

# Vibration Exposure Monitoring For Sanding Operations

## 1.0 Objective & Intent

The objective of this SOP is to establish a standardized procedure for monitoring and controlling hand-arm vibration (HAV) exposure during sanding operations in cabinet and millwork manufacturing. This procedure ensures compliance with WorkSafeBC Occupational Health and Safety Regulation (OHSR) Part 7.1, which mandates that employers assess and control the risk of hand-arm vibration syndrome (HAVS) when workers are exposed to vibration levels exceeding the exposure action value (EAV) of  $2.5 \text{ m/s}^2 \text{ A(8)}$  or the exposure limit value (ELV) of  $5.0 \text{ m/s}^2 \text{ A(8)}$ . The specific risk mitigated by this SOP is the development of HAVS, a debilitating condition affecting blood vessels, nerves, muscles, and joints of the hand, wrist, and arm, caused by prolonged use of vibrating tools such as orbital sanders, belt sanders, and random orbit sanders.

## 2.0 Operational Scope

This procedure applies to all sanding operations performed within the cabinet and millwork manufacturing facility, including but not limited to: hand-held orbital sanding, belt sanding, random orbit sanding, and any other powered sanding tools used on wood, MDF, plywood, or composite materials. It covers all personnel who operate sanding equipment, including production workers, finishers, and maintenance staff. The scope includes the sanding department, finishing area, and any temporary sanding stations set up for custom or repair work. This SOP does not cover pneumatic chisels, grinders, or other non-sanding vibrating tools, which are addressed in separate procedures.

## 3.0 Hazard Identification & Mandatory PPE

- **Hand-Arm Vibration (HAV):** Prolonged exposure to vibration from sanding tools can cause HAVS, leading to numbness, tingling, loss of grip strength, and blanching of fingers (Raynaud's phenomenon).
- **Noise Exposure:** Sanding operations generate noise levels that may exceed 85 dBA, requiring hearing protection and contributing to cumulative hearing loss.
- **Respiratory Hazards:** Sanding produces fine wood dust, MDF dust, and potentially toxic composite dusts that can cause respiratory irritation, asthma, or long-term lung disease.
- **Ergonomic Strain:** Repetitive motion and sustained grip force during sanding can lead to musculoskeletal disorders (MSDs) of the wrist, elbow, and shoulder.
- **CSA-Approved Anti-Vibration Gloves:** Must be rated for vibration reduction (e.g., ISO 10819) and worn at all times during sanding operations.
- **CSA-Approved Hearing Protection:** Earplugs or earmuffs with an NRR of at least 25 dB, mandatory for all personnel within the sanding area.
- **NIOSH-Approved N95 or P100 Respirator:** Required when sanding generates airborne dust; half-face or full-face respirator with particulate filters as per exposure assessment.
- **CSA-Approved Safety Glasses or Face Shield:** To protect eyes from flying dust and debris.
- **CSA-Approved Steel Toed Boots:** To protect feet from dropped tools or materials.
- **Work Gloves (non-anti-vibration):** Not to be substituted for anti-vibration gloves; only used for material handling when not operating sanders.

## 4.0 Required Safety Equipment & Tools

- Vibration meter or accelerometer (e.g., Svantek SV 106 or equivalent) calibrated within the last 12 months, capable of measuring tri-axial hand-arm vibration in  $\text{m/s}^2$ .
- Personal vibration dosimeter (e.g., Larson Davis HVM100) for individual worker exposure monitoring over a full shift.
- Calibrated sound level meter or noise dosimeter for simultaneous noise exposure assessment.
- Tool vibration data sheets or manufacturer-declared vibration emission values for each sanding tool model in use.
- Exposure monitoring log sheets (paper or digital via SafeDesk) to record tool type, serial number, duration of use, and measured vibration levels.
- Lockout/Tagout (LOTO) kit with personal lock and hasp for any maintenance or tool change requiring power disconnection.
- Dust extraction system (shop vacuum or central dust collector with HEPA filter) connected to each sander to minimize airborne dust.
- Anti-vibration workbench or mat to reduce transmitted vibration from the workpiece.
- First aid kit with cold packs and bandages for immediate treatment of any vibration-related injury or accident.

## 5.0 Step-by-Step Safety Procedure

1. Before any sanding operation begins, verify that all required PPE (anti-vibration gloves, hearing protection, respirator, safety glasses, steel-toed boots) is available, in good condition, and properly fitted. Conduct a pre-use inspection of the sander: check for damaged cords, loose guards, worn pads, and ensure the dust extraction port is clear and functional.
2. Connect the sander to the dust extraction system and confirm that the system is operating at the required airflow (minimum 400 CFM for orbital sanders). Turn on the dust collector before starting the sander to capture dust at the source.
3. Identify the specific sanding tool to be used and retrieve its manufacturer-declared vibration emission value (in  $\text{m/s}^2$ ) from the tool data sheet or the SafeDesk digital library. If the value exceeds  $2.5 \text{ m/s}^2$ , flag the tool for priority monitoring and consider substitution with a lower-vibration alternative.
4. Set up the vibration meter or personal dosimeter according to the manufacturer's instructions. Attach the accelerometer to the sander handle using the provided mounting bracket or adhesive pad, ensuring it is oriented to measure tri-axial vibration (x, y, z axes). Calibrate the meter using the supplied calibrator before each use.
5. Begin the sanding operation while the vibration meter records data. Maintain a consistent grip force (do not squeeze harder than necessary) and use the sander at the recommended speed and pressure. Avoid forcing the tool or applying excessive downward pressure, as this increases vibration transmission.
6. Monitor the cumulative vibration exposure in real-time using the dosimeter display. If the exposure action value (EAV) of  $2.5 \text{ m/s}^2 \text{ A}(8)$  is reached, stop the operation and rotate the worker to a non-vibrating task for the remainder of the shift. Document the time and exposure level on the monitoring log.
7. If the exposure limit value (ELV) of  $5.0 \text{ m/s}^2 \text{ A}(8)$  is approached or exceeded, immediately cease all vibrating tool use for that worker for the rest of the day. Notify the safety supervisor and initiate a root cause analysis to determine if tool maintenance, substitution, or engineering controls are needed.
8. At the end of the sanding task or shift, stop the vibration meter and download the data to the SafeDesk system or a secure database. Record the following in the exposure log: worker name, date, tool make/model/serial number, duration of use (minutes), measured vibration magnitude ( $\text{m/s}^2$ ), and calculated  $\text{A}(8)$  exposure. Attach any notes on tool condition or ergonomic factors.
9. Perform post-operation maintenance on the sander: clean the dust port, inspect the pad for wear, and check the power cord for damage. If any defects are found, tag the tool out of service and submit a repair request through the maintenance system. Do not use a damaged tool.
10. Review the exposure data weekly with the safety committee. If any worker's  $\text{A}(8)$  exposure exceeds  $2.5 \text{ m/s}^2$ , implement controls such as: job rotation, tool replacement with lower-vibration models, anti-vibration handle wraps, or administrative limits on daily sanding time. Update the SafeDesk digital SOP with any changes.

**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.