# Abrasive Wheel Mounting and Ring Test Safety Standard Operating Procedure

## 1.0 Objective & Intent

The objective of this SOP is to establish a mandatory, standardized procedure for the safe mounting of abrasive wheels and the execution of the ring test on all grinding equipment within the facility. This procedure is designed to prevent catastrophic wheel failure (bursting) during operation, which can cause severe or fatal injuries from high-velocity fragments. Compliance with this SOP ensures adherence to WorkSafeBC OHS Regulation Part 12 (Tools, Machinery and Equipment) and CSA Standard B173.5-17 for the safe use of bonded abrasive wheels.

## 2.0 Operational Scope

This procedure applies to all maintenance personnel, machine operators, and setup technicians who handle, mount, or replace abrasive wheels on any stationary or portable grinding machine within the cabinet and millwork manufacturing facility. This includes, but is not limited to, pedestal grinders, bench grinders, angle grinders, and surface grinders used for sharpening tooling, deburring, or finishing wood and composite materials. This SOP covers all types of bonded abrasive wheels, including vitrified, resinoid, and rubber-bonded wheels.

## 3.0 Hazard Identification & Mandatory PPE

- Wheel Burst / Fragmentation: Catastrophic failure of a cracked or improperly mounted wheel can launch high-velocity fragments, causing blunt force trauma, lacerations, or amputation.
- Entanglement: Loose clothing, gloves, or jewelry can be caught by rotating spindles or wheel arbors.
- Pinch Points: Hands and fingers are at risk during flange tightening and wheel handling.
- Noise Exposure: Grinding operations can exceed 85 dBA, requiring hearing protection.
- Respiratory Hazards: Airborne dust from abrasive and workpiece materials (e.g., silica, wood dust) can cause chronic lung disease.
- CSA-Approved Steel Toed Boots with puncture-resistant soles
- ANSI Z87.1-Approved Impact-Resistant Safety Glasses with side shields
- Full Face Shield (for ring test and initial wheel start-up)
- CSA-Approved Hearing Protection (earplugs or earmuffs with NRR ≥ 25 dB)
- Cut-Resistant Gloves (ANSI A4 or higher) for handling wheels; remove gloves before operating grinder
- Dust Mask or Half-Face Respirator with P100 filters (if dust control is inadequate)
- Close-Fitting Work Clothing (no loose sleeves, no jewelry, hair tied back)

## 4.0 Required Safety Equipment & Tools

- Lockout/Tagout (LOTO) Kit with personal lock, hasp, and danger tag
- Abrasive Wheel Ring Test Tool (non-marring mallet or wooden handle, e.g., a screwdriver handle)
- Torque Wrench calibrated to manufacturer's flange tightening specifications

- Flange Blotters (compressible paper washers) – one pair per wheel
- Spindle Wrench or Arbor Wrench (correct size for machine)
- Wheel Guard (must be in place and properly adjusted before operation)
- Work Rest (for stationary grinders, set within 3 mm of wheel)
- Dust Collection System (operational and connected)
- Inspection Log or Checklist for documenting wheel condition and ring test result

## 5.0 Step-by-Step Safety Procedure

1. Perform a Lockout/Tagout (LOTO) on the grinding machine. Isolate the electrical power source at the disconnect switch and apply a personal lock and danger tag. Verify zero energy state by attempting to start the machine.
2. Visually inspect the new abrasive wheel for damage. Check for cracks, chips, nicks, or any discoloration. Reject any wheel with visible defects. Verify that the wheel's rated speed (RPM) is equal to or greater than the machine's spindle speed.
3. Conduct the Ring Test on the wheel. Suspend the wheel on a clean, non-metallic rod (e.g., a wooden dowel) or hold it by the arbor hole. Tap the wheel gently with a non-marring tool (e.g., wooden mallet handle) at a point 45 degrees from the vertical centerline. Listen for a clear, metallic ring. A dull thud indicates a cracked wheel. Repeat the test at four equally spaced points around the wheel. If any test produces a dull sound, reject the wheel immediately.
4. Clean the spindle, flanges, and wheel bore. Remove all dirt, grease, and debris from the mounting surfaces using a clean, lint-free cloth. Ensure the spindle threads are clean and undamaged.
5. Install the inner flange and a blotter on the spindle. Place the inner flange against the spindle shoulder. Place one compressible blotter (paper washer) against the inner flange. Ensure the blotter is larger than the flange diameter.
6. Mount the wheel onto the spindle. Slide the wheel onto the spindle, ensuring it fits freely without force. Do not hammer or force the wheel onto the spindle. Place the second blotter on the outside of the wheel, followed by the outer flange.
7. Tighten the outer flange nut to the manufacturer's specified torque using a torque wrench. Do not overtighten. The flanges should clamp the wheel evenly. For most applications, tighten to 15-25 ft-lbs (20-34 Nm) or as specified by the machine manual. Remove the LOTO lock and tag.
8. Reinstall the wheel guard and adjust the work rest. Position the wheel guard to cover at least 180 degrees of the wheel. Set the work rest within 3 mm (1/8 inch) of the wheel face. Ensure the tongue guard gap is no more than 6 mm (1/4 inch).
9. Perform a controlled start-up. Stand to the side of the wheel (out of the plane of rotation). Turn on the machine and let the wheel run at operating speed for at least one minute. Listen for unusual vibrations or sounds. If any abnormality is detected, shut down immediately and re-inspect.
10. Document the inspection and ring test results in the maintenance log. Record the wheel type, size, date, inspector name, and ring test outcome. If a wheel was rejected, tag it as 'Defective – Do Not Use' and dispose of it according to manufacturer guidelines.