SUMMARY:

Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, will be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

POLICY:

I. PERSONAL PROTECTIVE EQUIPMENT

A. Application

Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, will be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

B. Employee-Owned Equipment

Where employees provide their own protective equipment, the employer will be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.
C. Design

All personal protective equipment will be of safe design and construction for the work to be performed.

D. Hazard Assessment and Equipment Selection

1. The employer will assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer will:
   a. Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;
   b. Communicate selection decisions to each affected employee; and
   c. Select PPE that properly fits each affected employee.

2. The employer will verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

E. Defective and damaged personal protective equipment will not be used.

F. Training

1. The employer will provide training to each employee who is required by this section to use PPE. Each such employee will be trained to know at least the following:
   a. When PPE is necessary;
   b. What PPE is necessary;
   c. How to properly don, doff, adjust, and wear PPE;
   d. The limitations of the PPE; and,
   e. The proper care, maintenance, useful life, and disposal of the PPE.

2. Each affected employee will demonstrate an understanding of the training specified in paragraph F.1 of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

3. When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph F.2 of this section, the employer will retrain each such employee.
Circumstances where retraining is required include, but are not limited to, situations where:

a. Changes in the workplace render previous training obsolete; or
b. Changes in the types of PPE to be used render previous training obsolete; or
c. Inadequacies in an affected employee’s knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

4. The employer will verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

II. EYE AND FACE PROTECTION

A. General Requirements

1. The employer will ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

2. The employee will ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g., clip-on or slide-on side shields) meeting the pertinent requirements of this section are acceptable.

3. The employee will ensure that each affected employee who wears prescription lenses which engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

4. Eye and face PPE will be distinctly marked to facilitate identification of the manufacturer.

5. The employer will ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation. The following is a listing of appropriate shade numbers for various operations.

B. Criteria for Protective Eye and Face Devices

Educational Eye and Face Protection,” which is incorporated by reference as specified in Sec. 1910.6.

2. Eye and face protective devices purchased before July 5, 1994, will comply with the ANSI “USA standard for Occupational and Educational Eye and Face Protection,” Z87.1-1968, which is incorporated by reference as specified in Sec. 1910.6, or will be demonstrated by the employer to be equally effective.

III. FOOT PROTECTION

A. General Requirements

The University will ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee’s feet are exposed to electrical hazards.

1. Protective footwear is required to protect the feet against injuries from heavy falling objects, against crushing by rolling objects, against lacerations from sharp edges, and against electrical hazards. When safety shoes are required, the University will purchase for the employee one pair per year or as needed. Employees who have been provided protective footwear by the University are not allowed to work without the required foot protection on jobs requiring safety shoes. It is the responsibility of the direct supervisor to insure that their employees are wearing the required footwear when they are performing their jobs. Non-compliance with this policy will result in disciplinary action taken in accordance to the University’s Disciplinary Policy 1247.

2. The University has determined that the following Job classifications in Facilities Planning and Management require the use of safety shoes or boots include: carpenters, electricians, plumbers, equipment maintenance, mechanical maintenance, housing maintenance, painters, warehouse supply staff, moving crews, custodial staff, and grounds staff operating power machinery or tools.

B. Criteria for Protective Footwear

Protective footwear purchased will comply with ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear," which are incorporated by reference in § 1910.6 or ANSI Z41-1999, "American National Standard for Personal Protection -- Protective Footwear," which is incorporated by reference in § 1910.6, or will be demonstrated by the employer to be equally effective. The University will determine safety shoe styles based on job classification hazards. The University will repair or replace shoes damaged during the performance of regular job duties.
IV. HAND PROTECTION

A. General Requirements

Employers will select and require employees to use appropriate hand protection when employees’ hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

B. Selection

Employers will base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

V. RESPIRATORY PROTECTION

A. Permissible Practice

1. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be used pursuant to the following requirements.

2. Respirators will be provided by the employer when such equipment is necessary to protect the health of the employee. The employer will provide the respirators which are applicable and suitable for the purpose intended. The employer will be responsible for the establishment and maintenance of a respiratory protective program which will include the requirements outlined in paragraph (b) of this section.

3. The employee will use the provided respiratory protection in accordance with instructions and training received.

B. Requirements for a Minimal Acceptable Program

1. Written standard operating procedures governing the selection and use of respirators will be established.

2. Respirators will be selected on the basis of hazards to which the worker is exposed.
3. The user will be instructed and trained in the proper use of respirators and their limitations.

4. Respirators will be regularly cleaned and disinfected. Those used by more than one worker will be thoroughly cleaned and disinfected after each use.

5. Respirators will be stored in a convenient, clean, and sanitary location.

6. Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use such as self-contained devices will be thoroughly inspected at least once a month and after each use.

7. Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.

8. There will be regular inspection and evaluation to determine the continued effectiveness of the program.

9. Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician will determine what health and physical conditions are pertinent. The respirator user’s medical status should be reviewed periodically (for instance, annually).

10. Respirators will be selected from among those jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health under the provisions of 30 CFR part 11.

C. Selection of Respirators


D. Air Quality

1. Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration will be of high purity. Oxygen will meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Breathing air will meet at least the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966. Compressed oxygen will not be used in supplied-air respirators or in an open circuit, self-contained breathing apparatus that has previously used compressed air. Oxygen must never be used with air line respirators.

2. Breathing air may be supplied to respirators from cylinders or air compressors.
a. Cylinders will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR Part 178).

b. The compressor for supplying air will be equipped with necessary safety and standby devices. A breathing air-type compressor will be used. Compressors will be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of compressor failure, and alarms to indicate compressor failure and overheating will be installed in the system. If an oil-lubricated compressor is used, it will have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor will be frequently tested for carbon monoxide to insure that it meets the specifications in paragraph D.1 of this section.

3. Air line couplings will be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with nonrespirable gases or oxygen.


E. Use of Respirators

1. Standard procedures will be developed for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Possible emergency and routine uses of respirators should be anticipated and planned for.

2. The correct respirator will be specified for each job. The respirator type is usually specified in the work procedures by a qualified individual supervising the respiratory protective program. The individual issuing them will be adequately instructed to insure that the correct respirator is issued.

3. Written procedures will be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel will be familiar with these procedures and the available respirators.

   a. In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person will be present. Communications (visual, voice, or signal line) will be maintained between both, or all, individuals present. Planning will be such that one
individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of an emergency.

b. When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby persons must be present with suitable rescue equipment.

c. Persons using air line respirators in atmospheres immediately hazardous to life or health will be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous atmospheres will be used. A standby person or persons with suitable self-contained breathing apparatus will be at the nearest fresh air base for an emergency rescue.

4. Respiratory protection is no better than the respirator in use, even though it is worn conscientiously. Frequent random inspections will be conducted by a qualified individual to assure that respirators are properly selected, used, cleaned, and maintained.

5. For safe use of any respirator, it is essential that the user be properly instructed in its selection, use, and maintenance. Both supervisors and workers will be so instructed by competent persons. Training will provide the employee an opportunity to handle the respirator, have it fitted properly, test its face-piece-to-face seal, wear it in normal air for a long familiarity period, and, finally, to wear it in a test atmosphere.

   a. Every respirator wearer will receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators will not be worn when conditions prevent a good face seal. Such conditions may be a growth of a beard, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a face piece. The worker’s diligence in observing these factors will be evaluated by periodic check. To assure proper protection, the face piece fit will be checked by the wearer each time he puts on the respirator. This may be done by following the manufacturer’s face piece fitting instructions.

   b. Providing respiratory protection for individuals wearing corrective glasses is a serious problem. A proper seal cannot be established if the temple bars of eye glasses extend through the sealing edge of the full face piece. Wearing of contact lenses in contaminated atmospheres with a respirator will not be allowed. Systems have been developed for mounting corrective lenses inside full face pieces. When a workman must wear corrective lenses as part of the face piece, the face piece and lenses will be fitted by qualified individuals to provide good vision, comfort, and a gas-tight seal.
c. If corrective spectacles or goggles are required, they will be worn so as not to affect the fit of the face piece. Proper selection of equipment will minimize or avoid this problem.

F. Maintenance and Care of Respirators

1. A program for maintenance and care of respirators will be adjusted to the type of plant, working conditions, and hazards involved, and will include the following basic services:
   a. Inspection for defects (including a leak check),
   b. Cleaning and disinfecting,
   c. Repair,
   d. Storage.

   Equipment will be properly maintained to retain its original effectiveness.

2. Inspection
   a. All respirators will be inspected routinely before and after each use. A respirator that is not routinely used but is kept ready for emergency use will be inspected after each use and at least monthly to assure that it is in satisfactory working condition.
   b. Self-contained breathing apparatus will be inspected monthly. Air and oxygen cylinders will be fully charged according to the manufacturer’s instructions. It will be determined that the regulator and warning devices function properly.
   c. Respirator inspection will include a check of the tightness of connections and the condition of the face piece, headbands, valves, connecting tube, and canisters. Rubber or elastomer parts will be inspected for pliability and signs of deterioration. Stretching and manipulating rubber or elastomer parts with a massaging action will keep them pliable and flexible and prevent them from taking a set during storage.
   d. A record will be kept of inspection dates and findings for respirators maintained for emergency use.

3. Routinely used respirators will be collected, cleaned, and disinfected as frequently as necessary to insure that proper protection is provided for the wearer. Respirators maintained for emergency use will be cleaned and disinfected after each use.

4. Replacement or repairs will be done by experienced persons with parts designed for the respirator. No attempt will be made to replace components or to make adjustment or repairs beyond the manufacturer’s recommendations. Reducing or admission valves or regulators will be returned to the manufacturer or to a trained technician for adjustment or repair.
5. Storage

a. After inspection, cleaning, and necessary repair, respirators will be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators placed at stations and work areas for emergency use should be quickly accessible at all times and should be stored in compartments built for the purpose. The compartments should be clearly marked. Routinely used respirators, such as dust respirators, may be placed in plastic bags. Respirators should not be stored in such places as lockers or tool boxes unless they are in carrying cases or cartons.

b. Respirators should be packed or stored so that the face piece and exhalation valve will rest in a normal position and function will not be impaired by the elastomer setting in an abnormal position.

c. Instructions for proper storage of emergency respirators, such as gas mask and self-contained breathing apparatus, are found in “use and care” instructions usually mounted inside the carrying case lid.

G. Identification of Gas Mask Canisters

1. The primary means of identifying a gas mask canister will be by means of properly worded labels. The secondary means of identifying a gas mask canister will be by a color code.

2. All who issue or use gas masks falling within the scope of this section will see that all gas mask canisters purchased or used by them are properly labeled and colored in accordance with these requirements before they are placed in service and that the labels and colors are properly maintained at all times thereafter until the canisters have completely served their purpose.

3. On each canister will appear in bold letters the following:

   a. Canister for (Name for atmospheric contaminant) or Type N Gas Mask Canister.

   b. In addition, essentially the following wording will appear beneath the appropriate phrase on the canister label:

   “For respiratory protection in atmospheres containing not more than percent by volume of (Name of atmospheric contaminant).

4. Canisters having a special high-efficiency filter for protection against radio nuclides and other highly toxic particulates will be labeled with a statement of the type and degree of protection afforded by the filter. The label will be affixed to the neck end of, or to the gray stripe which is around and near the top of, the canister. The degree of protection will be marked as the percent of penetration of the canister by a 0.3-micron-diameter dioctyl phthalate (DOP) smoke at a flow rate of 85 liters per minute.
5. Each canister will have a label warning that gas masks should be used only in atmospheres containing sufficient oxygen to support life (at least 16 percent by volume), since gas mask canisters are only designed to neutralize or remove contaminants from the air.

6. Each gas mask canister will be painted a distinctive color or combination of colors indicated in the following table. All colors used will be such that they are clearly identifiable by the user and clearly distinguishable from one another. The color coating used will offer a high degree of resistance to chipping, scaling, peeling, blistering, fading, and the effects of the ordinary atmospheres to which they may be exposed under normal conditions of storage and use. Appropriately colored pressure sensitive tape may be used for the stripes.

7. Canister Colors

<table>
<thead>
<tr>
<th>Atmospheric Contaminants to be Protected Against</th>
<th>Colors Assigned(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid gases</td>
<td>White</td>
</tr>
<tr>
<td>Hydrocyanic acid gas</td>
<td>White with ½-inch green stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Chlorine gas</td>
<td>White with ½-inch yellow stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>Black</td>
</tr>
<tr>
<td>Ammonia gas</td>
<td>Green</td>
</tr>
<tr>
<td>Acid gases and ammonia gases</td>
<td>Green with ½-inch white stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Blue</td>
</tr>
<tr>
<td>Acid gases and organic vapors</td>
<td>Yellow</td>
</tr>
<tr>
<td>Hydrocyanic acid gas and chloropicrin vapor</td>
<td>Yellow with ½-inch blue stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Acid gases, organic vapors, and ammonia gases</td>
<td>Brown</td>
</tr>
<tr>
<td>Radioactive materials, excepting tritium and noble gases</td>
<td>Purple (Magenta)</td>
</tr>
<tr>
<td>Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors</td>
<td>Canister color for contaminant, as designated above, with ½-inch gray stripe completely around the canister near the top</td>
</tr>
<tr>
<td>All of the above atmospheric the canister near the top</td>
<td>Red with ½-inch gray stripe completely around contaminants</td>
</tr>
</tbody>
</table>

Footnote (*): Gray shall not be assigned as a main color for a canister designed to remove acids or vapors.
NOTE: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

VI. HEAD PROTECTION

A. General Requirements

1. The employer will ensure that each affected employee uses appropriate safety helmet when exposed to falling or flying objects, building construction sites designated “Hard Hat Area”, tree/brush cutting and or trimming, sign installations and where danger from electrical hazards exist.

2. The employee will ensure that each affected employee uses appropriate safety helmet when exposed to falling or flying objects, building construction sites designated “Hard Hat Area”, tree/brush cutting and or trimming, sign installations and where danger from electrical hazards exist.

3. The employee inviting someone to assist in an inspection or accompany an employee to a University construction site needs to provide a safety helmet for his or her protection. The goal of wearing safety helmets is to provide a safe environment by reducing injuries for employees and visitors.

B. Protective safety helmet devices will meet the ANSI Z89.1-2003, type I helmet that is Class E.

C. Procedure for use of Protective safety helmet Devices

1. Inspect, maintain, and wear hard hats in accordance with the manufacturer’s recommendations to insure the safekeeping and cleanliness. Cleanse with a mild soap solution and water.

2. Take out of service any hard hats that sustain a heavy impact and replace with a new one. Do not alter the shell or suspension of a hard hat.

3. Hard hats are worn at a construction site until the construction site is closed. (signed-off)

4. Noncompliance with this policy will result in disciplinary action taken in accordance with the University’s Disciplinary Policy 1247.01.

VII. NON-MANDATORY COMPLIANCE GUIDELINES FOR HAZARD ASSESSMENT AND PERSONAL EQUIPMENT SELECTION
This is intended to provide compliance assistance for employers and employees in implementing requirements for a hazard assessment and the selection of personal protective equipment.

A. Controlling Hazards

Personal Protective Equipment (PPE) devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

B. Assessment and Selection

It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational or educational operation or process, and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.

C. Assessment Guidelines

In order to assess the need for Personal Protective Equipment the following steps should be taken:

1. Survey

Conduct a walkthrough survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

   a. Impact
   b. Penetration
   c. Compression (roll-over)
   d. Chemical
   e. Heat
   f. Harmful dust
   g. Light (optical) radiation

2. Sources

During the walkthrough survey the Safety Officer should observe:

   a. Sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects;
b. Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;
c. Types of chemical exposures;
d. Sources of harmful dust;
e. Sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;
f. Sources of falling objects or potential for dropping objects;
g. Sources of sharp objects which might pierce the feet or cut the hands;
h. Sources of rolling or pinching objects which could crush the feet;
i. Layout of workplace and location of co-workers; and
j. Any electrical hazards.

In addition, injury/accident data should be reviewed to help identify problem areas.

3. Organize Data

Following the walkthrough survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment, to enable proper selection of protective equipment.

4. Analyze Data

Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph C.1) should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

D. Selection Guidelines

After completion of the procedures above, the general procedure for selection of protective equipment is to:

1. Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.;

2. Compare the hazards associated with the environment, i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;

3. Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
4. Fit the user with the protective device and give instructions on care and use of Personal Protective Equipment (PPE). It is very important that end users be made aware of all warning labels for and limitations of their PPE.

E. Fitting the Device

Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely, if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

F. Devices with Adjustable Features

Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splashes to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases, a chin strap may be necessary to keep the helmet on an employee’s head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard.) Where manufacturer’s instructions are available, they should be followed carefully.

G. Reassessment of Hazards

It is the responsibility of the Safety Officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

H. Selection Chart Guidelines for Eye and Face Protection

Some occupations (not a complete list) for which eye protection should be routinely considered are: carpenters, electricians, machinists, mechanics and repairers, millwrights, plumbers and pipe fitters, sheet metal workers and tinsmiths, assemblers, sanders, grinding machine operators, lathe and milling machine operators, sawyers, welders, laborers, chemical process operators and handlers, and timber cutting and logging workers. The following charts provide general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard “source” operations.
1. Eye and Face Protection Selection Chart

<table>
<thead>
<tr>
<th>Source</th>
<th>Assessment of Hazard</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPACT: Chipping, grinding, machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting and sanding</td>
<td>Flying fragments, objects, large chips, particles, sand, dirt, etc.</td>
<td>Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), and (10). For severe exposure, use face shield</td>
</tr>
<tr>
<td>HEAT: Furnace operations, pouring, casting, dipping, and welding</td>
<td>Hot Sparks</td>
<td>Face shields, goggles, spectacles with side protection. For severe exposure, use face shield. See notes (1), (2), (3).</td>
</tr>
<tr>
<td></td>
<td>Splash from molten metals</td>
<td>Face shields worn over goggles. See notes (1), (2), (3).</td>
</tr>
<tr>
<td></td>
<td>High temperature exposure</td>
<td>Screen face shields, reflective face shields. See notes (1), (2), (3).</td>
</tr>
<tr>
<td>CHEMICALS: Acid and chemicals handling, degreasing, plating</td>
<td>Splash</td>
<td>Goggles, eyecup, and cover types. For severe exposure, use face shield. See notes (3) and (11).</td>
</tr>
<tr>
<td></td>
<td>Irritating mists</td>
<td>Special-purpose goggles</td>
</tr>
<tr>
<td>DUST: Woodworking, buffing, general dusty conditions</td>
<td>Nuisance dust</td>
<td>Goggles, eyecup, and cover types. See note (8).</td>
</tr>
<tr>
<td>LIGHT and/or RADIATION Welding: Electric arc</td>
<td>Optical radiation</td>
<td>Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12).</td>
</tr>
<tr>
<td>Welding Gas</td>
<td>Optical radiation</td>
<td>Welding goggles or welding face shield. Typical shades: 4-8, cutting 306, brazing 3-4. See note (9).</td>
</tr>
<tr>
<td>Cutting, Torch brazing, Torch soldering</td>
<td>Optical radiation</td>
<td>Spectacles or welding face shield. Typical shades 1.5-3. See notes (3), (9).</td>
</tr>
<tr>
<td>Glare</td>
<td>Poor vision</td>
<td>Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).</td>
</tr>
</tbody>
</table>
Notes to Eye and Face Protection Selection Chart:

(1) 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 provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Face shields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a).

(5) Tinted and shaded lenses are not filter lenses unless they are earmarked or identified as such.

(6) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eye wear.

(7) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

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

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or Face shields should be used only over primary eye protection (spectacles or goggles).

(10) Non-side shield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for “impact.”

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4). Select the darkest shade that allows task performance.

2. Filter Lenses for Protection against Radiant Energy
### Operations

<table>
<thead>
<tr>
<th>Operations</th>
<th>Electrode Size in 1/32 in.</th>
<th>Arc Current</th>
<th>Minimum (* ) Protective Shade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded metal arc welding</td>
<td>Less than 3 3-5 5-8 More than 8</td>
<td>Less than 60 60-160 160-250 250-550</td>
<td>7 8 10 11</td>
</tr>
<tr>
<td>Gas metal arc welding and flux cored arc welding</td>
<td></td>
<td>Less than 60 1 60-250 250-550</td>
<td>7 10 10</td>
</tr>
<tr>
<td>Gas Tungsten arc welding</td>
<td></td>
<td>Less than 50 50-150 150-500</td>
<td>8 8 10</td>
</tr>
<tr>
<td>Air carbon arc cutting</td>
<td>(Light) (Heavy)</td>
<td>Less than 500 500-1000</td>
<td>10 11</td>
</tr>
<tr>
<td>Plasma arc welding</td>
<td></td>
<td>Less than 20 20-100 100-400 400-800</td>
<td>68 10 11</td>
</tr>
<tr>
<td>Plasma arc cutting</td>
<td>(Light) (<strong>) (Medium) (</strong>) (Heavy) (**)</td>
<td>Less than 300 300-400 400-800</td>
<td>8 9 10</td>
</tr>
<tr>
<td>Torch brazing</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Torch soldering</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Carbon arc welding</td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

### Filter Lenses for Protection against Radiant Energy

<table>
<thead>
<tr>
<th>Operations</th>
<th>Plate Thickness (mm.)</th>
<th>Plate Thickness (in.)</th>
<th>Protective Minimum (*) Shade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Welding (Light)</td>
<td>Under 1/8</td>
<td>Under 3.2</td>
<td>4</td>
</tr>
<tr>
<td>Gas Welding (Medium)</td>
<td>1/8 / to 1/2</td>
<td>3.2 to 12.7</td>
<td>5</td>
</tr>
<tr>
<td>Gas Welding (Heavy)</td>
<td>Over 1/2</td>
<td>Over 12.7</td>
<td>6</td>
</tr>
<tr>
<td>Oxygen Cutting (Light)</td>
<td>Under 1</td>
<td>Under 25</td>
<td>3</td>
</tr>
<tr>
<td>Oxygen Cutting (Medium)</td>
<td>1 to 6</td>
<td>25 to 150</td>
<td>4</td>
</tr>
<tr>
<td>Oxygen Cutting (Heavy)</td>
<td>Over 6</td>
<td>Over 150</td>
<td>5</td>
</tr>
</tbody>
</table>

Footnote (*)  As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.
Footnote (**) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workplace.

I. Selection Guidelines for Head Protection

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors. Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers.

J. Selection Guidelines for Foot Protection

Safety shoes and boots which meet the ANSI Z41-1991 standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations, electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee’s feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal, etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians,
machinists, mechanics and repairers, plumbers and pipe fitters, structural metal workers, assemblers, drywall installers and lathers, packers, wrappers, craters, punch and stamping press operators, sawyers, welders, laborers, freight handlers, gardeners and groundskeepers, timber cutting and logging workers, stock handlers and warehouse laborers.

K. Selection Guidelines for 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. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

1. As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

2. The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied. With respect to selection of gloves for protection against chemical hazards:

3. With respect to selection of gloves for protection against chemical hazards:
   
   a. 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;
   
   b. Generally, any “chemical resistant” glove can be used for Dry powders;
   
   c. For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,
   
   d. Employees must be able to remove the gloves in such a manner as to prevent skin contamination.
L. Cleaning and Maintenance

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

For the purposes of compliance with 1910.132(a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.