

Mill Speeds and Feeds

How fast should the mill spindle spin?

Calculate mill spindle speed using the following formula:

$$Speed = \frac{(CS) * 4}{D}$$

Speed is the calculated spindle speed in revolutions per minute (rpm).

CS is the cutting speed of the material, a property that you can find in reference books. It is measured in surface feet per minute (sfpm). Our shop uses the following values:

500 plastic
300 aluminum
200 brass
100 mild steel
50 stainless steel

D is the diameter of the tool in inches.

Example: If you were using a 3/8"-diameter endmill on mild steel, you would perform the following calculation

$$Speed = \frac{(100sfpm) * 4}{0.375"} = 1067RPM$$

Note that when using plastic or very small endmills, you may calculate speeds far higher than our machines can reach. Use the highest speed available and reduce your feed rate accordingly.

REMEMBER, this formula is only a guideline for selecting a speed. Always use common sense, pay close attention to your work, and adjust your settings to the situation. If you have a question, always ask a TA.

What is a good mill feed rate?

Calculate mill feed rate using the following formula:

$$Feed = (ChipLoad) * (n) * (Speed)$$

Feed is the calculated feed rate in inches per minute (ipm).

ChipLoad is the amount of material that each flute will remove on each revolution. Each material/operation has a suggested value, which you can find in reference books. It is measured in inches, sometimes written inches per tooth (ipt). Our shop uses the following typical values:

0.005" for roughing

0.001" to 0.002" for finishing

n is the number of flutes on the tool.

Speed is the spindle speed in revolutions per minute (rpm).

Example: If you were doing a roughing pass with a four-fluted endmill turning at 1000 rpm, you would perform the following calculation

$$Feed = (0.005") * (4) * (1000rpm) = 20ipm$$

REMEMBER, this formula is only a guideline for selecting a feed rate. Always use common sense, pay close attention to your work, and adjust your settings to the situation. If you have a question, always ask a TA.

revision history

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