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Feeds and Speeds for Armor Mills

Armor Mills are designed for use with rigid cnc machines when cutting or engraving granite or other hard materials.

Control of the depth of cut, the spindle speed, and the cutting feedrate is critical to achieve maximum tool life.

Cutting granite or other extremely hard materials may not be possible with the use of a hand operated tool or the life of the tools may be significantly reduced.

2L inc. has tested the armor mills on granite with a rigid cnc machine and a rigidly held workpiece.

Suggested Feedrates are below:

Material	Recommended Spindle Speed (SFPM) and Feedrates - IPT (MMPT)	Cutting the below piece of granite, 2L used:	
		Cutter Diameter = .078" Depth of Cut per pass = .020"	Cutter Diameter = .125" Depth of Cut per pass = .030"
Granite Stone Armor Plate Hardened Steel	50- 125 SFPM 15.2-38.1 M/Min. 0.0001-0.001 IPT 0.0025-.0254 MMPT	6000 RPM F5.0 IPM (127 MM/Min.) Plunge = 2.0 IPM (50.8MM/Min.)	6000 RPM F6.0 IPM (152 MM/Min.) Plunge = 2.0 IPM (50.8MM/Min.)
Broken Taps and Drills	50- 125 SFPM 15.2-38.1 M/Min. 0.0001-0.0005 IPT 0.0025-0.0127 MMPT	1500-2500 RPM Plunge = 0.1 IPM (2.54 MM/Min.)	1500-2500 RPM Plunge = 0.1 IPM (2.54 MM/Min.)

Please note as with all machining it is important to take appropriate safety precautions.

$$\text{RPM} = (\text{SFM} \times 3.82) / D$$

$$\text{IPM} = (\text{No. of teeth}) \times \text{IPR} \times \text{RPM}$$

RPM= Spindle Speed.

D = Diameter of tool.

IPR = Inches per rev.

IPM = Inches per minute.

MM/Min. = MM per minute.

IPT = Inches per tooth.

MMPT = MM per tooth

SFM and SFPM = Surface feet per minute.

M/Min. = Meters per minute

Use of coolant is typically recommended and will extend the life of the cutting tool bit.

The sample of granite shown below was machined at the specific feeds and speeds listed above in the table. The Armor Mills successfully machined for 30 minutes at the above conditions to complete the sample.



Note: Consider the above feeds and speeds as a reference point. Variations in the above table may be required depending on material being machined and cutting conditions.

To remove broken taps and drills, it is recommended to feed the tools by hand (handwheel on lowest feedrate) until the tool has plunged far enough into the broken tool to encounter a stable cutting condition.

In other words, as the tool begins cutting into the uneven jagged surface of the broken tool, feed extremely slowly to prevent the tool from walking which will put high side loads on the cutting tool and lead to breakage.

Once the tool is fully into the cut and seems stable, feeding with the cnc control at the above feeds and speeds is possible.

Stones such as granite and marble have different machining properties among different varieties and even at different spots within the same piece of stone.