PERSONAL PROTECTIVE EQUIPMENT SELECTION

EYE AND FACE PROTECTION

Eye and face protective equipment should be routinely considered for occupations such as, but not limited to, carpenters, electricians, machinists, mechanics, plumbers and pipefitters, lathe and milling machine operators, welders, grounds-keepers, and employees using chemicals.

General eye and face protective equipment selection criteria:

- All eye and face protective equipment shall comply with ANSI Z87.1989, except eye protection designed for laser operations. Laser protective eyewear optical density is dependent on laser wavelength *(Contact Environmental Health and Safety for further information)*. Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be required.

- As a general rule face-shields should be worn over primary eye protection (spectacles or goggles).

- Wearers of contact lenses must also wear appropriate 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.

- Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

EYE AND FACE PROTECTION SELECTION CHART

Source/Activity	***Hazard***	***Protection***
IMPACT: 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, furnace operations, pouring and casting.	Hot sparks.	Goggles, spectacles with side protection. For severe exposure use face-shields.
	Splash from molten metals.	Face-shields worn over goggles.
	High temperature exposure.	Screen face-shields, reflective face-shields.
DUST: Woodworking, buffing, cleaning with compressed air and grain and coal handling.	Dust.	Goggles.

LIGHT and/or RADIATION:		
Welding - Electric Arc	Optical Radiation	Welding helmets or shields. Typical shades: 10-14.
Welding - Gas	Optical Radiation	Welding goggles or face-shields. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4.
Cutting, Torch Brazing, Torch Soldering	Optical Radiation	Spectacles or welding face-shield. Typical shades: 1.5-3.
Lasers	Thermal exposure, acoustic, photochemical	Protective eyewear with an optical density for the specific application. Refer to the laser manufacturer's operations manual or ANSI Z136.1 (1993).
CHEMICALS: Laboratory research, chemical handling and transferring, custodial, construction and maintenance operations.	Splash	Goggles, eyecups, face-shields. See Material Safety Data Sheet for appropriate eye and face protection.
	Vapor and Gas Exposures	Goggles must be non-ventilated. See Material Safety Data Sheet for appropriate eye and face protection.

FOOT PROTECTION

Foot protective equipment should be routinely considered for occupations such as, but not limited to, carpenters, electricians, machinists, mechanics, plumbers and pipefitters, dry wall workers, welders, grounds-keepers, shipping and receiving clerks, warehouse workers, and employees using chemicals.

FOOT PROTECTION SELECTION CHART

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 should be considered a hazard.	Safety shoes or boots complying with ANSI Z41-1991.
COMPRESSION: Manual and powered material handling equipment, bulk rolls and heavy tools.	Rolling or pinching equipment and objects.	Safety shoes or boots complying with ANSI Z41-1991.
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 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 should pass over top of boot/shoe to prevent chemical from entering.

HEAD PROTECTION

Head protective equipment should be routinely considered for occupations such as, but not limited to, carpenters, electricians, machinists, mechanics, plumbers and pipefitters, dry wall workers, welders, grounds-keepers, shipping and receiving clerks and warehouse workers. Head protective equipment selection criteria:

- Protective helmets shall comply with ANSI Z89.1-1986.
- 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 CHART

Source/Activity	*Hazard*	*Protection*
IMPACT/PENETRATION: Construction, repair, demolition and tree trimming.	Overhead hazards, falling objects.	Type A, B, C Protective Helmets.
ELECTRICAL: Electrical utility installation and repair.	Electrical shock and electrocution.	Class A Protective Helmets (Impact/penetration protection and proof tested to 2,200 volts).
		Class B Protective Helmets (Impact/penetration, protection, and proof tested to 20,000 volts).
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.

Physical and chemical hand protective equipment selection criteria:

- Work activities should 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 should 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 should 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 CHART

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, 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 gloves, 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.
CHEMICAL: Laboratory research, chemical handling and transferring, custodial, construction and maintenance operations.	Glove permeation and degradation causing dry skin, dermatitis, burns, irritation or ulceration	Gloves composed of chemically resistant material. Refer to the Material Safety Data Sheet and the WSU Laboratory Safety Manual. Contact EH&S for assistance.

HEARING PROTECTION

Hearing protective equipment should be routinely considered for occupations such as, but not limited to, carpenters, plumbers, welders, grounds-keepers, printing press operators, musicians, heavy equipment operators, feed mill workers, farm equipment operators and power plant operators.

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

Contact Environmental Heath and Safety to arrange a noise hazard assessment.

HEARING PROTECTION SELECTION CHART

Source/Activity	*Hazard*	*Protection*
NOISY EQUIPMENT: High speed tools, heavy mobile equipment and frequent use of mechanized equipment.	Noise induced hearing loss.	Ear plugs, ear muffs with the appropriate Noise Reduction Rating (NRR).

RESPIRATORY PROTECTION

Respiratory protective equipment should be routinely considered for occupations such as, but not limited to, painters, plumbers, carpenters, asbestos abatement workers, pesticide applicators, laboratory researchers, fire fighters and chemical waste handlers. Respiratory protective equipment should also be considered for employees and students engaged in activities such as construction, demolition, sanding and welding which create dusts and fumes.

Employees required to wear respirators are to be included in a written respiratory protection program. The program includes air monitoring, fit testing, the use of appropriate respiratory protective equipment and annual training. Employees potentially exposed to specific contaminants (e.g., lead, asbestos) are to be covered by a medical surveillance program.

Contact Environmental Heath and Safety to arrange a respiratory hazard assessment.

RESPIRATORY PROTECTIVE SELECTION CHART

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).

MISCELLANEOUS PERSONAL PROTECTIVE EQUIPMENT

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