
Grounding And Bonding Verification For Dust Collection

1.0 Objective & Intent

The objective of this SOP is to establish a standardized, verifiable procedure for inspecting and confirming the integrity of grounding and bonding systems on all dust collection equipment and ductwork. This procedure is mandated by WorkSafeBC regulations (OHS Guideline G4.87-1) to mitigate the risk of static electricity accumulation, which can ignite combustible wood dust and cause catastrophic explosions or fires. The intent is to ensure that every conductive component of the dust collection system is electrically continuous and connected to earth ground, eliminating any potential for spark discharge.

2.0 Operational Scope

This procedure applies to all maintenance personnel, safety officers, and external contractors responsible for the inspection, installation, or repair of dust collection systems within the cabinet and millwork manufacturing facility. It covers all ductwork (including spiral, rectangular, and flexible hoses), collection hoppers, cyclone separators, baghouse filters, and any metal components within 10 feet of the dust collection path. This SOP does not apply to pneumatic conveying systems for non-combustible materials.

3.0 Hazard Identification & Mandatory PPE

- Combustible Dust Explosion: Accumulated static charge can ignite fine wood dust suspended in air, leading to deflagration or detonation.
- Electric Shock: Contact with improperly grounded or energized components during testing or maintenance.
- Slip/Trip/Fall: Accessing elevated ductwork or confined spaces near collection units.
- CSA-Approved Safety Glasses with side shields
- CSA-Approved Steel Toed Boots (Grade 1)
- Cut-resistant gloves (ANSI A4 or higher) when handling metal ductwork
- Hard hat when working under suspended ductwork or near overhead equipment
- Hearing protection (earplugs or earmuffs) if operating near active dust collection fans

4.0 Required Safety Equipment & Tools

- Digital Multimeter (DMM) with resistance measurement capability (0.1 ohm resolution minimum)
- Grounding and bonding test kit (includes test leads, alligator clips, and probe tips)
- Lockout/Tagout (LOTO) kit with personal lock and hasp
- Insulated tools (screwdrivers, wrenches) for accessing junction boxes and bonding clamps
- Non-contact voltage tester (to verify de-energized state before testing)
- Flashlight or headlamp for inspecting dark ductwork areas
- Calibration certificate for DMM (valid within 12 months)

5.0 Step-by-Step Safety Procedure

1. Notify all affected personnel (operators, supervisors, maintenance team) that a grounding verification is in progress. Post warning signs on the dust collection system control panel and at all access points to prevent accidental startup.
2. Isolate the dust collection system by performing a full Lockout/Tagout (LOTO) on the main electrical disconnect. Verify zero energy state using a non-contact voltage tester on the motor terminals and control circuit. Attach personal lock and tag.
3. Visually inspect all bonding jumpers, ground clamps, and connections for corrosion, loose hardware, or physical damage. Pay special attention to flexible hose sections where bonding wires may be broken or missing. Document any defects found.
4. Set the digital multimeter to the lowest resistance range (typically 200 ohms or auto-ranging). Perform a self-test by touching the probes together to confirm a reading of 0.0 to 0.2 ohms. Record the baseline probe resistance.
5. Establish a known good earth ground reference point (e.g., a verified ground rod or building steel). Connect one test lead to this reference. Using the other lead, measure resistance from the reference to a clean, unpainted metal surface on the dust collection ductwork near the collection unit. The reading must be less than 1.0 ohm. If higher, inspect and clean the connection point.
6. Systematically test each section of ductwork, hopper, and filter housing. For each component, measure resistance from the component to the established ground reference. Record the reading. Acceptable limit: less than 1.0 ohm for rigid metal components; less than 10 ohms for flexible hoses with internal bonding wires.
7. For flexible hoses, verify continuity of the internal bonding wire by measuring resistance from the metal fitting at one end to the fitting at the other end. The reading must be less than 1.0 ohm. If the hose is not bonded internally, it must be replaced or an external bonding jumper must be installed.
8. Inspect all bonding clamps and connections for tightness. Use insulated tools to tighten any loose clamps. Re-measure resistance after tightening to ensure the reading remains below 1.0 ohm. Document the final resistance value for each connection point.
9. Remove all test equipment and tools from the work area. Verify that no tools or debris remain inside ductwork or near moving parts. Remove LOTO devices in reverse order (personal lock first, then group lockout) and re-energize the system only after confirming all personnel are clear.
10. Complete the Grounding Verification Log (form GVL-001) with date, time, inspector name, all resistance readings, and any corrective actions taken. File the log in the Safety Binder and notify the Plant Safety Officer of any failures or repairs required. Schedule the next verification per the facility's preventive maintenance calendar (minimum annually).

Regulatory Disclaimer: This document is a generic safety template provided for educational and informational purposes only. It does not constitute professional engineering, legal, or regulatory compliance advice. The end-user assumes all liability for validating all safety protocols against specific machinery manufacturer manuals and local occupational health and safety regulations (e.g., WorkSafeBC, CSA standards) before deployment.