

Formulas and definitions for turning - INCH

Cutting speed, ft/min

$$v_c = \frac{\pi \times D_m \times n}{12}$$

Spindle speed, rpm

$$n = \frac{v_c \times 12}{\pi \times D_m}$$

Machining time, min

$$T_c = \frac{l_m}{f_n \times n}$$

Metal removal rate, inch³/min

$$Q = v_c \times a_p \times f_n \times 12$$

Net power, HP

$$P_c = \frac{v_c \times a_p \times f_n \times k_c}{33 \times 10^3}$$



Symbol	Designation/ definition	Unit
D_m	Machined diameter	inch
f_n	Feed per revolution	inch/r
a_p	Cutting depth	inch
v_c	Cutting speed	ft/min
n	Spindle speed	rpm
P_c	Net power	HP
Q	Metal removal rate	inch ³ /min
h_m	Average chip thickness	inch
h_{ex}	Maximum chip thickness	inch
T_c	Period of engagement	min
l_m	Machined length	mm
k_c	Specific cutting force	lbs/inch ²
Ψ_r	Lead angle	degree