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| **TITLE:** Abrasive Wheels/Grinders – Bench, Floor, and Hand | | |
| **Created Date:**  2018/06/19  **Reviewed Date:** | **Prepared by:**  **Approved by:** | **Review Period:**  Annually |

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| **DESCRIPTION:**  There are two basic types of grinders: stationary grinders, such as bench or pedestal grinders; and portable hand grinders. This SOP applies to both types of grinders. The content of this SOP is based on the Alberta Occupational Health and Safety Act, Regulation and Code, as well as recognized safe work practices and standards. |

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| **RESPONSIBILITY:**  **A. Supervisor**  The Supervisor is responsible for ensuring personnel under his/her supervision are trained on the safe and proper use of the grinder and that correct procedures are followed.  **B. Operators of a grinder**   * Operators must receive proper training from their Supervisor on the safe and proper use of a grinder prior to use. * Operators must follow correct procedures. * Operators shall report any injuries and incidents to Campus Safety <http://www.uleth.ca/risk-and-safety-services/node/add/cair> and their Supervisor. |

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| **TRAINING REQUIREMENTS:**  All operators must receive training on the use and maintenance of a grinder prior to use. Training may be delegated to a qualified individual, but it remains the responsibility of the Supervisor to ensure their personnel are adequately trained. |

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| **FREQUENCY OF TASK PERFORMED:**  • Monthly, or as required. | **SPECIALIZED EQUIPMENT and PPE (if any):**  •CSA/ANSI approved equipment and guarding •20lb ABC Fire Extinguisher •safety pylons to caution off area • face shield and goggles or safety glasses with side shields •close fitting/protective clothing •hearing protection •CSA approved footwear •a fit-tested respirator may also be required based on conditions. |

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| **CRITICAL HAZARDS:**  Eye and body injuries (struck by, cut by), kick-back, flying debris, broken grinder disks |

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| **APPLICABLE DOCUMENTS / RECORDS:**  • Hazard Assessment  • Maintenance records  • Inspection records  • Manufacturer’s Operating Procedures | **WASTE DISPOSAL:** N/A |

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| **GENERAL SAFETY:**  • Conduct a hazard assessment for the task(s) to be performed.  • Establish the work procedures to be followed and assemble all equipment required to perform the work.  • Ensure the worker has been adequately trained in the hazards and proper methods of the job at hand. |

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| **GENERAL SAFETY contined:**  • Review the procedures to deal with other possible hazards involved with the work at hand. Ensure the task (e.g. drawings, instructions, specifications, etc.) is clearly understood.  • Inspect tools before use. Look for cracked or frayed electrical cords, cracked or broken grinding disks, missing/modified guards. If cords are not in working condition, tag and take the tool out of service. Inspect grinding wheel for cracks or chips. If the disk is cracked or broken, replace the disk with an adequate one. All wheels must be sound (ring) tested before use. Do not use the wheel if it is cracked or damaged. Check that the wheels are running true and not wobble.  • The grinding wheel must be rated for the RPM speed of the motor. Most grinding problems are caused by mismatching the wheel speed with the rated speed of the blade.  •When installing a new wheel, observe all instructions provided by the manufacturer. Ensure the recommended speed (as posted on the wheel) is compatible with the grinder, and that the type of wheel is compatible with the material being ground. An improperly installed or incompatible wheel can break or explode and cause injury. Sound (ring) test the wheel before use. Grinding wheels should fit freely on the spindle and remain free under all grinding conditions. The spindle nut must be tightened enough to hold the wheel in place without distorting the flange. When a bushing is used in the wheel hole it should not exceed the width of the wheel and or contact the flanges.  • Ensure guards are fitted, secure and functional. Do not operate if guards are missing or faulty.  • Before working with a grinder, secure or remove jewelry, loose clothing, scarves, ties (i.e., snap, button, zip, tie, etc.) and confine long hair, which can be snagged by the grinder and wrap around the shaft quickly  • Check work area to ensure no slip/trip hazards are present. Keep the floor and work area clean.  • Keep hands, fingers, and other body parts from coming into contact with the revolving wheel.  • Hold work firmly when using a grinder. If possible, use vise-grip pliers or a clamp to handle/secure work pieces.  • Ensure guards are fitted, secure and functional. Do not operate if guards are missing or faulty.  • Check work area to ensure no slip/trip hazards are present. Keep the floor and work area clean. |

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| **GENERAL SAFETY (continued):**  • Store flammable and combustible materials a safe distance (e.g., a minimum of 10 meters) away from the grinding operation. Sparks can ignite debris and flammable vapors.  • Don PPE and have a fire extinguisher on site before starting work.  • Know the location of eyewashes, fire extinguishers and fire blankets before starting work.  • Avoid grinding aluminum and steel on the same wheel to prevent residual aluminum particles from heating up and flying back at the operator when harder surfaces such as steel are being ground later.  • To avoid burring, loading, and uneven wear on the wheel, use the minimum pressure necessary and keep work in motion evenly across the face of wheel.  • Never grind on the side of the wheel.  •All contact surfaces of wheels, blotters and flanges must be flat and free of foreign matter.  • In some cases, a hot work permit may be required before starting work. For additional information on the University of Lethbridge Hot Work Permit, contact Facility, Operations and Maintenance.  • If working in a common area, place barriers/pylons around the work site to restrict access until the work has been completed.  • Do not store abrasive wheels where they would be exposed to high temperature, high humidity, liquids, oils, freezing temperatures or where they could be subjected to physical damage. |

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| **PROCEDURE:**  **Bench and Pedestal Grinders**  • The grinder should be positioned by height and location to eliminate the need to overreach while grinding; and securely anchored. |

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| **PROCEDURE continued:**  • The transmission cover and outer wheel guard must be secured in the proper position prior to operation. In addition, adjustable guards must be properly secured before use. Do not make adjustments with the wheel in motion.  Side guards should cover the spindle, nut, flange, and seventy-five percent of the wheel diameter.  Adjust the tongue guard on the top side of the grinder to within ¼-inch (0.6350cm) of the wheel.  Adjust the tool rest to within 1/8- inch of the grinding wheel.  • Before starting the grinder, inspect the wheel to make sure it is not cracked or broken. Never use a wheel that has been dropped or received a heavy blow, even if there is no apparent damage. To minimize hazards from undetected defects or imbalance, stand to one side of the wheel until it has reached full speed. Do not begin grinding until the wheel has reached full speed.  • As the wheel wears down, readjust the tool rest and tongue guard. When you can no longer adjust them, replace the wheel. Visually inspect the wheel for cracks before mounting.  • All flanges must be maintained in good condition. When the bearing surfaces become worn, warped, sprung, or damaged they should be trued, refaced, or replaced, in accordance with manufacturer recommendations.  **Portable Hand Grinders**  • Guards must be in place and properly positioned such that sparks fly away from the operator.  The clearance between the wheel side and the guard shall not exceed one-sixteenth inch.  Safety guards used on machines known as right angle head or vertical portable grinders shall have a maximum exposure angle of 180 deg., and the guard shall be located so as to be between the operator and the wheel during use. Adjustment of guard shall be such that pieces of an accidentally broken wheel will be deflected away from the operator.  The maximum angular exposure of the grinding wheel periphery and sides for safety guards used on other portable grinding machines shall not exceed 180 deg. and the top half of the wheel shall be enclosed at all times |

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| **PROCEDURE continued:**  • Before using the tool on a workpiece, let it run for several minutes. Watch for flutter or excessive vibration that might be caused by poor installation or a poorly balanced wheel. • Do not stand in the plane of rotation of the wheel as it accelerates to full operating speed.  • Never use a grinding wheel on an air sander. Pistol-grip, high speed air sanders operate at speeds exceeding the maximum-rated speeds for grinding wheels.  • Never clamp a hand-held grinder in a vise.  • Always engage the OFF switch and wait for the wheel to come to a complete stop before adjusting or removing the wheel or changing its work position or angle. |

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| **REFERENCES:**  Alberta Occupational Health and Safety Act, Regulation and Code, <https://www.alberta.ca/ohs-act-regulation-code.aspx>  University of Nebraska-Lincoln, Safe Operating Procedure, Abrasive Wheels/Grinders – Bench, Floor, and Hand, <https://ehs.unl.edu/sop> |