/min.)

n = r/min (RPM)

fn = feed/rev

MILLING

RPM

$$n = \frac{V_c * 1000}{\pi * D}$$

n = RPM

V_c = cutting speed m/min.

D = diameter in mm

Torque

$$M_c = \frac{a_p * a_e * v_f * k_c}{2 \pi * n}$$

M_c = Cutting Torque [Nm]

a_p = axial depth [mm]

a_e = radial depth [mm]

h_m = average chip thickness
[mm or inch]

z = correction factor joined
to average chip thickness

where

$$h_m = \frac{fz * a_e * 360}{D * \pi * \arccos\left[1 - \frac{2 * a_e}{D}\right]}$$

Table feed

$$V_f = n * f_z * z$$

V_f = feed rate mm/min.

f_z = feed/tooth

z = no. of teeth

Power

$$P_c = \frac{a_p * a_e * v_f * k_c}{60 * 102 * 9,81}$$

P_c = Cutting Power [kW]

n = RPM

k_c = specific cutting force [N/mm²]

$$k_c = k_{c1} * h_m^{-z}$$

k_c = specific cutting force [N/mm²]

k_{c1} = specific cutting force
related to a 1 mm h_m

General Information

THREADING

RPM

$$n = \frac{V_c * 1000}{\pi * D}$$

Torque Calculations

$$M_d = \frac{p^2 * D * k_c}{8000}$$

M_d = Torque [Nm]

p = pitch [mm]

D = nominal diam. [mm]

Power

$$P = \frac{M_d * 2 * \pi * n}{60}$$

k_c = specific cutting force [N/mm²]

n = RPM

P = Power (kW)

FORMULAE (IMPERIAL)

DRILLING

RPM

$$n = \frac{12 * V_c}{\pi * D_c}$$

n = RPM

V_c = cutting speed (ft/min.)

D_c = Cutting diameter (inches)

Table feed

$$V_f = n * f_n$$

V_f = feed rate (inch/min)

n = r/min (RPM)

f_n = feed/rev (inch)

MILLING

RPM

$$n = \frac{12 * V_c}{\pi * D_c}$$

n = RPM

V_c = cutting speed (ft/min.)

D_c = Cutting diameter (inches)

Table feed

$$V_f = f_z * n * z$$

V_f = feed rate (inch/min)

f_z = feed per tooth (inches)

n = r/min (RPM)

z = no. of teeth