

Consolidated Machining RPM Reference Sheet

This comprehensive reference sheet provides starting RPM values for the Bridgeport mill and engine lathe. All values are optimized for **Aluminum** as the base material and incorporate specific shop safety limits and engagement standards.

Section 1: Bridgeport Mill - End Mills & Drills

Application: Slotting, pocketing, or profiling at **10% Depth of Cut (Axial or Radial)**.

Tool Size	Carbide End Mill (RPM)	HSS End Mill (RPM)	Drill (HSS) (RPM)
1/8"	3,500 (Max)	3,000	2,500
1/4"	3,000	2,000	1,268
3/8"	4,533	1,385	845
1/2"	3,400	1,039	634
5/8"	2,720	831	507
3/4"	2,267	693	423
7/8"	1,943	594	362
1"	1,700	520	317
2"	850	260	160

Section 2: Bridgeport Mill - Boring Bars & Key Cutters

Application: Precision boring and Woodruff keyway cutting.

Tool Size	Carbide Boring Bar (RPM)	HSS Boring Bar (RPM)	Carbide Key Cutter (RPM)	HSS Key Cutter (RPM)
1/4"	2,500 (Max)	2,500 (Max)	450	350
1/2"	2,500 (Max)	2,500 (Max)	350	200
3/4"	1,000	500	250	150
1"	800	300	200	100
1-1/2"	700	170	150	90
2"	600	80	100	80

Section 3: Engine Lathe - Single Point & Drilling

Application: Turning, facing, and drilling operations on the lathe.

Work Diameter	Carbide Single Point (RPM)	HSS Tooling (RPM)	HSS Drill (RPM)
1/4"	1,500 (Max)	1,500 (Max)	500
1/2"	1,500 (Max)	1,500 (Max)	350
3/4"	1,500 (Max)	1,019	917
1"	1,200	764	688
1-1/2"	900	509	458
2"	800	382	344
3"	600	255	229
4"	400	191	172

Machinability Comparison

To calculate RPMs for other materials, multiply the **Aluminum RPM** from the tables above by the corresponding percentage below.

Material	Machinability %	Note
Aluminum	100%	Base Reference
Brass / Bronze	80% - 90%	Slightly slower than Aluminum
Mild Steel	60%	Standard machining steel
Cast Iron	50%	Abrasive; use lower speeds
Tool Steel	40%	Harder material; watch for heat
Stainless Steel	30%	Work hardens easily; use coolant

Example Calculation: To find the RPM for a $\frac{1}{2}$ " HSS End Mill in Mild Steel: $1,039 \text{ (Aluminum RPM)} \times 0.60 \text{ (Mild Steel \%)} = 623 \text{ RPM}$

Operational & Safety Notes

- **Mill Drilling:** “10% depth” refers to the initial entry or peck depth.
- **Boring Bars:** Prone to chatter. If vibration occurs, reduce RPM by 20% and check tool rigidity.
- **Key Cutters:** Ensure chips are cleared frequently to prevent tool breakage in deep slots.
- **Lathe Safety:** Never leave the chuck key in the chuck. Ensure the tool is on center.
- **Coolant:** Always use appropriate cutting fluid or oil to prevent tool wear and improve finish.
- **Chatter:** If the machine vibrates or “chatters,” reduce the RPM or the feed rate immediately.