Turning Formulas

Feed Rate:
The rate of insert travel through the workpiece measured in inches per minute.

Feed Rate (inches per minute) = Feed (inches per revolution) x RPM

Cutting Speed:
The velocity of the workpiece as it passes the insert measured in surface feet per minute.

Cutting Speed (SFM) = Workpiece Diameter x .262 x RPM

Revolutions Per Minute:
The rotating velocity of the machine spindle.

RPM = Cutting Speed (SFM) ÷ Workpiece Diameter x 3.82

Metal Removal Rate:
The speed, measured in cubic inches per minute, that stock is removed from the part being machined.

MRR = Depth of Cut x Feed x Cutting Speed x 12

Milling Formulas

Feed Rate:
The rate of insert travel through the workpiece measured in inches per minute.

Feed Rate (inches per minute) = Chip load x Number of teeth x RPM

Cutting Speed:
The velocity of the workpiece as it passes the insert measured in surface feet per minute.

$$\text{Cutting Speed (SFM)} = \frac{\text{Cutter Diameter} \times \text{RPM} \times 3.1416}{12}$$

Revolutions Per Minute:
The rotating velocity of the machine spindle.

$$\text{RPM} = \frac{\text{Cutting Speed} \times 12}{\text{Cutting Diameter} \times 3.1416}$$

Metal Removal Rate:
The speed, measured in cubic inches per minute, that stock is removed from the part being machined.

MRR = Depth of Cut x Width of Cut x Feed

Chip Load:
Inches Per Tooth

$$\text{Chip Load} = \frac{\text{Feed Rate}}{\text{Number of Teeth} \times \text{RPM}}$$