THE OHIO STATE UNIVERSITY

Facilities Operations and Development
Environmental Health and Safety

1314 Kinnear Road #106
Columbus, OH 43212-1168

614-292-1284 Phone
614-292-6404 Fax

www.ehs.osu.edu

Machine Shop Safety Program

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Plan prepared by:
The Ohio State University
Office of Environmental Health & Safety
Occupational Safety & Industrial Hygiene
1314 Kinnear Road
Columbus, OH 43212
P: 292-1284
F: 292-6404
www.ehs.osu.edu

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1.0 Introduction

1.1 It is the policy of The Ohio State University (OSU) to take precautions to eliminate hazards associated with the use of hand and power tools; and to ensure employees are properly trained to utilize these tools in a safe manner to minimize injuries related to their use in OSU machine shops. This Machine Shop Safety Program provides an overview of shop safety to minimize injury and/or accidents associated with machine shop activities.

1.2 Purpose: The purpose of this program is to outline the requirements to minimize/eliminate machine shop related injuries. This program is developed in accordance with the following Occupational Safety and Health Administration (OSHA) regulations and OSU Programs and policies:

- 29 CFR 1910 Subpart O, “Machinery and Machine Guarding”
- 29 CFR 1910 Subpart P, “Hand and Portable Powered Tools and Other Hand-Held Equipment”
- OSU Welding, Cutting and Brazing (Hot Work) Safety Program
- OSU Hearing Conservation Program
- OSU Lockout/Tagout Program
- OSU Hazard Communication Program
- OSU Hand and Portable Power Tool Safety Program
- Applicable ANSI standards

1.3 Scope: This Machine Shop Safety Program establishes and outlines the OSU Environmental Health & Safety, departmental, supervisor and user responsibilities; identification of safety hazards and control measures; and training, inspection and recordkeeping for OSU machine shops. The program applies to all OSU employees whose work duties require them to utilize equipment within machine shops. All hand and powered tools and other hand-held equipment utilized at OSU for construction, alteration, repair, demolition, electrical, plumbing, vehicle maintenance and general purposes are covered by this policy. This program covers all rooms that are dedicated to the housing of shop equipment and are used for student instruction, the completion of student tasks or the completion of work by OSU employees.

2.0 Responsibilities

2.1 Environmental Health & Safety

2.1.2 Environmental Health & Safety (EHS) provides program oversight and consultation to OSU employees who work in machine shops; including training; maintaining applicable records; performing program reviews and updates as necessary; and providing recommendations for safety procedures to supervisors and departments.

2.2 OSU Department (Facilities Operations & Development (FOD); Athletics; OSU Medical Center (OSUMC); Student Life; et al.)

2.2.1 Each department or working units within a department where machine shops are present are responsible for the following.

2.2.1.1 Ensure the applicable components of the Machine Shop Safety Program are available to employees.

2.2.1.2 Provide applicable training to employees expected to utilize hand and power tools as part of their job duties within machine shops.

2.2.1.3 Ensure machine shop equipment is properly maintained and any equipment deficiencies are addressed to ensure employee safety.

2.2.1.4 Maintain manufacturer manuals and other applicable documentation related to the machine shop equipment in use.

2.2.1.5 Develop and implement Standard Operating Procedures for operations requiring specialized knowledge and/or skills.

2.3 Supervisors

2.3.1 OSU employees who supervise personnel with responsibilities to work in machine shops must be informed of the contents of this program; identify authorized personnel to utilize equipment; address safety hazards in a timely manner; provide all appropriate personal protective equipment (PPE); ensure appropriate safety programs are in place and implemented (i.e., Hearing Conservation, Hazard Communication, Respiratory Protection, Hot Work, etc.); ensure training is completed by all employees; and maintain all appropriate records, including training.

2.4 Authorized Person

2.4.1 Employees working with hand machine shop equipment must be fully trained to ensure all applicable elements of the OSU Machine Shop Safety Program are followed. In addition, employees are responsible for completing adequate training, reporting equipment deficiencies; use of PPE; and safe use of machine shop equipment at all times.

3.0 Definitions

3.1 The following definitions are provided to allow for a better understanding of the OSU Machine Shop Safety Program.

Employee	An Ohio State University faculty or staff member directly compensated by the University.
Graduate/Teaching Assistant	A student who works and is compensated by the University.
Machine Shop	Any workshop or workspace where materials are cut, shaped or otherwise manipulated using hand and/or powered tools and equipment.
Monitor	An individual identified by their department who is capable of observing others working in a machine shop in order to ensure a safe work environment.

4.0 General Shop Safety Rules

4.1 Only fully trained and competent personnel are permitted to utilize machine shop equipment and tools. The following general machine shop safety guidelines apply to general shop duties and do not serve as adequate replacement of specific shop equipment training. These guidelines must be implemented to ensure safety and health in machine shops; failure to do so may result in serious injury or death.

4.1.1 Eye protection (i.e., safety glasses, goggles or face shields) is required in all shop areas, whether working or not.

4.1.2 Open toed shoes, or sandals, are prohibited within machine shops. Closed toed shoes are required when in any shop area. Steel toed shoes may be required if working with heavy materials, such as metal.

4.1.3 Adequate hand protection must be worn depending on the materials being handled.

4.1.4 Wear appropriate clothing for the shop and tasks being completed.

4.1.5 Operation of any piece of shop equipment is not permitted unless the user is fully trained on the contents of the OSU Machine Shop Safety Program and specific equipment training has been completed.

4.1.6 At least two people should be present in machine shops when equipment and/or tools are in use.

4.1.7 The use of compressed air to clean equipment should be minimized and only used at pressures less than 30 pounds per square inch (psi). Compressed air should never be used for cleaning clothing, hair or aimed at other persons.

4.1.8 In the event of an injury or exposure to a chemical, regardless of severity, the employee must report to OSU Employee Health and complete an accident report. In the event of serious/severe injuries or exposures call 9-1-1 immediately for medical attention.

University Health Services (formerly known as Employee Health Services)
Phone: 614-293-8146
Fax: 614-293-8018
McCampbell Hall, 2nd Floor
1581 Dodd Drive
Hours: M-F, 7:30am – 4:00pm

If University Health Services is closed or unavailable, seek medical treatment for minor injuries at:

Martha Morehouse Medical Plaza – After hours care Suite 2400, Pavilion 2050 Kenny Road 614-685-3357	OSU Occupational Medicine CarePoint East 543 Taylor Ave, 2nd Floor 614-688-6492	OSU Occupational Medicine CarePoint West 86 N. Wilson Road 614-293-3500

Refer to Appendix A for the OSU Employee Accident Report Form.

4.1.9 Do not attempt to remove foreign objects from the eye or body. Seek medical attention immediately. If chemicals are splashed into the eyes, utilize an eyewash station to rinse eyes for 15 minutes before seeking medical attention.

4.1.10 During repair, cleaning or oiling, machines and equipment MUST be shut off and locked out to ensure unauthorized startup does not occur.

4.1.11 Neck ties, loose clothing, jewelry, gloves, etc. are prohibited around moving or rotating machinery. Long hair must be tied back or covered to keep it away from moving machinery.

4.1.12 Do not attempt to work in a machine shop when tired, or “in a hurry.”

4.1.13 All machines must be operated with all required/recommended guards and shields in place.

4.1.14 A brush, hook or specialized tool is preferred for removal of chips, shaving, etc. from work areas. Never use hands to clear work areas.

4.1.15 Keep fingers and hands clear of points of operation on shop equipment. Use specialized tools such as push sticks, pliers, clamps or hooks to maintain materials in place or move them through work areas. Never use rags near moving equipment/machinery.

4.1.16 Damaged or broken equipment/tools must be removed from service and tagged “DO NOT USE”, or something similar, to ensure tools/equipment are not used in an unsafe manner. Repairs must be made prior placing equipment back into service.

4.1.17 Maintain shops in a clean and orderly manner.

4.1.18 Keep the floor around machines clean, dry and free from trip hazards.

4.1.19 Perform a brief inspection of the equipment prior to use to ensure it is in proper working order and free from any noticeable hazards.

4.1.20 Food and drinks are prohibited in machine shop areas.

4.1.21 Be aware of the Safety Data Sheet (SDS) for all chemicals used and stored in the machine shop.

4.1.22 Ensure power cords are in adequate condition free from damage or fraying.

4.1.23 Store oily rags in approved containers only.

5.0 Hazard Communication in Machine Shops

5.1 The purpose of the Hazard Communication Program is to ensure employees are aware of hazardous chemicals in the workplace and are provided information regarding the potential hazards associated with exposure to these chemicals. Specifically, hazardous chemicals produced or imported into the workplace are to be evaluated for physical and health hazards; this information is to be provided to employees. The program also covers container labeling, safety data sheets, employee training and emergency procedures. This program is designed to comply with the Public Employment Risk Reduction Program (PERRP) and the OSHA Hazard Communication Program or “Employee Right-to-Know” Act.

5.1.1 Machine shops, which use or store hazardous chemicals must implement the Hazard Communication Written Program and maintain an inventory of the chemicals.

5.1.2 Chemical containers must be in adequate condition and properly labeled.

5.1.3 Safety Data Sheets (SDS) must be maintained in the shop for all chemicals present to inform employees of the hazards associated with the chemicals.

5.2 Solvents and resins are common chemicals found in machine shops. The following safety guidelines apply to the storage and use of these types of chemicals.

5.2.1 Before using a chemical, users should be knowledgeable on the safe use, storage and exposure concerns.

5.2.2 Use water-based cleaners instead of solvents and other less hazardous products whenever possible.

5.2.3 Use solvents in well ventilated areas. Use of solvents in confined areas can result in exposure issues.

5.2.4 Avoid skin contact with solvents. Appropriate hand protection should be worn by users when handling solvents.

5.2.5 Smoking is not permitted in shops or laboratories. Flames and spark production is prohibited in areas where solvents are stored.

5.2.6 Used solvents should never be poured down the drain or disposed outdoors. Contact Environmental Health & Safety for chemical disposal services.

5.2.7 Mix resins in small batches. Fumes from resins, paints, solvents and adhesives can affect other shop areas. Ensure adequate ventilation is present when dealing with these types of materials.

5.2.8 Clean up solvent and chemical spills immediately. In the event of a large spill, contact Environmental Health & Safety emergency response team for cleanup services.

5.2.9 The use of respirators may be necessary depending on the type of chemical being used and the application. The use of respirators must comply with the OSU Respiratory Protection Program. Consult Environmental Health & Safety for additional information regarding respirator requirements and use.

6.0 Access Control

6.1 Machine shops contain tools and equipment, which if used by unauthorized personnel can cause serious injury. Efforts must be made by each shop to ensure access to the shop is controlled.

6.1.1 OSU Staff Machine Shops

6.1.1.1 During business hours, machine shops should be staffed, and a supervisor present, to ensure unauthorized personnel are not permitted within working areas.

6.1.1.2 During non-business hours machine shops must be locked or under key card control to limit access by unauthorized personnel.

6.1.2 OSU Student/Teaching Machine Shops

6.1.2.1 When students are present within a shop, the course instructor or supervisor must be present at all times to ensure all tools and equipment are used properly and safely.

6.1.2.2 When students are not present within a shop, the shop must be locked to limit access by unauthorized personnel.

7.0 Cleaning and General Housekeeping

7.1 Machine shops should be maintained in a clean and orderly manner.

7.2 Floors should be swept clean at the end of each work shift or class.

7.3 Equipment/tools should be cleaned after use.

7.3.1 Turn off the power to any equipment or tool prior to cleaning

7.3.2 Clean chips/shaving away from the tool work area and remove any dust/metal collecting container and dispose of waste materials properly.

7.3.3 Do not overuse compressed air for cleaning equipment. Compressed air is permitted to be used for cleaning operations at pressures less than 30psi.

7.4 Report any damage or missing parts to tools/equipment to the shop supervisor immediately.

7.5 At the end of work remove cutting bits and blades and store in a safe manner.

7.6 Lower saw blades to safe positions for storage.

7.7 Place storage guards back on tools/equipment after use if applicable.

8.0 Machine Guarding

8.1 Tools and equipment where hazards are present due to points of operation, nip points, rotating parts, flying chips and sparks must be properly guarded. All tools and equipment MUST be equipped with the appropriate machine guards. A properly guarded tool will help minimize injuries associated with its use.

8.2 Guards must not pose additional hazards to the worker.

8.3 At no time should a guard be manipulated, removed or changed in any way.

8.4 If a guard is found to be missing from a piece of equipment, it should be tagged to prevent use and reported to the shop supervisor. Once the equipment is properly guarded it may be placed back into service.

8.5 A “Machine Guarding Reference Guide” is found in Appendix B of this program. This guide contains the requirements for machine guarding for common machine shop equipment. If there is a question on machine guarding not addressed in this guide, contact Environmental Health & Safety.

9.0 Visitors & Contractors

9.1 Visitors and contractors are not permitted to utilize machine shop tools or equipment unless prior approval has been granted by the shop supervisor. Approval should include the completion of appropriate training for the tools and equipment to be used.

9.2 Contractors are responsible for providing their own tools to complete tasks and jobs at OSU. Contractors should follow their own power tool safety guidelines at all times.

10.0 Machine Shop Hazard Matrix

10.1 A hazard matrix including some of the common types of tools/equipment found in OSU machine shops can be found in Appendix B. The matrix utilizes three hazard categories (Low, Medium, High) depending on the type of tool/equipment being used.

10.2 The matrix, found in Appendix C, provides the requirements for each shop based on the hazard category of the equipment present.

10.2.1 The three hazard categories are provided at the top of the matrix (low, medium, high).

10.2.2 **General Design -** This category contains a basic explanation of the size and power of the shop equipment.

10.2.3 **Common Examples -** This category is a listing of the common equipment types fitting the criteria for each hazard level.

10.2.4 **Shop Monitoring** – This category outlines what individual must be physically present in order to allow shop equipment to be used.

10.2.4.1 Adequate monitoring/oversight of all shop activities is vital to minimize the potential for injury during the use of tools/equipment.

10.2.4.2 Individuals designated as shop monitors/supervisors must be capable of identifying existing and predictable hazards in a shop environment and have the authority to take prompt corrective actions.

10.2.4.3 Staff members, faculty, teaching assistants, graduate students, etc. may serve as shop monitors provided they are provided the authority to do so. Undergraduate students should not serve as shop monitors.

10.2.4.4 Shop monitors/supervisors must display adequate knowledge of shop procedures to determine competency.

10.2.4.5 As listed in Appendix C:

10.2.4.5.1 No monitor is necessary during the use of “Low” hazard equipment.

10.2.4.5.2 A monitor must be present during the use of “Medium” hazard equipment.

10.2.4.5.3 A shop supervisor, faculty member, or staff member with professional level training and experience must be present during the use of “High” hazard equipment.

10.2.5 **Training** – This category outlines the level of training required to operate the shop equipment.

10.2.5.1 Three training levels are provided in the Machine Shop Hazard Matrix

10.2.5.1.1 “General Shop Information” (Appendix D) – Provides basic information to the users of the shop and must be completed by anyone using low, medium or high hazard equipment/tools.

10.2.5.1.2 “General Shop Safety Training” (Appendix E) – Provides information regarding the safe use of tools and equipment and must be completed by anyone using low and medium hazard equipment/tools.

10.2.5.1.3 “Equipment Specific Training” (Appendix F) – Provides specific information on the safe use of high hazard equipment. Anyone using high hazard equipment must complete this training.

10.2.5.2 The shop supervisor is responsible for providing the aforementioned training. EHS can assist with training upon request.

10.2.5.3 First aid training is strongly recommended for shop monitors and supervisors.

10.2.5.4 Refresher training must be provided if:

10.2.5.4.1 Changes in the workplace render previous training obsolete.

10.2.5.4.2 Changes in the type of shop equipment render previous training obsolete.

10.2.5.4.3 The operator has been observed using the equipment in an unsafe manner.

10.2.5.4.4 The operator has been involved in an accident or near miss.

11.0 Inspections and Recordkeeping

11.1 Shop supervisors, or their designee, should perform a shop inspection at regular intervals. It is recommended the shop be inspected biannually to ensure safety is maintained throughout the year.

11.1.1 Appendix G contains an example of a “Shop Safety Checklist”. This checklist, or something similar, addressing the tools/equipment utilized in the machine shop should be maintained at the shop.

11.2 Environmental Health & Safety may perform additional shop inspections throughout the year to ensure safety requirements are being met and any additional safety programs are in place for employees exposed to hazards.

11.3 Records to be maintained by the shop supervisor include the following:

11.3.1 Completed shop safety inspection checklists

11.3.2 Training records for all shop employees

11.3.3 Tool/equipment manufacturer instruction/owner manuals

11.3.4 Repair/maintenance records for applicable tools/equipment

11.3.5 Employee accident reports

12.0 Rooms, Laboratories or Areas with Miscellaneous Equipment

12.1 Not all rooms, laboratories or areas at Ohio State, which contain equipment/tools, are classified as machine shops. Research laboratories, non-traditional workspaces, temporary locations, etc. may utilize individual tools or equipment.

12.2 It is the responsibility of the supervisor for these types of areas to ensure proper safety guidelines are followed.

12.2.1 At a minimum, these areas should have a monitoring program, training program and machine guarding practices to ensure the safety of the users.

12.2.2 Research labs utilizing machine shop equipment must have adequately developed standard operating procedures, which address hazards of equipment use and safeguards.

Appendix A – OSU Employee Accident Report Form

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Employee Accident Report

Read These Instructions Before Proceeding

The Employee Accident Report must be completed for every work-related accident or illness. (Medical complex personnel refer to Employee Health Web Page on the Intranet.) This report will:

1. Assist employees in obtaining immediate medical treatment
2. Inform supervisor/charge person of accident
3. Be recorded for follow-up and future prevention

Below are guidelines for completing this form (please print neatly in ink or complete electronically)

Employee Responsibilities:

1. Immediately notify supervisor/designated charge person of work-related accident or illness.
2. Fully complete "Employee Information" and "Accident Information" sections, sign, and date the report.
3. Give form to supervisor/charge person for signature.
4. Seek medical treatment if necessary (see "Medical Treatment" section below).

Supervisor/Charge Person Responsibilities:

1. Complete "Supervisor/Charge Person" section. Sign and date the report. If employee needs or desires medical treatment, arrange for appropriate medical care (see "Medical Treatment" section below).
2. If employee does not need or desire medical treatment, make a copy of this report for your records and send the original to Employee Health (address is listed below). If medical treatment is needed at a later date as a result of this accident, refer employee to Employee Health Services.

Medical Treatment

Columbus campus employees should seek treatment for work-related injuries and/or illness at:
OSU Employee Health Services
Phone: (614) 293-8146
Fax: (614) 293-8018
McCampbell Hall, 2nd floor
1581 Dodd Drive
Hours: Monday–Friday, 7:30 a.m. to 4 p.m.
(There is no cost for medical treatment of employee accidents or injuries at Employee Health.)

If Employee Health Services is closed or unavailable, seek treatment at:

OSU Occupational Medicine–CarePoint East
543 Taylor Ave., 2nd floor
Columbus, OH 43203
(614) 688-6492
Hours: M–F, 8 a.m. to 5 p.m.

OSU Occupational Medicine–CarePoint West
86 N. Wilson Road
Columbus, OH 43204
(614) 293-3500
Hours: M–F, 8 a.m. to 5 p.m.

After Hours Care
Martha Morehouse Medical Plaza
2nd Floor, Suite 2400, Pavilion
2050 Kenny Road
Columbus, OH 43212
(614) 685-3357
Hours: M–F, 8a-5p; SAT 10a-6p; SUN 10a-6p

After normal business hours or on weekends, for non-emergencies, seek treatment at Employee Health Services during normal business hours. After normal business hours, seek treatment at After Hours Care. If life threatening, seek emergency treatment at Ohio State's Wexner Medical Center Emergency Department or University Hospital East Emergency Department. (Hospital employees should report to Employee Health the next day.)

Regional campus employees should seek treatment at the designated local health provider.

For blood and body fluid exposures (BBFE): Employees must report blood and body fluid exposures immediately to their supervisor and complete the BBFE Addendum to this report. Wexner Medical Center personnel should refer to Blood and Body Fluid Exposure Protocol for instructions. All others should call Employee Health Services at (614) 293-8146 for instructions.

Submit this report to: OSU Employee Health Services
University Hospital Clinic
McCampbell Hall, 2nd floor
1581 Dodd Drive
Fax: (614) 293-8018

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Employee Accident Report

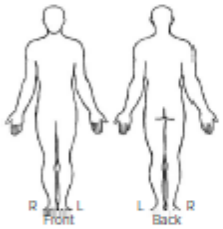
Section I: Employee Information—all fields must be completed

Name: _____ OSU Employee ID#: _____ Sex: _____ Age: _____
Home Address: _____ Date of Birth: _____ Date Hired: _____
City: _____ State: _____ Zip Code: _____ Home Phone: _____
Job Title: _____ Department: _____ Shop: _____
Work Address: _____ Work Phone: _____ Full Time/Part Time: _____
Supervisor's Name: _____ Supervisor's Phone: _____

Section II: Accident Information—provide as much detail as possible

Accident date: _____ Accident time: _____ ☐A.M. ☐P.M. Time shift began: _____ ☐A.M. ☐P.M.
Location of accident (Room # and building): _____ Room use (Lab, Shop, etc.): _____
What was being done before the accident occurred? _____
What happened? _____

Body part(s) affected/injured (circle on diagram)



	L	R
Eyes/Ears/Face	☐	☐
Neck/Shoulders/Arms/Elbows	☐	☐
Hips/Legs/Knees	☐	☐
Wrist/Hands/Fingers	☐	☐
Ankles/Feet/Toes	☐	☐
Back (Upper/Lower)	☐	
Head	☐	
Internal Organs	☐	
Other: _____		

What object or substance directly harmed the employee? _____
Was this part of your normal job duty? _____
Type of injury or illness: _____
Witnesses (name and phone): _____
Date of death, if applicable: _____
Report prepared by (if different than injured employee): _____
Phone: _____

If this is a blood/body fluid exposure (BBFE), you are required to complete the BBFE Addendum to this report in its entirety.

Hospital Medical Record # of source patient: _____

Section III: EMPLOYEE AUTHORIZATION

I understand that it is my right to apply for Workers' Compensation benefits and that I have two years from the date of this accident to do so. For more information regarding workers' compensation, call (614) 292-3439. I also authorize release of medical information regarding this accident to OSU BWC claim administrators.
Did the employee seek medical treatment? ☐Yes ☐No If Yes, where? _____
EMPLOYEE SIGNATURE: _____ Date: _____
Send Columbus campus employee for treatment with this form to: Employee Health Services, McCampbell Hall, 2nd floor (University Hospital Clinic), 1581 Dodd Drive, within 72 hours after accident is reported. Regional campus employees should be sent to local health care provider.
If no medical treatment is necessary or if treatment is sought somewhere other than OSU Employee Health Services (EHS), send a copy of this completed report to EHS at: Fax: (614) 293-8018 or McCampbell Hall, 2nd floor, 1581 Dodd Drive.

Section IV: Supervisor / Charge Person

This accident was reported to me on: Date: _____ Time: _____ Cost Center/Department #: _____
Is further investigation required? ☐Yes ☐No SUPERVISOR/CHARGE PERSON SIGNATURE: _____ Date: _____
If YES, please provide additional information: _____

Section V: Health Care Provider

Treated by Employee Health? ☐Yes ☐No If NO, treated by? _____
Medical provider printed name: _____ Medical provider signature: _____
Diagnosis/Assessment: _____
Body part(s) affected: _____ Date treated: _____
Is this a reaggravation of a previous injury? ☐Yes ☐No Date of initial injury: _____
☐Full Duty ☐Restricted Duty Date (if restricted, please use MEDCO-14): _____

OSHA300 Recordable Code(s): ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8
1 - Injury involving loss of consciousness
2 - Injury involving restriction of work or lost time
3 - Injury involves transfer to another job
4 - All work-related fatalities (death)
5 - All work-related illness
6 - All work-related injuries (treatment beyond first aid)
7 - Not recordable
8 - Human Bloodborne Pathogen Exposure

Medical Record # _____ Send copies to: (date/initial when sent)
_____ OSU Workers' Compensation Fax: (614) 292-0271
_____ Medical Center Safety Fax: (614) 293-8100
_____ Environmental Health & Safety Fax: (614) 292-6404
_____ Employee Health Services Fax: (614) 293-8018
_____ OSHALOG Coordinator (see list)
_____ Supervisor/Dept.
_____ Injured employee

Section VI: Worker's Compensation Self-Insurance

Certification? ☐Yes ☐No ORG #: _____ Signature: _____ Date: _____

ATTENTION: This form contains information relating to employee's work-related injury and must be used in a manner that protects the confidentiality of the employee to the maximum extent possible.

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Blood/Body Fluid Exposure Addendum

ALL parts of this form MUST be completed with as much detail as possible.
This form must be sent directly to Employee Health Services (not to supervisor).

Section I: Employee Information

Name:_____ OSU employee ID#:_____ Date of exposure:_____
Time of exposure:_____ Date of hire:_____ Number of hours on duty:_____
Occupation: _____ Phone # (for reporting lab results):_____ Pregnant: ☐ Yes ☐ No

Section II: BBFE Information

Specific location of exposure (room # and building):_____
Location type (patient room; laboratory; bathroom): _____
Cause of the exposure (splash; needlestick; bite):_____
Detailed account of the event (be as specific and detailed as possible):

_____
_____
In your opinion, what could have prevented this BBFE? (be specific): _____

Section III: Needlesticks/Sharps Injuries

Was the sharp item: ☐ Contaminated ☐ Uncontaminated ☐ Unknown
Source of contamination (blood; other-please specify):_____
Depth of injury: ☐ Superficial (surface scratch) ☐ Moderate (penetrated skin) ☐ Deep puncture or wound
Was the sharp being held? ☐ Yes ☐ No
If not, was the sharp: ☐ Hands too close to someone else handling sharp ☐ Being passed by someone else
☐ Dropped by someone else ☐ Set aside for future use
☐ Inappropriately discarded or left there by someone else

Type of sharp:
- ☐ Needle for blood draw
  - ☐ Push button butterfly
  - ☐ Multi sampling needle
  - ☐ Slide safety butterfly
  - ☐ ABG needle
  - ☐ Syringe to draw cord blood
  - ☐ Other
- ☐ Central line placement
  - ☐ Lidocaine
  - ☐ Introducer
  - ☐ Scalpel
  - ☐ Other
- ☐ Insulin pen
  - ☐ Novo Nordisk Innolet (Reg or NPH)
  - ☐ Novo Nordisk Flex Pen (Novolog Aspart or 70/30)
  - ☐ Solostar (Lantus)
  - ☐ Lilly (Humalog)
- ☐ Peripheral IV
  - ☐ Angioset (butterfly)
  - ☐ Angiocath (straight)
- ☐ Huber needle
  - ☐ Safety
  - ☐ Non-safety
- ☐ Suture needle
- ☐ Needle for injection
- ☐ EMG/SSEP needle
- ☐ Surgical instrument _____

If administering lidocaine, was needle:
☐ Being reused ☐ Set aside for reuse
☐ Stuck self while administering ☐ Recapping

If scalpel, was it a safety (retractable) scalpel? _____
Do you feel the device was defective? _____
****If YES, please save device for Employee Health if possible.**

Section IV: Splashes

Was this exposure related to a splash? _____
Fluid involved:
☐ Blood ☐ Urine ☐ Stool
☐ Vomitus ☐ Sweat, tears ☐ Saliva, sputum
☐ Vent condensation ☐ CSF, synovial, pleural, peritoneal, pericardial, or amniotic fluid

If urine, sweat, vomitus, stool, saliva, sputum, or vent condensation, was fluid visibly bloody? _____
What type of personal protective equipment (PPE) was worn during exposure? _____
☐ Gloves ☐ Glasses ☐ Mask
☐ Gown ☐ Goggles ☐ Mask with face shield

If splashed, fluid came in contact with:
☐ Intact skin ☐ Non-intact skin ☐ Eyes
☐ Nose ☐ Mouth ☐ Other

Did someone else inadvertently splash you? _____
If this BBFE was caused by a splash, list barrier protections that could have prevented it:

_____

Appendix B – Machine Guarding Reference

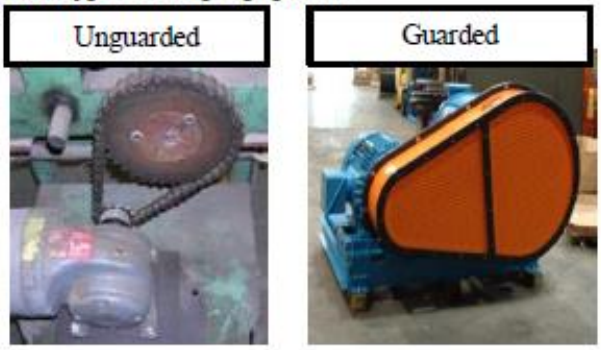
Machine Guarding Reference Guide

- The following are general guidelines regarding machine guarding. In many cases there is more than one way to achieve proper machine guarding.
- This is not intended to be an all-inclusive list of shop equipment.
- Consult with EHS and/or the equipment manufacturer for additional machine guarding information.

Guarding Requirements for All Shop Equipment

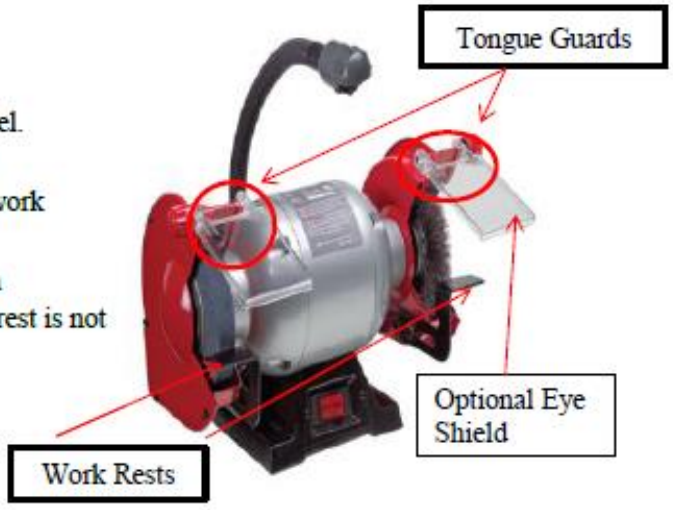
The following points must be adequately guarded on all types of shop equipment:

- Point of operation:
  - Area where the machine performs work. (An example would be where a saw blade meets the material being cut).
- Power transmission devices:
  - Elements of the mechanical system that transmits energy. (Examples would include flywheels, belt, chains and pulleys).
- Other moving parts:
  - Other parts of the machine that move when the machine is in cycle.



Bench Grinder

- Guarding Requirements
  - Adjustable tongue guard ¼" from wheel.
  - Adjustable work rest 1/8" from wheel.
  - Bench grinder needs to be secured to work surface.
  - The required guarding for a wire brush attachment is a tongue guard. (A tool rest is not recommended in this situation).



- Safe Work Practices
  - Grinding wheel must be dressed to prevent a ridge from forming.
  - Perform a ring test before mounting an abrasive wheel.
    - The abrasive wheel must not be used if a dull sound is noted.
  - If the grinding wheel is cracked, do not use it because it could shatter.

Grinder Dresser Tool

Band Saw

- Guarding Requirements
  - Adjustable guard. Set the guard as close as possible to the stock.

Blade guard

Milling Machine

- Guarding Requirements
  - Point of operation guard.

Point of operation guard

Belt/Disc Sander

- Guarding Requirements
  - Fixed guards at pinch and nip points.

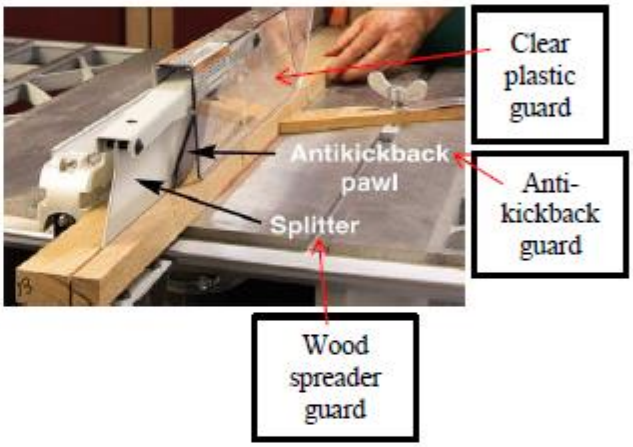
Fixed guards

Angle Grinders

- Guarding requirements
  - A fixed guard must be on the grinding wheel enclosing one-half or 180° of the grinding wheel.

Table Saw

- Guarding Requirements
  - There are three guards needed on a table saw: a wood spreading guard, anti-kickback guard and a self-adjusting guard over the blade.
- Safe Work Practices
  - A push stick must be used when the stock being cut is small.
  - The top of the teeth of the table saw blade shall not extend ¼" above the material being cut.



Saw Stop – Table Saw

- Guarding Requirements
  - The guarding requirements for a "Saw Stop" table saw are the same as those for a standard table saw.

Radial Arm Saw

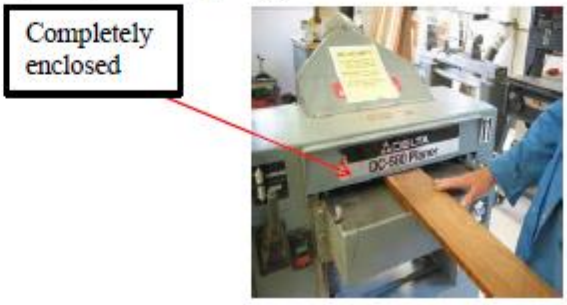
- Guarding Requirements
  - A self-adjusting guard below the blade
- Safe Work Practices
  - The radial arm saw must be returned to the original position after a cut is finished.
  - Saw should only be used for cross cutting. A table saw is a better tool for ripping.

Jointer (manual)

- Guarding Requirements
  - Self-adjusting blade guard.
- Safe Work Practices
  - If the wood stock is small, use a push stick to feed the stock.

Planer/Moulder (Automatic)

- Guarding Requirements
  - Cutter heads must be completely enclosed, except for the opening needed to feed the stock into the tool.



Circular Saw

- Guarding Requirements
  - Self-adjusting blade guard.
- Safe Work Practices
  - If the saw cut is stopped before the cut is finished, the saw must be turned off before being removed. If the saw is pulled out before stopping, kickback could occur.

Routers

- Guarding Requirements
  - Self-adjusting guard above cutting bit on bench version. Fixed guard on hand held version.

Welding and Brazing

- PPE
  - Fire resistance clothing
    - Coat
    - Pants
  - Welding helmet or tinted face shield
    - Tinted number depends on what type of welding or torch being used.
    - If face shield is used, safety glasses are required.
  - Leather gloves
    - Heat resistant
  - Respiratory Protection (site specific)
- Safe Work Practices
  - Oxygen and acetylene cylinders must be secured to a cart by using chain or webbing strap.
  - If a cylinder does not have a regulator attached, it must be capped.
  - Inspect work area for any combustibles. (Follow PSU Hot Work Permit Program)

Chop/Miter saws

- Guarding Requirements
  - Both saws must have self-adjusting blade guards.
- Safe Work Practices
  - Only use the recommended blade based on size and revolutions per minute (RPM).

Reciprocating Saw

- Guarding Requirements
  - Must be equipped with hand/finger guard.

Jig Saw

- Guarding Requirements
  - Upper portion of the blade, above the tool rest, must be guarded.

Scroll Saw

- Guarding Requirements
  - Blade guard

Power Press Brake

- Guarding Requirements
  - Note: There are many different methods which can be used to effectively guard this equipment. They are listed below. The best means of guarding will depend on how the press brake is used.
    - Moveable barrier guards
    - Fixed guards
    - Presence-sensing devices
    - Pull back devices
    - Restraint devices
    - Two-hand trip devices

Power Shear

- Guarding Requirements
  - Adjustable guard

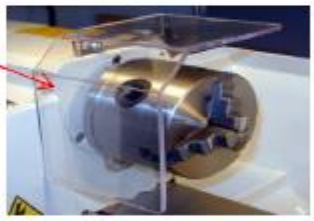
Power Press (Mechanical and Hydraulic) (Part Revolution and Full Revolution)

- Guarding Requirements
  - Note: Depending on the size and type of power press a variety of guarding methods are available. The following are examples of such methods. Contact EHS or the equipment manufacturer for consultation.
    - Point of operation guard
    - Pull back device
    - Restraint device
    - Gate type guards (A and B types)
    - Two-hand trip
    - Two-hand control
    - Presence-sensing device

- Safe Work Practices
  - Operators must never place their hands in the die area (point of operation) while performing normal production operations.
  - Hand tools designed for freeing or removing work or scrap pieces from the die must be used.
  - OSHA has a specific standard on Mechanical Power Presses. (CFR 1910.217 – Mechanical Power Presses)

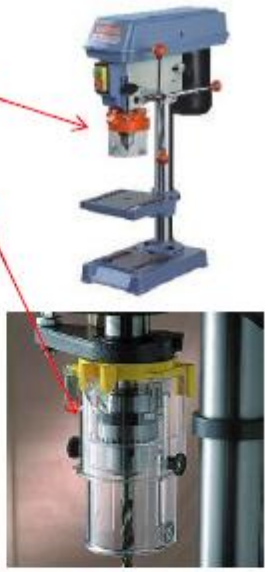
Lathe (Automatic and Manual) (Wood and Metal)

- Guarding Requirements
  - A guard over the chuck.
  - For lathes used for turning long stock, a guard over top of the stock.
- Safe Work Practices
  - Tie back hair and no loose clothing so it doesn't get caught on the spinning chuck.
  - After making adjustments to the machine, remove the chuck key.



Drill Press

- Guarding Requirements
  - Chuck guard
- Safe Work Practices
  - Small material being cut shall be clamped to prevent any spinning.
  - The drill press machine must be secured so it will not "walk".



Milling Machine

- Guarding Requirements
  - Adjustable or permanent chip/coolant shield
- Safe Work Practices
  - Tie back hair and no loose clothing so it doesn't get caught on the spinning chuck.
  - Do not allow large quantities of chips to accumulate around the work piece or machine table.

Compressed Air Tools

- Guarding requirements
  - Safety tips must be installed to relieve air pressure in the event the nozzle is "dead-ended".
  - Air pressure must be less than 30 PSI when using compressed air for cleaning.
- Safe Work Practices
  - Compressed air tools shall never be used to remove dirt from clothing or skin.

Appendix C – Machine Shop Hazard Matrix

Hazard Level	Low	Medium	High
General Design	Hand tools (non-powered) Small powered tools Small bench top tools	Larger portable power tools Larger powerful bench top tools Light industrial tools	Large industrial tools and equipment
Common Examples	Belt sander (handheld) Dremel tool Drill (corded/cordless) Hand tools (non-powered) Heat guns Jig saw Laser cutter/engraver Oven Paint booth Palm sander Scroll saw Soldering iron	Angle grinder Belt/disc sander (pedestal) Bench grinder Circular saw Chop/miter saw Drill press (benchtop) Enclosed CNC machine Horizontal band saw Larger than 3/8” drills Manual brake Manual shear Milling machine (benchtop) Nail guns Planer Reciprocating saw Routers Water jet	Band saw (free standing) Cranes and hoists Drill press (free standing) Hydraulic/mechanical press Lathe Milling machine (standing) Open CNC mill Power press brake Power shear Radial arm saw Surface grinder Table saw Vertical band saw Welding (Hot Work)
Shop Monitoring	Equipment use is permitted in designated area of the shop or other pre-approved location. Employees - Direct monitoring is not required for low hazard level tools. Students – Direct safety monitoring is not required, but students shall not work alone with low hazard level tools; student must have prior approval to use equipment.	Equipment use is permitted only in designated areas. Employees – direct monitoring is not required, but worker should not work alone with medium hazard level tools. Students – Safety monitor MUST be present during operation to ensure safe use of equipment.	Equipment use is permitted only in designated areas. Employees – direct monitoring is not required, but worker MUST not work alone; and the monitor/supervisor must be available in the event of an emergency. Students – Safety monitor MUST be present during operation to ensure safe use of equipment
Required Training	1. General shop information 2. General shop safety training	1. General shop information 2. General shop safety training 3. Equipment specific safety training	

Appendix D – General Shop Information

	Name	Phone	Emergency Phone	Email
Shop Supervisor 1				
Shop Supervisor 2				
Safety Monitor 1				
Safety Monitor 2				
Additional				

Emergencies:

In the event of an emergency dial 9-1-1, notify the supervisor or safety monitor and remain with the injured staff member until medical assistance arrives.

Phones are located in the following areas of the shop:_____

Injuries:

Life threatening injuries (large cuts, uncontrollable bleeding, head injury, etc.) must be treated as emergencies (see above).

Non-Life threatening injuries (small cuts, burns, scrape, bruise, etc.):

- Treat the injury in the shop using first aid techniques
- Transport employee to University Health Services and notify the supervisor to complete an Employee Accident Form.

Emergency Equipment Locations:

Fire Extinguisher(s) _____
First Aid Kit(s) _____
Emergency Shutdown _____
Eyewash/Shower Station(s) _____

Right-to-Know:

Safety Data Sheets (SDS) are located:_____

Chemicals are stored:_____
_____

Building Emergency Action Plan (BEAP):

In the event of a fire, tornado, bomb threat, etc. the Building Emergency Action Plan should be reviewed by all employees outlining emergency contacts, meeting points, evacuation plans, etc.

Additional specific shop information must be reviewed with all employees.

Appendix E – General Shop Safety Training

Only fully trained and competent personnel are permitted to utilize machine shop equipment and tools. The following general machine shop safety guidelines apply to general shop duties and do not serve as adequate replacement of specific shop equipment training. These guidelines must be implemented to ensure safety and health in machine shops; failure to do so may result in serious injury or death.

- Safety glasses, goggles or face shields are required when in any shop area, whether working or not.
- Open toed shoes, or sandals, are prohibited within machine shops. Closed toed shoes are required when in any shop area. Steel toed shoes may be required if working with heavy materials, such as metal.
- Adequate hand protection must be worn depending on the materials being handled.
- Wear appropriate clothing for the shop and tasks being completed.
- Operation of any piece of shop equipment is not permitted unless the user is fully trained on the contents of the OSU Machine Shop Safety Program and specific equipment training has been completed.
- Two people should be present in machine shops when equipment and/or tools are in use.
- The use of compressed air to clean equipment should be minimized and only used at pressures less than 30 pounds per square inch (psi). Compressed air should never be used for cleaning clothing, hair, or aimed at other persons.
- In the event of an injury or exposure to a chemical, regardless of severity, the employee must report to OSU Employee Health and complete an accident report. In the event of serious/severe injuries or exposures call 9-1-1 immediately for medical attention.
  University Health Services
  Phone: 614-293-8146
  Fax: 614-293-8018
  McCampbell Hall, 2nd Floor
  1581 Dodd Drive
  Hours: M-F, 7:30am – 4:00pm

  If University Health Services is closed or unavailable, seek medical treatment for minor injuries at:

Martha Morehouse Medical Plaza – After hours care Suite 2400, Pavilion 2050 Kenny Road 614-685-3357	OSU Occupational Medicine CarePoint East 543 Taylor Ave, 2nd Floor 614-688-6492	OSU Occupational Medicine CarePoint West 86 N. Wilson Road 614-293-3500

- Do not attempt to remove foreign objects from the eye or body. Seek medical attention immediately. If chemicals are splashed into the eyes, utilize an eyewash station to rinse eyes for 15 minutes before seeking medical attention.
- During repair, cleaning, or oiling machines and equipment MUST be shut off and locked out to ensure unauthorized startup does not occur.
- Neck ties, loose clothing, jewelry, gloves, etc. are prohibited around moving or rotating machinery. Long hair must be tied back or covered to keep it away from moving machinery.
- Do not attempt to work in a machine shop when tired, or “in a hurry”.
- All machines must be operated with all required/recommended guards and shields in place.
- A brush, hook or specialized tool is preferred for removal of chips, shaving, etc. from work areas. Never use hands to clear work areas.

- Keep fingers and hands clear of points of operation on shop equipment. Use specialized tools such as push sticks, pliers, clamps or hooks to maintain materials in place or move them through work areas. Never use rags near moving equipment/machinery.
- Damaged or broken equipment/tools must be removed from service and tagged “DO NOT USE”, or something similar, to ensure tools/equipment are not used in an unsafe manner. Repairs must be made prior placing equipment back into service.
- Maintain shops in a clean and orderly manner.
- Keep the floor around machines clean, dry and free from trip hazards.
- Perform a brief inspection of the equipment prior to use to ensure it is in proper working order and free from any noticeable hazards.
- Food and drinks are prohibited in machine shop areas.
- Be aware of the Safety Data Sheet (SDS) for all chemicals used and stored in the machine shop.
- Ensure power cords are in adequate condition free from damage or fraying.
- Store oily rags in approved containers only.

Trainer:

Name (print):	
Signature:	
Date:	

Trainee(s):

Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	

Appendix F – Equipment Specific Training

Equipment specific training documents an employee has been fully trained to operate certain types of tools/equipment within the shop.

To obtain certification:

- Equipment specific training must be provided by the shop supervisor or their designee who can demonstrate full competency on the equipment.
- The trainee/employee must complete the General Shop Information and General Shop Safety Training prior to equipment specific training.
- The trainer must provide:
    - An overview of the equipment
    - Hands-on training providing exact use of the equipment
- Employee must demonstrate competency to become certified to operate the tool/equipment.

Once complete, equipment specific training certification is permanent unless:

- Changes in the workplace render the previous training obsolete
- Changes in the type of shop equipment render the previous training obsolete
- The operator is observed using the equipment in an unsafe manner
- The operator has been involved in an accident or near miss.

Utilize the following page to document equipment specific training. Add additional equipment as necessary.

Equipment Specific Training – Proof of Training

Initial and date all applicable shop equipment.

Tool/Equip.	Trainer Initials	Date	Tool/Equip.	Trainer Initials	Date
Angle grinder			Power shear		
Band Saw (free standing)			Radial arm saw		
Belt/Disc sander (free standing)			Reciprocating saw		
Bench grinder			Router		
Chop / Miter saw			Shaper/molder		
Circular saw			Surface grinder		
Drill press (bench top)			Table saw		
Drill press (free standing)			Vertical band saw		
Enclosed CNC Machine			Water jet machine		
Horizontal band saw			Welding/brazing (Hot Work)		
Hydraulic/mechanical press			Other:		
Jointer					
Laser cutting			Other:		
Large drills					
Lathe			Other:		
Manual brake					
Manual shear			Other:		
Milling machine (bench top)					
Milling machine (free standing)			Other:		
Nail guns					
Open CNC mill			Other:		
Planer					
Plastic Injection molding			Other:		
Power press brake					

Trainee Name (print):	Trainee Signature:	Date:

Appendix G – Shop Safety Inspection Checklist

Date:		Inspector(s):			
Building/Room:		Department:			
			Yes	**No**	**N/A**
A. Housekeeping					
1. Shop is maintained in a clean and orderly manner.					
2. Shop is free from slip/trip/fall hazards.					
B. Chemical Safety					
1. Chemical containers and cylinders are clearly labeled.					
2. Chemical containers are in good condition.					
3. Chemicals are properly stored and segregated.					
C. Personal Protective Equipment					
1. PPE is available and used where necessary.					
2. Eye protection					
3. Hand protection					
4. Hearing protection					
5. Foot protection					
6. Respiratory protection					
7. Are eyewash/shower stations labeled, accessible and routinely tested.					
D. Fire Protection					
1. Exits are clearly marked.					
2. Fire extinguishers labeled and accessible					
3. Fire extinguishers properly mounted					
4. Fire extinguishers serviced in the last 12 months					
5. All emergency pull stations are accessible					
6. Sprinklers have at least 18 inched of clearance					
7. Oily rags and combustible wastes stored properly					
8. Flammable liquids are properly stored					
E. Electrical Safety					
1. Equipment is free from frayed or exposed wiring					
2. All disconnecting means are labeled to indicate the equipment served					
3. At least 3 feet of clearance in front of electrical panels					
4. All electrical openings are covered					
5. All switches and outlets equipped with tight fitting covers					
6. All extension cords equipped with grounding connectors					
7. Portable power tool wires either grounded or double-insulated					

	Yes	No	N/A
F. Equipment/Tools/Machinery			
1. Equipment is free from exposed or moving parts (machine guarding)			
2. Machine guarding is in proper working order			
3. Emergency stop mechanisms are adequately identified and working			
4. Equipment controls clearly labeled			
5. Warning stickers are legible			
6. Equipment is arranged to prevent unauthorized access during use			
7. Are work rests in place and adequately secured			
8. Is compressed air used for cleaning utilized at less than 30 psi			
9. Equipment is capable of being locked out for service			
10. All hand tools are in working condition			
G. Material Storage and Handling			
1. Materials are stored in a safe manner			
2. Compressed gas cylinders are properly secured			
3. Cylinders not in use are stored with protective caps in place			
4. Means for lifting/moving heavy materials in place (crane/pallet jack)			
5. Load ratings clearly marked on all hoisting equipment			
H. Occupational Health			
1. Adequate ventilation exists for the work being conducted			
2. Exhaust ducts are in good condition			
3. Local ventilation is used where necessary			
4. Noise levels are maintained at a safe level			
5. Lighting is adequate			
6. Repetitive motion injuries are addressed			
7. First aid supplies are maintained in a usable manner			
I. Hazardous Waste			
1. Waste materials are placed in appropriate containers			
2. Waste is removed by EHS routinely			
3. Waste containers are properly labeled			
4. Spill cleanup supplies are available.			

Note any other inspection items here:
Corrective actions listed here:

Appendix H – Power Actuated Fastener Equipment Requirements*

Power actuated fastener tools are a class of fastening tools utilized in construction activities to join materials to hard substrates such as steel or concrete. This technology relies on the release of controlled energy in the form of a small chemical propellant charge (powder), compressed gas, or pneumatic means to drive the fastener. Due to the characteristics of the energy source, these tools present potential health and safety hazards to the worker and work area. Based upon these circumstances, there is a need for safe work practice requirements whenever such equipment is used. The basic requirements regarding the use of this equipment are as follows:

***The University Building Design Standards currently prohibit the use of power actuated fastener devices on construction, renovation, or remodeling projects unless a variance has been granted. Once granted the contractor must comply with the following Power Actuated Fastener Equipment Requirements**.

1. The contractor shall inspect the substrate and the fastening material to determine if the proposed fastening method is appropriate. The determination should include a description of the type of material to be fastened and the method of fastening. The base material should be inspected to determine if it is too hard, soft, or brittle, which may cause spalling, damage to the fastener, inability of the fastener to hold in the substrate, or cause the fastener to free flight.
2. The contractor shall develop written description of the work to be performed for the specific University project where the variance has been granted. The procedures should include the type of surfaces (i.e., metal studs to floor, hangers to the deck, etc.) to be fastened to minimize damage to the building and injury to the user, other employees, and the public.
   NOTE: Concrete or other surfaces that are damaged shall not be fastened. When fastening into concrete, never fasten closer than two inches from the edge since this may reduce fastener strength or damage to this material.
3. Trained, competent, and credentialed individuals shall be the only persons allowed to utilize such fastening tools.
4. Individuals will be expected to demonstrate competency with the University approved fastener equipment prior to usage on the specific project. This demonstration should be performed in the presence of the University Project Manager and/or a representative from the Office of Environmental Health and Safety.
5. The contractor shall develop written instructions or procedures on the use of the specific fastener tool, types of acceptable fastening surfaces, injury prevention, and safety precautions. These documents must be submitted for approval to the University prior to being approved for use.
6. A “Competent Person” shall be present to ensure the fastener tool is being used properly and workers not involved with the fastener task are clear of the immediate work area. This includes non-construction workers or building occupants above and below where the fastener tool is being used.
7. Fastener tool operators shall immediately report any problems associated with the device or fastener work to the “Competent Person” or immediate supervisor. Fastening activities shall not proceed until the problem has been resolved and authorization given to proceed.
8. Only the University approved fastener tool shall be used for the specific requested fastening application. No other fastener tool shall be used, unless granted approval by the University.
9. The contractor shall specify information about the fastener tool(s) to be used on the job. This should include the name of the manufacturer and model number. No other fastener tool can be used without the permission of the University.
10. The fastener tool shall be operated at the lowest power or charge setting, as well as the shortest fasteners to ensure a sufficient fastening and minimize personal injury and/or property damage.
11. The fastener equipment should be inspected for proper operation before use to ensure the proper discharge and a solid fastener attachment.
12. The fastener equipment should be unloaded before inspecting, servicing, cleaning and storing.

13. The fastener equipment and charging equipment shall be stored in a tamper resistant container that can be locked when not in use.
14. The fastener equipment shall be used in accordance with the owner's manual and manufacturer's specifications.
15. The appropriate personal protective equipment (i.e., safety glasses, hard hats, hearing protection, etc) shall be worn by the operator of the fastener equipment.