

## Common Drilling Formulas

RPM	$\text{RPM} = \frac{vc \times 12}{3.14 \times D}$ <p style="text-align: center;">(rev/minute)</p> $\text{or RPM} = (3.8197 / D) \times \text{SFM}$
Cutting Speed	$vc = \frac{\text{RPM} \times 3.14 \times D}{12}$ <p style="text-align: center;">(ft/min)</p> $\text{or SFM} = 0.2618 \times D \times \text{RPM}$
Feed Rate	$vf = \text{IPR} \times \text{RPM}$ <p style="text-align: center;">(inch/min)</p>
Cross-section area of hole	$AT = 3.14 \times R^2$ <p style="text-align: center;">(in<sup>2</sup>)</p>
Material Removal Rate	$Q = vf \times AT$ <p style="text-align: center;">(inch<sup>3</sup>/min)</p>
Power Requirement	$P_c = \frac{D/4 \times f \times vc \times kc}{33,000 \times \eta}$ <p style="text-align: center;">(Hp)</p>
Torque	$M_c = \frac{H_p \times 5252}{\text{RPM}}$ <p style="text-align: center;">(ft/lbs)</p>
Feed Force (approx.)	$F_f = .7 \times D/2 \times f \times kc$ <p style="text-align: center;">(lbs)</p>
Machining Time	$T_c = \frac{L + H}{vf}$ <p style="text-align: center;">(Min/piece)</p> $\text{or } T_c \text{ (seconds)} = \frac{(60 \times \text{feed minus stroke})}{\text{IPM}}$

f = Feed per revolution (IPR) (inch/rev)

h = Distance from drill point to workpiece before feeding (inch)

kc = Specific cutting force (Lbf/inch<sup>2</sup>)

L = Depth of hole (inch)

η = Machine efficiency (%)

D = Tool diameter (inch)