

Grinding Wheel Reference

Cincinnati No. 2 Tool & Cutter Grinder

Starter Kit, Wheel Usage, Dressing Techniques, and Beginner Checklists

Machine Context

- **Machine:** Cincinnati No. 2 Tool & Cutter Grinder
- **Spindle speed:** 3800 RPM
- **Wheel mounting:** 1-1/4" bore hubs, **maximum 1/2" mounting thickness**
- **Typical wheel diameter:** ~7"

Primary materials:

- HSS (lathe bits, twist drills, end mills)
- Alloy steel (4140)
- Occasional carbide

This document is intended as a **shop reference**: a practical starter wheel cabinet, clear wheel usage guidance, and beginner-friendly dressing and operating checklists.

1. Ideal Starter Wheel Kit (by Task)

A. Finishing & Squaring 4140 Shaft Ends

First Choice (Selected / Purchased):

- Cincinnati Milacron 9A60-H6-VRW (cup wheel)

Second Choice:

- Norton 38A 60-I or 60-J VBE

Third Choice:

- Norton 5SG 60 (vitrified)

Do Not Use: Diamond wheels; very fine grits (≥ 100)

B. Sharpening HSS Twist Drills & End Mills

First Choice:

- Norton 38A60-I VBE, $7 \times 1/2" \times 1-1/4"$

Second Choice:

- Norton 32AA60-J

Third Choice:

- 38A 70–80 grit aluminum oxide

C. Very Light Surface Grinding of Steel

First Choice:

- Norton 38A80-J VBE

Second Choice:

- Norton 38A60-J VBE

Third Choice:

- Norton 5SG 80

D. Carbide Tools

- Diamond wheel, resin bond, ~150 grit
- Diamond wheel, resin bond, ~220 grit (finer)

Rule: Never grind steel or HSS on diamond.

2. Wheels You Own – What to Use Them For

Norton 38A60-I VBE (two wheels)

Use for all HSS sharpening. Dedicate one wheel strictly to tools.

Cincinnati Milacron 9A60-H6-VRW (cup)

Use for 4140 shaft end grinding and light face work.

Norton 32AA60-J VTR (radius dressed)

Reserve for form or radius grinding once experienced.

Cincinnati Milacron 9A150-K4-VRW

Fine form finishing only. Not a general sharpening wheel.

Diamond Cutoff / Saucer Wheels

Carbide only. Never steel.

3. Dressing Techniques by Task

General

- Dress often
- Use a diamond dresser for vitrified wheels
- Use a dressing stick for diamond wheels

HSS Sharpening

- Dress flat and sharp
- Light dressing passes

4140 End Grinding

- Dress flat
- Slightly deeper dress to keep wheel open

Surface Grinding

- Dress flat across full face
- Slightly open dress for freer cutting

4. Beginner Checklists

Before Grinding

- Wheel RPM rating ≥ 3800 RPM
- Correct wheel for material
- Wheel freshly dressed

During Grinding

- Light passes
- No dwell
- Let the wheel cut

After Grinding

- Re-dress if glazing appears
- Label wheel if dedicated

Final Notes

This setup is period-correct, technically sound, and well matched to the Cincinnati No. 2. With careful dressing and light technique, it will support accurate, repeatable grinding while skills develop.