Chapter 24

Personal Protective Equipment

A. References

a. SPPM: S2.00, General Workplace Safety; S2.64 Hearing Conservation; S2.62 Respiratory Protection. SPPM S2.00 General Workplace Safety
SPPM: S2.60 General Requirements for Personal Protective Equipment, S3.14 Prescription Eyewear Program, S3.16 Safety-Toe Footwear. SPPM S2.60 General Requirements for Personal Protective Equipment

b. EHS Laboratory Safety Manual; Section IV: Standard Operating Procedures; D. Personal Protective Equipment; Workplace Hazard Assessment: PPE; Web Site; Workplace Hazard Assessment and Personal Protective Equipment Selection Charts. http://ehs.wsu.edu/labsafety/LabSafetyManual.html

c. WAC 296-800-160, Personal Protective Equipment

d. WAC 296-817-20015, Hearing Loss Prevention (Noise)

e. WAC 296-842, Respirators. WAC 296-842, Respirators

B. Appendices:

a. Appendix A: Hazard Assessment Certification Form

C. Scope

This chapter establishes requirements for hazard assessments, evaluating whether hazards are present that require personal protective equipment (PPE). EHS requires the use of personal protective equipment to protect employees from chemical, physical, biological and radiological hazards having the potential to cause injury or impairment.

Personal protective equipment must be selected and used when workplace hazards are not eliminated or controlled by engineering controls (i.e., guards, ventilation) and/or administrative controls (i.e., job rotation, work practices). Employees required to wear PPE must be trained on its proper use and limitations. This training must be documented.

D. Responsibilities

Supervisors are responsible for the following:

- Performing or designating an individual responsible for performing hazard assessments;
- Documenting hazard assessments;
- Providing PPE to employees;
- Training employees to use PPE;
- Retraining employees if necessary;
- Documenting training; and,
- Requiring employees to use PPE when necessary.

Employees are responsible for the following:

- Identifying hazards requiring PPE;
- Contacting their supervisor for guidance when hazards or hazard controls (including PPE) are unknown or require clarification;
- Maintaining PPE in good and safe condition;
- Requesting new PPE when required;
- Participating in hazard control and PPE training; and

- Using PPE as required, employees failing to use PPE as required may be subject to disciplinary action.

E. Hazard Assessments

To evaluate PPE requirements, supervisors must understand work areas, work activities and work practices. Supervisors may apply their general knowledge of the work environment and activity, such as custodial work in classroom buildings on campus. For more unique environments, it may be necessary to consult with users of the space, such as laboratories, and a walk-through survey of the space may be conducted to identify specific concerns. The hazard assessment must identify hazards that employees are potentially exposed to during while working. Supervisors must evaluate the working conditions and practices in their areas. Supervisors conducting hazard assessments must observe work practices and obtain information from affected employees or others knowledgeable about the hazards present.

Supervisors shall evaluate tools, equipment, facilities and work practices for the following general hazards:

- Impact/Penetration and Compression Hazards: Sources of motion (e.g., movement of tools, machine components or particles) and sources of rolling and potential falling objects must be evaluated.
- Chemical Hazards: Chemical exposures to the eyes and skin as well as inhalation hazards must be assessed.
- Noise Hazards: Loud tools and equipment must be evaluated by EHS.
- Respirable Hazards: Processes creating dusts, mists, fumes and vapors must be evaluated by EHS.
- Electrical Shock Hazards: Equipment using electricity must be assessed.
- Light Radiation Hazards: Welding, brazing, torch cutting, furnaces and lasers or other sources of radiation must be assessed.
- Heat/Cold Hazards: Sources of high and low temperatures must be assessed as well as employee exposure to hot or cold work environments.

A hazard re-assessment must be conducted whenever new equipment or processes are introduced, or the review of an incident report, occupational injury and/or illness records by the supervisor or EHS indicates the potential need for additional PPE. A hazard re-assessment may also support eliminating the need for PPE based upon hazard elimination (e.g. product substitution) or the implementation of engineering or administrative controls.

Identified hazards shall be eliminated or controlled using engineering and administrative controls when technologically and economically feasible. However, when engineering and administrative controls are not feasible, timely, or do not completely eliminate the hazard, PPE must be used. Contact EHS (372-7163) for assistance in identifying and evaluating potential engineering and/or administrative controls.

The following “Workplace Hazard Assessment and Personal Protective Equipment Selection Tables” have been developed to assist supervisors in assessing their work areas. Though all workplace activities are to be evaluated, hazards requiring the use of PPE will generally not be found in office type work areas. Supervisors may reference the following tables to identify the PPE required for their employees.

WORKPLACE HAZARD ASSESSMENT AND PERSONAL PROTECTIVE EQUIPMENT SELECTION TABLES

EYE AND FACE PROTECTION

Eye and face protective equipment shall be routinely considered for employees using, handling, sorting, or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods, employees entering shop, construction or renovation areas and laboratory inspectors.

General eye and face protective equipment selection criteria:

- All eye and face protective equipment shall comply with ANSI Z87.1-1989, 1998 or 2003, except eye protection designed for laser operations. Laser protective eyewear optical density is dependent on laser wavelength (Contact EHS for further information).

- Care must be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest reasonably anticipated level of each hazards must be required.

- As a general rule, face-shields, when required must be worn over primary eye protection (spectacles or goggles).

- Contact lenses wearers must also consider additional eye and face protection devices in a hazardous environment. Dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

- Operations involving heat may also produce light radiation. Protection from both hazards is required.

- Protection from light radiation is directly related to spectacle filter density. Select the darkest shade that allows task performance.

EYE AND FACE PROTECTION SELECTION TABLE

SOURCE/ACTIVITY	*HAZARD*	*PROTECTION*
IMPACT: Demolition, abrasive blasting, grinding, machining, masonry work, woodworking, sawing, drilling, powered fastening, riveting and sanding.	Flying fragments, objects, chips and sand particles.	Spectacles with side protection, goggles, and/or face shields.
HEAT: Welding, torch cutting, furnace operations, pouring and casting.	Hot sparks. Splash from molten metals. High temperature exposure.	Goggles, spectacles with side protection. For severe exposure use face-shields. Face-shields worn over goggles. Screen face-shields, reflective face-shields.
Cold: Using, pouring or transferring liquid nitrogen or helium.	Splash from liquid gas. Low temperature exposure.	Face-shields worn over goggles. Screen face-shields.
DUST: Woodworking, buffing, cleaning with compressed air and grain and coal handling.	Dust.	Goggles.
LIGHT and/or RADIATION: Welding - Electric Arc Welding - Gas Cutting, Torch Brazing, Torch Soldering Lasers	 Optical Radiation Optical Radiation Optical Radiation Thermal exposure, acoustic, photochemical	 Welding helmets or shields. Typical shades: 10-14. Welding goggles or face-shields. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. Spectacles or welding face-shield. Typical shades: 1.5-3. Protective eyewear with an optical density for the specific application. Refer to the laser manufacturer's operations manual or ANSI Z136.1 (most current edition).
CHEMICALS: Laboratory research, chemical handling and transferring, custodial, construction and maintenance operations, dangerous waste processing, bulking and treatment, drug lab investigations and crowd control	Splash Vapor and Gas Exposures	Goggles, eyecups, face-shields. See Material Safety Data Sheet for appropriate eye and face protection. Goggles must be non-ventilated. See Material Safety Data Sheet for appropriate eye and face protection.

FOOT PROTECTION

Foot protective equipment must be routinely considered for employees using, handling, sorting, bulking or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods, employees entering shop, construction or renovation areas, employees collecting environmental samples outdoors on uneven terrain, employees lifting or manipulating heavy objects or working with heavy equipment and laboratory inspectors.

FOOT PROTECTION SELECTION TABLE

SOURCE/ACTIVITY	HAZARD	PROTECTION
IMPACT: Routinely carrying or handling materials such as packages, parts, or heavy tools.	Falling objects. As a general guide, routinely lifting hard edge objects, weighing 10 pounds or more, at waist level must be considered a hazard.	Safety shoes or boots complying with ASTM FR-2412-(most current edition) or ANSI Z41-1991 & (most current edition).
COMPRESSION: Manual and powered material handling equipment, bulk rolls and heavy tools.	Rolling or pinching equipment and objects.	Safety shoes or boots complying with ASTM FR-2412-(most current edition) or ANSI Z41-1991 & (most current edition).
PUNCTURE: Construction and demolition activities.	Stepping on nails, tacks, screws, large staples, scrap metal or broken glass.	Safety shoes or boots with puncture resistant soles.
ELECTRICAL: Construction and maintenance of electrical equipment/service.	Electrical shock and electrocution.	Electrical insulating safety shoes.
CHEMICAL: Laboratory research, chemical & dangerous waste handling and transferring, custodial, construction and maintenance operations.	Splash - skin burns and absorption toxicity.	Impervious rubber boot or bootie covering the shoe. Pant leg or lab coat must pass over top of boot/shoe to prevent chemical from entering.

HEAD PROTECTION

Head protective equipment must be routinely considered employees entering shop, construction or renovation areas, controlling crowds, riding ATVs, motorcycles and bicycles or working with heavy equipment.

Head protective equipment selection criteria:

- Protective helmets shall comply with ANSI Z89.1-(most current edition).
- Proper fitting of helmets is important to ensure it will not fall off. In some cases a chin-strap may be necessary.

HEAD PROTECTION SELECTION TABLE

SOURCE/ACTIVITY	HAZARD	PROTECTION
IMPACT/PENETRATION: Construction, repair, demolition, tree trimming, crowd control, riding bicycles, motorcycles, and ATVs.	Overhead hazards, falling objects, thrown, or swung objects, collisions/impacts.	Type I Protective Helmets (Top protection). Type II Protective Helmets (Lateral impact protection)
ELECTRICAL: Electrical utility installation and repair.	Electrical shock and electrocution.	Class E (electrical), tested to withstand 20,000 volts; Class G (general), tested at 2200 volts; and Class C (conductive), provides no electrical protection.
ENTANGLEMENT: Rotating machinery.	Hair becoming entangled in moving parts.	Caps or other protective hair coverings.

HAND PROTECTION

Gloves are often relied upon to prevent cuts, abrasions, burns and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. There is not a single glove that provides protection against all potential hand hazards. Therefore, it is important to select the most appropriate glove for a particular application, and to determine how often and long it can be worn and whether it can be reused. In some cases, particularly those relating to chemical exposure, double glove use (inner and outer glove) may be required.

Physical and chemical hand protective equipment selection criteria:

- Work activities must be evaluated to determine the degree of dexterity required, the duration, frequency, and degree of exposure, and the physical stresses that will be applied.
- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- For mixtures and formulated products (unless specific test data are available), gloves must be selected on the basis of the chemical component that will breakthrough the glove material in the shortest time.

Electrical hand protective equipment selection criteria and testing:

- Rubber insulating gloves must meet the American Society for Testing and Materials (ASTM D 120-87), Specification for Rubber Insulating Gloves.
- Electrical protective equipment, including gloves, shall be subject to periodic electrical tests. Rubber gloves are to be tested before first use and every 6 months thereafter.

HAND PROTECTION SELECTION TABLE

SOURCE/ACTIVITY	HAZARD	PROTECTION
SHARP TOOLS/MATERIALS: Cutting, dissecting, dicing, butchering, handling sharp or ragged objects.	Lacerations from blades, knives, glass, sheet metal. Splinters from rough lumber. Severe abrasions.	Leather, Kevlar®, wire mesh or stitch gloves, cut-resistant rubber gloves.
THERMAL HEAT: Cooking, welding, soldering, brazing, foundry work, steam line/furnace repair, autoclaves.	Thermal Heat/Burns.	Leather, Kevlar®, flame-retardant gauntlet gloves, chemical treated cloth gloves.
EXTREME COLD: Handling cold materials, cryogenic research.	Frostbite.	Permeable or impervious non-insulated gloves, permeable or impervious insulated gloves.
ELECTRICAL: Electrical utility installation and repair.	Electrical shock and electrocution.	Rubber insulated voltage rated gloves, other gloves rated for electrical work.
BIOLOGICAL: Bloodborne pathogens, handling potential disease vectors e.g. dead rodents or birds, biological research.	Infection/Illness	Gloves impervious to saliva or body fluids, such as disposable nitrile gloves.

SOURCE/ACTIVITY	HAZARD	PROTECTION
CHEMICAL: Laboratory research, chemical handling and transferring, custodial, construction and Maintenance operations.	Glove permeation and degradation causing dry skin, dermatitis, burns, irritation or ulceration, systemic effects	Gloves composed of chemically resistant material. Refer to the Safety Data Sheet and the WSU Laboratory Safety Manual. Contact EHS for assistance.

HEARING PROTECTION

Hearing protective equipment must be routinely considered for employees working in loud or noisy environments. As a general rule, if you must raise your voice to speak to an individual standing 3 feet away from you, hearing protection is required.

Employees exposed to noise at 85 dBA and higher based on an 8-hour time weighted average are to be included in WSU's hearing conservation program. The program includes noise monitoring, the use of appropriate hearing protection, annual audiometric testing, and annual training.

Contact EHS to arrange a noise hazard assessment.

HEARING PROTECTION SELECTION TABLE

SOURCE/ACTIVITY	HAZARD	PROTECTION
NOISY EQUIPMENT: High speed tools, heavy mobile equipment and frequent use of mechanized equipment or firearms.	Noise induced hearing loss.	Ear plugs, ear muffs with the appropriate Noise Reduction Rating (NRR)[1].

1. Note: The NRR does not reflect the actual number of decibels (dBA) protection the hearing protection device provides. Instead, the hearing protection device provides NRR-7 protection, example: TWA=100 dBA, ear muff NRR=19 dB, estimated exposure=100-(19-7)=88 dBA.

RESPIRATORY PROTECTION

Respiratory protective equipment must be routinely considered for using, handling, sorting, bulking or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods without a negative exposure assessment, employees entering construction or renovation areas where activities such as demolition, sanding and welding create dusts and fumes, and employees evaluating potential biohazards such as rodent or bird droppings.

Employees required to wear respirators are to be included in WSU's respiratory protection program. The program includes hazard assessment, air monitoring, medical evaluation, fit testing, the use of appropriate respiratory protective equipment and annual training. Employees potentially exposed to specific contaminants (e.g., lead, asbestos, formaldehyde) are to be covered by an additional medical surveillance program.

Contact EHS to arrange a respiratory hazard assessment.

RESPIRATORY PROTECTIVE SELECTION TABLE

SOURCE/ACTIVITY	HAZARD	PROTECTION
Employees exposed to activities creating dusts, mist, fumes and vapors.	Oxygen deficient atmospheres, irritants, carcinogens, sensitizers and other health effects.	Supplied air respirators (SCBAs, air-line) and air-purifying respirators (half and full face)[1].

1. Note: Different airborne contaminants require significantly different levels of respiratory protection based upon airborne contaminants and contaminant concentrations (e.g. compared to permissible exposure levels, immediately dangerous to life and health thresholds), respirator applied protection factors, contaminant specific regulations, respirator cartridge service life and other factors. Therefore, when seeking to protect employees from additional or newly identified airborne hazards, it is critical that EHS be consulted to assist in identifying the appropriate level of respiratory protection.

MISCELLANEOUS PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment not listed on the preceding charts may be required when employees are exposed to cold weather, laceration, burn, abrasion, chemical and fall hazards. Personal protective equipment to consider includes: Snow and ice cleats, chaps, aprons, lab coats, protective sleeves, knee pads, coveralls, safety vests, welding coats, and personal fall restraint and arrest systems.

The "Hazard Assessment and Personal Protective Equipment Selection Charts" only address the most frequently encountered hazards and recommended PPE. Therefore, the contents are not all inclusive. Hazards not listed may be found in your work area and special PPE could be needed. If you require assistance in conducting a hazard assessment or selecting PPE, contact EHS for additional information.

HAZARD ASSESSMENT CERTIFICATION

Supervisors verify that a hazard assessment has been performed through a written certification. After surveying work areas and practices, the supervisor completes the Workplace Hazard Assessment Certification Form provided in Appendix A. If a work area assessment does not reveal hazards requiring the use of PPE, enter "No Hazard" on the Workplace Hazard Assessment Certification form. These forms are retained by the department.

PERSONAL PROTECTIVE EQUIPMENT SELECTION

Upon completing the hazard assessment, each unit selects and provides the types of PPE suitable for the specific hazards present. The previous "Workplace Hazard Assessment and Personal Protective Equipment Selection Tables" were developed to assist supervisors in selecting appropriate PPE.

Careful consideration must be given to the level of protection, fit and comfort of the PPE. Personal protective equipment that fits poorly will not afford the necessary level of protection. Protective devices are generally available in a variety of sizes and care must be taken to ensure that the right size is selected. Some PPE is equipped with adjustable features. Adjustments must be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. However, PPE must never be modified without written approval from the manufacturer.

F. Training

Supervisors must ensure their employees receive information and training on how to use the assigned PPE. Employees access PPE training on WSU's Learning and Organizational Development website. Supervisors may assign PPE training using WSU's learning management system.

Training and information to be provided to each user of PPE includes:

- Why, when, and what PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The selection criteria and limitations of the PPE
- The proper care, inspection, maintenance, useful life and disposal of the PPE

Each employee must demonstrate an understanding of this training before being allowed to perform work requiring the use of PPE. Methods of demonstrating understanding include orally questioning

the employee, observing the employee using the PPE in a real or artificial setting, or administering a written test. Employees must pass a test at the completion of on-line training with a score of 80% or better to receive credit for course completion.

Employees must be retrained when there have been: (1) Changes in the workplace, such as new processes and equipment (e.g. engineering controls), which render previous training obsolete; (2) Changes in the type(s) of PPE render the previous training obsolete; and (3) Inadequacies in an employee's knowledge or use of assigned PPE indicate the employee has not retained the requisite understanding or skill.

TRAINING CERTIFICATION

WSU's learning management system (Skillsoft/Percipio) maintains a record of PPE training completion. Additional training provided by the supervisor unique to the PPE issued may also be documented.

Appendix A: Hazard Assessment Certification Form

WORKPLACE HAZARD ASSESSMENT CERTIFICATION FORM			
Instructions: Complete form using Personal Protective Equipment Hazard Assessment Guidelines. Completed form is to be retained for departmental records.			
Person conducting the hazard assessment:			**Date of hazard assessment:**
Work Activity Assessed	**Location of Assessment (Blg/Rm)**	**Hazard(s) Identified**	**PPE Selected (Make & Model #)**
I, _____ , certify that the assessment of the identified work activities has been performed. **Date:**			
Signature			