

# Clemson University Hazard Communication Plan

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## Hazard Communication Plan for Non-Laboratorians

The Hazard Communication Standard 29 CFR 1910.1200 (HCS) implemented by the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor requires employers to provide information to employees regarding the hazardous chemicals in the workplace and the hazardous properties of these chemicals. This information must be disseminated through a hazard communication program involving labeling, material safety data sheets, employee training, employee access to written records, and a written hazard communication plan. The implementation of the Hazard Communication Program will ensure all employees the “right-to-know” the hazards and identities of the chemicals with which they work.

The HCS applies to any chemical that is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use, or in a foreseeable emergency. In accordance with OSHA regulations, laboratory employees are covered under Clemson University’s Chemical Hygiene Plan and are not included in the Hazard Communication Program. The OSHA standard, 29CFR 1910.1200 sets out a procedure for hazard determination and any substance determined to be hazardous under this procedure is subject to the program. The definition of “hazardous chemical” under the standard is extremely broad, and includes any chemical that is a physical or health hazard. For determination of physical and health hazards associated with products not synthesized at Clemson University, personnel should rely on the evaluation performed by the chemical manufacturer or importer transmitted via Material Safety Data Sheets.

Clemson University’s Hazard Communication Program is designed to:

- Reduce the likelihood of injury or illness to employees by implementing specific procedures to identify and evaluate the chemical hazards in the workplace and then inform and train employees on those hazards.
- Ensure that all individuals at risk are adequately informed about the chemicals used and stored in their workplaces.
- Outline procedures for all employees working with hazardous chemicals.

The following Hazard Communication Plan was written to comply with the OSHA Hazard Communication Standard.

## Hazard Communication Responsibilities

Clemson University’s Hazard Communication Program is overseen by the University’s Chemical Hygiene Officer (CHO) Naomi Kelly, who reports to the Chief Environmental Health and Safety Officer.

### ***Supervisory Personnel***

1. Creating and maintaining an inventory of all hazardous chemicals stored or used within their area of responsibility.
2. Ensuring that all hazardous chemicals/products are properly labeled, and that these labels are not removed or defaced.
3. Maintaining copies of Material Safety Data Sheets (MSDS) for each hazardous chemical in the workplace, and ensuring that the MSDS are readily available to employees.
4. Identifying employees under their supervision who may be exposed to hazardous chemicals under normal operating conditions or in a foreseeable emergency based on hazard assessment.
5. Informing employees of: Any operations in their work area where hazardous chemicals are present; the location and availability of the written Hazard

- Communication Plan; the chemical inventory; MSDS; and the requirements of the Hazard Communication Standard.
6. Providing employees with training regarding hazards or practices specific to their work area at the time of their assignment and whenever a new hazard is introduced into their work area. Training records should be forwarded to the University CHO.
  7. Determine the required personal protective equipment (PPE) for the procedures and materials in use in their area. Contact EHS personnel for assistance in the selection of PPE.
  8. Ensure that the proper PPE is made available to employees.
  9. Ensure that the employees are trained in the use of PPE, that the PPE is properly maintained, and ensure that the employees wear the appropriate PPE where necessary/required.
  10. Develop safe procedures for work in their areas, as well as written procedures for emergencies.
  11. Inform outside contractors of chemical (or other) hazards that they may be exposed to while working at Clemson University. Inform them of the location of the MSDS.
  12. Inform employees about proper performance of non-routine tasks.

### **Employees**

1. Planning and conducting each operation according to the Hazard Communication Program.
2. Maintaining his/her area in good order.
3. Using the required personal protective equipment. Properly maintaining and storing the PPE assigned to him/her.
4. Reporting any exposures, injuries, or safety problems to his or her supervisor.
5. Reviewing MSDS prior to using a chemical for the first time, then reviewing periodically thereafter as necessary.
6. Attend required Hazard Communication training.

### **CHO**

1. Development of the written Hazard Communication Program.
2. Develop a Hazard Communication training program.
3. Providing technical support to the departments covered by the Hazard Communication Program.
4. Conduct random safety reviews.
5. Provide technical assistance in the selection of personal protective equipment.
6. Review Hazard Communication Program at least annually, and make necessary changes.

### **Contractors**

Developing and implementing their own Hazard Communication Program and informing Clemson University personnel of any chemical hazards they bring with them. They must also ensure the proper handling, use, and storage of these chemicals and provide access to MSDS for them. Outside contractors must provide University project managers and EHS with information concerning hazardous materials to be brought into any Clemson facility to perform contracted work before the materials are brought onto campus. Attachment H should be filled out by the contractor and copies sent to the University's contracting official(s) (project managers, Department heads, etc.) and EHS.

## **Hazardous Chemicals Inventory**

The supervisor, or his/her designee is required to maintain a list of all hazardous chemicals known to be present in each work area (i.e., maintenance shop, storage buildings, etc.) and update the list as necessary to ensure that it stays current. The inventory must identify each hazardous chemical by the primary name on the label (either chemical name or product name, but it must be consistent; i.e. if you choose to list chemicals by the common or product name, you must do so with all chemicals listed on the inventory), the manufacturer or distributor of the chemical, and chemical abstract number (CAS), the location (Building, room number, etc.), quantity, and date received.

The inventory must be kept in the work area in a suitable format (see Attachment A), on a log sheet, or in electronic format (inventories kept in electronic format should be printed periodically (at least annually or if major changes in the inventory are made) and posted in the work area). This inventory shall list all hazardous chemicals (this includes compressed gases) found in the work area. This inventory must be submitted annually (by February 15) to Warren Wang (wangw@clemson.edu). The inventory should be submitted as an Excel or Filemaker attachment. The inventory may also be submitted directly using the online form found on our website at: <http://ehs.clemson.edu>.

## **Labeling Requirements**

The supervisor must ensure that all containers of hazardous chemicals in his/her area of responsibility are properly labeled. Labels should list at least the chemical identity, appropriate hazard warnings, and the name and address of the manufacturer. Portable containers of working solutions must also be labeled appropriately. Labels must be legible and must be prominently displayed on the container. Labels on incoming containers must not be defaced or removed until the container is empty. Once the container is empty, the guidelines in the University Hazardous Waste Management Manual should be followed for container disposal. Whenever chemicals are transferred into another container, the container must be labeled with the full chemical name, appropriate hazard warnings, and the manufacturer's name and address. The date of transfer, name or initials of the person making the transfer, and additional information about the possible health effects should also be included. In the event that labels must be created, the labels must be durable, legible, and must be firmly affixed to the container(s). Labels should be replaced whenever they fade, peel, or otherwise deteriorate so as to become difficult to read. All chemicals should be dated upon receipt. No chemical should ever be used without completely reading the label.

Contents of all vessels, pipelines, storage tanks, etc. must be adequately labeled.

Products that are synthesized at Clemson and distributed outside of the University must be properly labeled in accordance with OSHA's Hazard Communication Standard—if they contain hazardous chemicals in concentrations greater than one percent (or 0.1% for carcinogens).

## **Material Safety Data Sheets**

The purpose of Material Safety Data Sheets is to inform employees of the potential hazards associated with materials used or stored in their work area. A MSDS also advises employees on the appropriate way to handle hazardous chemicals, what PPE is required for handling the chemical, how to properly store the chemical, information on handling spill clean up, etc.

A Material Safety Data Sheet must be kept for every hazardous chemical used and must be readily available to employees at all times. The area supervisor or manager is responsible for acquiring and updating MSDS for all hazardous chemicals found in their work area. Prior to use

of any chemical, all personnel should review the MSDS. The MSDS should be filed alphabetically by chemical name and should be kept in a convenient location. MSDS should be reviewed at least annually to ensure that they are updated and the latest revisions are available. For chemicals where there have been revisions made to the MSDS, the current MSDS should be inserted and the old MSDS should be archived.

To obtain specific MSDS, request them from the manufacturer or distributor or copy them from the website of the manufacturer if they are available online. If you are unable to obtain a MSDS, contact the CHO (656-7554) for assistance. You may submit a request by submitting a fax, "Request of Material Safety Data Sheet" (Attachment B) or sending the request by interoffice or email.

For chemicals purchased locally from retail stores, MSDS should be requested from the retailer.

A material safety data sheet must be developed and sent with those products that are synthesized at Clemson and distributed outside of the University proper in accordance with OSHA's Hazard Communication Standard. If products contain hazardous chemicals in concentrations greater than one percent (or 0.1% for carcinogens), it is the responsibility of the laboratory synthesizing the product to develop and distribute the MSDS.

See Attachments B and C.

## **Employment Training and Information**

Employers must provide employees with effective information and training on hazardous chemicals that are located in their work area at the time of their initial assignment and whenever a new physical or health hazard is introduced into the work area.

Employees Must be Informed of:

1. The requirements of the Hazard Communication Standard (29CFR 1910.1200).
2. The location and availability of the written Hazard Communication Plan.
3. Physical and health hazards of chemicals in the work area and their locations.
4. Location of the hazardous chemicals inventory and the Material Safety Data Sheets for all hazardous chemicals in their work area.
5. Methods and observation techniques used to detect the presence or release of a hazardous chemical.
6. How to lessen or prevent exposure to these hazardous chemicals through usage of controls, work practices, and personal protective equipment (PPE).
7. How to use the information provided on MSDS.
8. How to read and understand labels.
9. Contingency plans for medical and accident response.
10. The proper use, maintenance, and storage of any PPE required.
11. Procedures implemented to provide employee information about chemical hazards for non-routine or special tasks.
12. A record of the date, location, and facilitator of each training session, as well as a list of attendees. A copy of training records should be sent to Clemson's CHO, or this information may be incorporated into the EHS online training database (<http://ehs.clemson.edu>). The supervisor should also maintain a copy of these records.

See Attachments D and E.

## Hazard Determination

All chemicals that pose a physical or health hazard in the workplace should be identified. By completing an inventory listing these chemicals and reviewing MSDS, these chemicals can be identified.

### ***Physical Hazard***

A physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water reactive.

### ***Health Hazard***

A health hazard means a chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees.

Health hazards fall into two general categories: acute and chronic. Acute hazards occur rapidly as a result of short-term exposures. The acute effects referred to most frequently are irritation, corrosivity, sensitization and lethal dose. Chronic hazards generally occur as a result of long-term exposure. The term chronic effect is often used to cover carcinogenicity, teratogenicity and mutagenicity. The following is an explanation of specific acute and chronic effects.

Acute effects result from either breathing vapor, swallowing the material, or direct contact with the body. Headaches, nausea, dizziness, blurred vision, rashes, and burns are common examples of acute effects. When an employee becomes aware of acute symptoms, the fastest remedy is to flush the affected area using the appropriate emergency drench equipment (eyewash, drench shower or both) for at least 15 minutes in the case of contact with the eyes or body. There are some exceptions to this (i.e. Hydrofluoric acid, for which specific first aid treatment and is required). Employees should be made aware of these exceptions and receive specific first aid training if they are exposed to such chemicals. Campus emergency medical services should be called while initial flushing, etc. is being performed. In the case of headaches, nausea, dizziness, blurred vision, etc., the employee should leave the area and alert his/her supervisor.

Chronic effects result from the repeated, low-level (usually) exposure to a material. Over a period of time, symptoms may become apparent. These may include: shortness of breath, loss of feeling in areas of the body, gradual drying of skin. If these types of symptoms occur, and you think they may be associated with exposure to workplace chemicals, inform your supervisor and EHS.

## Personal Protective Equipment

Personal protective equipment (PPE) includes gloves, safety glasses, goggles, face shields, aprons, respirators, etc. The PPE necessary for protection while being exposed to hazardous chemicals, flying particles, damaging light sources, etc. must be provided to employees.

Proper use of protective equipment is essential to prevent exposure. Supervisors must instruct employees as to what personal protective equipment must be worn. This equipment must be kept clean and stored in such a manner that it is protected from contaminants, dirt, dust or any atmosphere that might cause damage or deterioration of the equipment. Protective clothing should always be free from holes, rips, or tears.

Gloves should be selected based on the chemicals being handled, or the task being performed. Safety goggles should always be worn whenever a potential chemical splash hazard or flying



particle hazard exists. Goggles used for this purpose should have indirect vents (vents should be covered).

Eye protection, safety glasses or goggles, must meet ANSI (American National Standards Institute) Z87.1 standards. They must fit well, be reasonably comfortable, and not interfere with vision. If an employee wears prescription lenses, safety glasses or goggles must be worn over prescription glasses whenever eye protection is required unless the prescription glasses are approved safety glasses (ANSI Z87.1). Safety glasses must always have side shields. Departments may choose to cover all or part of the purchase price of prescription safety glasses. Contact the CHO (864.656.7554) for information about the University contract for a local provider.

If the use of respirators is required for specific tasks, employees must be enrolled in the University Respiratory Protection Program. This covers all type of respiratory protection equipment, including dust/mist type masks. Contact EHS for information on the Respiratory Protection Program. No employee is allowed to wear a respirator until approval is given by EHS.

For additional information or assistance with the selection of PPE, contact EHS (864.656.7554).

## **Non-Routine Tasks**

Employees performing “non-routine” tasks can be exposed to chemicals from unusual and unsuspected sources. These “non-routine” tasks may include, for example, periodic tank or boiler cleaning or the replacement of seals and gaskets. Written procedures shall be developed for every “non-routine” task by the supervisor of the employees who will perform the task. The information will include chemical hazards associated with the performance of the tasks and appropriate protective measures required to perform the task safely. The procedures shall be included (or specific location referenced) in the local copy of the Hazard Communication Plan. The Office of Health and Safety will provide guidance and advice upon request.

**Attachments**

***Request for Material Safety Data Sheet***

The Occupational Safety and Health Administration Hazard Communication Standard (29CFR 1910.1200) requires us to maintain and distribute material safety data sheets (MSDS) for all hazardous chemicals used by our employees. To fulfill these requirements, we request a completed MSDS for the following chemicals.

If there are chemicals for which you are unable to find a MSDS, you may list those chemicals on this form and fax to Naomi Kelly at 864.656.7630.

NAME: (Last, First, MI)

DATE:

DEPARTMENT:

BLDG/RM NO.

PRODUCT NAME:

PRODUCT NUMBER:

MANUFACTURER:

CAS NUMBER:

MSDS(s) should be sent to the address provided below on or before the date the product(s) will be delivered. We also request any additional information you currently have, or may acquire in the future, concerning the safety and health of these products to be sent to:

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**Employee/Student Safety Checklist**

		Supervisor Initials	Employee Initials
1.	Individual employee's responsibilities		
2.	Location of Hazard Communication Plan		
3.	Location of Chemical Inventory and Material Safety Data Sheets and other information available relating to hazardous chemicals found in the work area.		
4.	Minimum personal protective equipment requirements		
5.	Specific personal protective equipment requirements		
6.	Injury and Illness reporting		
7.	Non-injury incident reporting		
8.	Location and use of fire extinguishers		
9.	Location and use of eyewash and safety shower equipment		
10.	Location of first aid kits		
11.	Housekeeping		
12.	Rules on food/beverage consumption in areas where chemicals are stored or used		
13.	Respirator use (must be enrolled in EHS Respiratory Protection Program unless respirator is used for non-respiratory (i.e., nuisance dusts) hazards		
14.	Hazards of the job (i.e., chemical, biological, radioactive materials, mechanical, electrical, etc.)		
15.	Spill control, clean-up procedures, etc.		
16.	Fire and Disaster Evacuation Procedures		
17.	Training Requirements		

My supervisor has explained the above items to me. I understand the information provided and will follow the policies and procedures as required.

Department \_\_\_\_\_

Employee Signature \_\_\_\_\_

Supervisor Signature \_\_\_\_\_

**Hazard Communication Training**

	Training Item	Yes	No
1.	The location, availability, and requirements of the Hazard		
2.	Communication Plan has been made known to me.		
3.	The location and availability of the chemical inventory for my area was made known to me.		
4.	The location and availability for the Material Safety Data Sheets (MSDS) for the chemicals that I will be working with was made known to me. An explanation of how to use the information on the MSDS was provided to me.		
5.	I was informed of the health and physical hazards and location of the chemicals in my work area. Any special precautions required for chemicals used in my area was also explained to me.		
6.	Any Personal Protective Equipment required for chemicals used in my area was provided to me and its proper use and maintenance explained.		
7.	Training on reading and understanding labels was provided.		
8.	Methods to lessen or prevent exposure through administrative, engineering, and the use of protective equipment was reviewed.		
9.	Methods and observation techniques used to detect the presence or release of a hazardous chemical were explained.		
10.	Contingency plans for medical, accident, and spill response were explained.		

I certify that the above listed training was provided to me, and that understand the Hazard Communication Program and training and agree to abide by the policies and procedures set forth in the Hazard Communication Plan.

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Signature of Employee Date

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Signature of Department Head or Trainer Date

Retain all training records within your department. Provide a copy of the training records to the Department Chair or Director and EHS. Information may be provided to EHS by entering the appropriate data into the training database found at our website: <http://ehs.clemson.edu>. A list of employees trained (see attachment E1) may be provided rather than individual sheets, if the employees are provided the training as a group and all of the information listed above is covered.

**Hazard Communication Training Roster**

Date of Training: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Facilitator: \_\_\_\_\_

Attendees: \_\_\_\_\_

Name	SS#	Department/Zone	Supervisor

All of the items in Attachment E must be covered in this training session. A copy of Attachment E should be attached to this roster for informational purposes.

***Training Form for New Hazards and Non-Routine Tasks***

Hazardous Chemical or Material: \_\_\_\_\_

Date Trained: \_\_\_\_\_

Employee Name: \_\_\_\_\_

Social Sec. #: \_\_\_\_\_

Supervisor: \_\_\_\_\_

Training Provided by: \_\_\_\_\_

**Assigned Responsibility for the Hazard Communication Standard Requirements**

Department name: \_\_\_\_\_

Location(s) covered by these assigned responsibilities: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**A. HAZARDOUS CHEMICALS LIST:**

Responsible for checking all chemicals in the workplace and listing those hazardous chemicals as required:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

**B. MATERIAL SAFETY DATA SHEETS:**

Responsible for obtaining and maintaining MSDS for all hazardous chemicals in the workplace:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

**C. LABELING:**

Responsible for labeling identity and hazard info on workplace containers:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

**D. EMPLOYEE TRAINING:**

Responsible for conducting training:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

**E. NON-ROUTINE TASKS:**

Responsible for appraising and preparing employees for non-routine tasks:

Name: \_\_\_\_\_ Position: \_\_\_\_\_

\_\_\_\_\_  
Department Head/Supervisor Signature

\_\_\_\_\_  
Date





# Personal Protective Equipment

This regulation requires employers to ensure that personal protective equipment be “provided, used, and maintained in a sanitary and reliable condition wherever it is necessary...” to prevent injury. This includes protection of any part of the body from hazards through absorption, inhalation or physical contact.

Employers must not only ensure that the proper personal protective equipment is available and properly maintained, but they must also ensure that employees wear the proper personal protective equipment.

## ***Eye and Face Protection***

(29 CFR 1910.133)

### **Introduction**

The Occupational Safety and Health Act of 1970 and good safety practices dictate that "Protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment. Suitable eye protectors shall be provided where machines or operations present the hazard of flying objects, glare, liquids, injurious radiation, or a combination of these factors." Employers must provide a type of protector suitable for work to be performed and employees must use the protectors. These stipulations also apply to supervisors, management personnel, and visitors while they are in hazardous areas.

### **Equipment**

The type of eye protection required depends on the hazard. For most situations, safety glasses with side shields are adequate. Where there is danger of splashing chemicals, safety goggles are required. For more hazardous operations, a combination face shield and safety goggles or glasses (some of which may be supplied with prescription lenses) should be used. Failure to wear the prescribed eye-protection equipment is grounds for disciplinary action. The Office of Environmental Health and Safety will assist in the choice of suitable protective equipment.

Design, construction, tests, and use of eye and face protection purchased prior to July 5, 1994, must be in accordance with ANSI Z87.1-1968 USA Standard Practice of Occupational and Educational Eye and Face Protection. Protective eye and face devices purchased after July 5, 1994, must comply with ANSI Z87.1-1989, American National Standard Practice for Occupational and Educational Eye and Face Protection.

Protectors must meet the following minimum requirements:

Provide adequate protection against the particular hazard

Be reasonably comfortable when worn under the designated conditions

Fit snugly without interfering with the movements or vision of the wearer

Be durable

Be capable of being disinfected

Be easily cleanable and kept clean and in good repair

## **Selection**

Each eye, face, or face-and-eye protector is designed for a particular hazard. In selecting the protector, consideration should be given to the kind and degree of hazard, and the protector should be selected on that basis. Where a choice of protectors is given, and the degree of protection required is not an important issue, worker comfort may be a deciding factor.

Persons using corrective spectacles and those who are required by OSHA to wear eye protection must wear face shields, goggles, or spectacles of one of the following types:

Safety Spectacles with protective lenses providing optical correction

Goggles worn over corrective spectacles without disturbing the adjustment of the spectacles

Goggles that incorporate corrective lenses mounted behind the protective lenses

Persons who wear prescription glasses must either wear approved safety glasses over the prescription glasses or wear prescription glasses that are designed and approved (ANSI Z87.1) safety glasses. If safety glasses that fit properly over prescription glasses cannot be found, departmental funds may be allocated for the purchase (or a part of the cost) of safety spectacles or goggles with protective lenses providing optical correction. Approved safety frames that may be taken to your Optometrist for insertion of protective lenses providing optical correction are available from Fisher and other safety supply companies. Safety spectacles require special frames. Combinations of normal street-wear frames with safety lenses are not in compliance. Safety glasses must always have side shields (these may be detachable, but must always be in place where required at work).

## **Inspection and Maintenance**

It is essential that the lenses of eye protectors be kept clean. Continuous vision through dirty lenses can cause eyestrain—often an excuse for not wearing the eye protectors. Daily inspections and cleaning of the eye protector with soap and warm water, or with a cleaning solution and tissue, is recommended.

Pitted lenses, like dirty lenses, can be a source of reduced vision. They should be replaced. Deep scratches or excessively pitted lenses are apt to break more readily.

Slack, worn-out, sweat-soaked, or twisted headbands do not hold the eye protector in proper position. Visual inspection can determine when the headband elasticity is reduced to a point beyond proper function.

Goggles and safety glasses should be kept in a case when not in use. Spectacles, in particular, should be given the same care as one's own glasses, since the frame, nose pads, and temples can be damaged by rough usage.

Personal protective equipment that has been previously been used should be thoroughly disinfected before being issued to another employee.

Personal protective equipment should be cleaned and disinfected regularly. Several methods for disinfecting eye-protective equipment are available. The most effective method is to thoroughly clean all parts with soap and warm water. Carefully rinse all traces of soap, and replace any defective straps, etc. Swab thoroughly or completely and immerse all parts for 10 minutes in a solution of germicidal deodorant fungicide. Remove parts from solution and suspend in a clean place for air-drying at room temperature or with heated air. Do not rinse after removing parts from the solution because this will remove the germicidal residue, which retains its effectiveness after drying.

The dry parts or items should be placed in a clean, dust-proof container, such as a box, bag, or plastic envelope, to protect them until usage or reissue.

### **Special Hazards**

Contact lenses do not provide eye protection. The capillary space between the contact lenses and the cornea may trap material present on the surface of the eye. Chemicals trapped in this space cannot be washed off the surface of the cornea. If the material in the eye is painful or the contact lens is displaced, muscle spasms will make it very difficult to remove the lens. In order to provide full protection, persons exposed to hazardous chemicals cannot wear contact lenses unless goggles or face shields are also worn. It is the responsibility of supervisors to identify employees who wear contact lenses.

The Occupational Safety and Health Administration requires that where the eyes and body of any person may be exposed to injurious materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use.

### **Eye-Hazard Areas**

Eye-protective equipment must be worn in the following areas:

In laboratories where hazardous chemicals are used or stored

When explosive materials are handled

If hollow glassware is under vacuum or pressure

When cryogenic materials are handled

Flying particles may be generated (grinders, mills, power saws, drill presses, lathes)

Molten metal is used or metal is melted (soldering, leading joints, etc.)

Gas or electric arc welding is done

Processes can produce aerosols of infectious agents (removing lyophil vials from liquid nitrogen, etc.)

Any area posted "Eye Hazard Area"

Help for supervisors in identifying "Eye-Hazard Areas" is available from the Office of Environmental Health and Safety.

### **Supervisor's Responsibilities**

The supervisor is responsible for:

Determining that an eye hazard exists

Placarding the work area

Determining the type of eye protection equipment needed; obtaining necessary assistance from the Office of Environmental Health and Safety

Ensuring that the equipment is available to employees

Ensuring that the accessory protective equipment is worn by employees

## ***Hearing Protection***

(29 CFR 1910.95)

Exposure to high noise levels can cause hearing loss or impairment. It can create physical and psychological stress. There is no cure for noise-induced hearing loss, so the prevention of excessive noise exposure is the only way to avoid hearing damage. Specially designed protection is required depending on the type of noise encountered.

Preformed or molded earplugs should be individually fitted by a professional. Waxed, cotton, foam, or fiberglass wool earplugs are self-forming. When properly inserted, they work as well as most molded earplugs.

Some earplugs are disposable, to be used one time and then thrown away. The non-disposable type should be cleaned after each use for proper protection. Plain cotton is ineffective as protection against hazardous noise.

Earmuffs need to make a perfect seal around the ear to be effective. Glasses, long sideburns, long hair, and facial movements, such as chewing, can reduce protection. Special equipment is available for use with glasses or beards.

For extremely noisy situations, earplugs should be worn in addition to earmuffs. When used together, earplugs and earmuffs change the nature of sounds; all sounds are reduced including one's own voice, but other voices or warning devices are easier to hear.

Supervisors are responsible for ensuring that employees are provided and use hearing protection where it is needed. To determine if employees in your area are being exposed to hazardous noise levels and should be wearing hearing protection, contact the Industrial Hygienist or EHS.

## ***Foot Protection***

(29 CFR 1910.136)

Protective footwear is a requirement for many workplaces. OSHA states in its Occupational Foot Protection regulation 29CFR 1910.136(a), that "each affected employee shall wear protective footwear when working in areas where there is 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."

Protective footwear purchased prior to July 5, 1994, must comply with ANSI Z41.1-1967, USA Standard for Men's Safety-Toe Footwear. Protective footwear purchased after July 5, 1994, must comply with ANSI Z41-1991 American National Standard for Personal Protection-Protective Footwear.

In this regulation, OSHA defers to an American National Standards Institute (ANSI) standard (Z41-1991) for determining what constitutes "protective footwear".

ANSI Z41-1991 defines performance measurements and test methods for protective footwear. The standard contains performance measurements for impact and compression protection for the toes, metatarsal protection for the toes and metatarsal area (top of foot), electrical hazard protection against punctures and penetration.

An important point to remember is that the ANSI Standard does not allow for the use of add-on type devices (such as strap-on foot, toe, or metatarsal guards) as a substitute for protective

footwear. "The toe box shall be incorporated into the footwear during construction and shall be an integral part of the footwear." Add-on devices are suitable only for visitors, or for employees temporarily assigned to areas where safety-toed footwear is required.

Protective footwear can meet all the requirements of the ANSI standard, or specific elements of it. A steel-toed work boot that meets the impact and compression requirements of the standard may not provide protection for the metatarsal or offer puncture protection in the sole.

All footwear manufactured to ANSI specifications will be marked with the specific portion of the standard with which it complies. The ANSI Standard incorporates a coding system that manufacturers use to identify the portions of the standard with which the footwear complies. The following is an example of an ANSI code that could be found on protective footwear:

ANSI Z41 PT 91  
F1/75 C/75 MT/75  
Cd 1 EH  
PR

Line #1: ANSI Z41 PT91

This line identifies the ANSI standard. The letters PI indicate the protective toe section of the standard. This is followed by the last two digits of the year of the standard with which the footwear meets compliance (1991).

Line #2: F1/75 C/75 MT/75

This line identifies the applicable gender (M or F) for which the footwear is intended. It also identifies the impact resistance (I) rating (75, 50, or 30 foot-pounds), compression resistance (C) rating (75, 50, or 30 which correlates to 2500 lbs., 1750 lbs. and 1000 lbs. of compression respectively). This line can also include a metatarsal designation (MT) and rating (75,50, or 30 foot-pounds).

Lines 3 & 4: Cd 1 EH PR

This area of the code designates conductive properties (Cd) and type (1 or 2), electrical hazard (EH) and puncture resistance (PR), if applicable.

The identification code must be legible (printed, stamped or stitched) on one shoe of each pair of protective footwear.

When selecting protective footwear, an occasional point of confusion is the difference between steel shanks and steel midsoles. These items are not interchangeable. A steel shank is a relatively narrow piece of metal that's inserted into the arch area strictly for support purposes. Steel midsoles, on the other hand, provide puncture protection on the soles of the footwear. According to the ANSI standard, protective steel midsoles, "shall cover the maximum area of the insole allowed by the construction of the footwear and shall at least extend from the toe to overlap the breast of the heel."

Protective footwear with steel midsoles can be easily distinguished by the PR marking in the ANSI compliance code. The ANSI standard does not contain a marking to distinguish footwear that incorporates steel shanks.

All footwear requires routine inspection for cuts, holes, tears, cracks, worn soles, and other damage that could compromise the footwear's protective qualities. Outsoles should be kept free of stones, tacks, nails, and other debris. Footwear should be cleaned according to the manufacturer's instructions.

## **Head Protection**

(29 CFR 1910.135)

### **Introduction**

Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object. Head protection, in the form of protective hats, must do two things - resist penetration and absorb the shock of a blow. This is accomplished by making the shell of the hat of a material hard enough to resist the blow, and by utilizing a shock-absorbing lining composed of headband and crown straps to keep the shell away from the wearer's skull. Protective hats also are used to protect against electrical shock.

### **Criteria**

The standards recognized by OSHA for head protection purchased prior to July 5, 1994, are contained in ANSI Requirements for Industrial Head Protection, Z89.1-1969, and ANSI Requirements for Industrial Protective Helmets for Electrical Worker, Z89.2-1971. The standards for helmets purchased after July 5, 1994, are contained in ANSI Personnel Protection-Protective Headware for Industrial Workers-Requirements, Z89.1-1986.

### **Selection**

Each type and class of head protectors is intended to provide protection against specific hazardous conditions. An understanding of these conditions will help in selecting the right protection for the particular situation.

Head protection is made in the following types and classes:

Type 1: helmets with full brim, not less than 1.25 inches wide

Type 2: brimless helmets with a peak extending forward from the crown

For industrial purposes three classes are recognized:

Class A: general service, limited voltage protection

Class B: utility service, high-voltage helmets

Class C: special service, no voltage protection

Helmets under Class A are intended for protection against impact hazards. They are used in mining, construction, shipbuilding, tunneling, lumbering and manufacturing.

Class B, utility service helmets protect the wearer's head from impact and penetration by falling or flying objects and from high-voltage shock and burn—they are used extensively by electrical workers.

The safety helmets in Class C are designed specifically for lightweight comfort and impact protection. This class is usually manufactured from aluminum and offers no dielectric protection.

Class C helmets are used in certain construction and manufacturing occupations, oil fields, refineries, and chemical plants where there is not danger from electrical hazards or corrosion. They also are used on occasions where there is a possibility of bumping the head against a fixed object.

Materials used in helmets should be water-resistant and slow burning. Each helmet consists essentially of a shell and suspension. Ventilation is provided by a space between the headband and the shell. Each helmet should be accompanied by instructions explaining the proper method of adjusting and replacing the suspension and headband.

The wearer should be able to identify the type of helmet by looking inside the shell for the manufacturer, ANSI designation and class.

### **Fit**

Headbands are adjustable in 1/8-size increments. When the headband is adjusted to the right size, it provides sufficient clearance between the shell and the headband. The removable or replaceable type sweatband should cover at least the forehead portion of the headband. The shell should be of one-piece seamless construction and designated to resist the impact of a blow from falling material. The internal cradle of the headband and sweatband forms the suspension. Any part that comes into contact with the wearer's head must not be irritating to normal skin.

### **Inspection and Maintenance**

Manufacturers should be consulted with regard to paint or cleaning materials for their helmets because some paints and thinners may damage the shell and reduce protection by physically weakening it or negating electrical resistance.

A common method of cleaning shells is dipping them in hot water (approximately 140F) containing a good detergent for at least one minute. Shells should then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.

Users are cautioned that if unusual conditions occur (such as higher or lower extreme temperatures than described in the standards), or if there are signs of abuse or mutilation of the helmet or any component, the margin of safety may be reduced. If damage is suspected, helmets should be replaced.

Helmets should not be left in sunlight or extreme temperatures when not in use.

Supervisors are responsible for ensuring that employees receive and use head protection when applicable.

### ***Hand Protection***

(29 CFR 1910.138)

#### **General Requirements**

Employers shall 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.

#### **Selection**

There is a wide assortment of gloves, hand pads, sleeves, and wristlets for protection against various hazardous situations.

Supervisors need to determine what hand protection their employees need. The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure to hazards and the physical stresses that will be applied.

Also, it is important to know the performance characteristics of gloves relative to the specific hazard anticipated; (e.g., exposure to chemicals, heat, or flames). Glove 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. For example, for protection against chemical hazards, the toxic properties of the chemical(s) must be



determined—particularly, the ability of the chemical(s) to pass through the skin and cause systemic effects.

The protective device should be fitted to the job. For example, some gloves are designed to protect against specific chemical hazards. Employees may need to use gloves, such as wire mesh, leather, and canvas, that have been tested and provide insulation from burns and cuts. The employee should become acquainted with the limitations of the glove used.

Many of the safety supply catalogs have information charts providing information on rates of degradation, permeation, etc. for chemicals or chemical classes. If you are unsure of the type of glove to use when handling a specific chemical, information is available by calling the toll free Safety Tech Lines provided on the Material Safety Data Sheet for the chemical you are using.

Help is available by contacting the Department of Environmental Health and Safety.

This information is to be used as a guide. For handling chemicals that pose a high degree of dermal toxicity, contact the chemical manufacturer or EHS.

## **Emergency Drench Equipment**

The Occupational Health and Safety Administration requires that where the eyes and body of any employee may be exposed to injurious materials, suitable facilities for quick drenching or flushing of the eyes and body be provided within the work area for immediate emergency use. A variety of emergency units are available for the purpose of quick drenching of the body of a person exposed to injurious materials. These include emergency showers, eye/face washes, eyewashes, combination shower and eyewash units, and hand-held drench hoses. Hand-held drench hoses may be used in conjunction with safety shower/eyewash units, but a drench hose is not a substitute for shower/eyewash units. Wall-mounted, squeeze-bottle type eyewash kits do not meet the requirements for eyewash units. They may be used in conjunction with approved eyewash units if the water/solution in them is changed weekly to avoid contamination (this must be documented and records kept); otherwise, those units should be removed from the laboratory and discarded.

The following guidelines may be used to determine if existing showers and/or eyewashes are adequate or when installing new equipment:

- Before purchasing any safety shower/eyewash unit, make sure the equipment meets the ANSI (American National Standards Institute) compliance standards. (contact Naomi Kelly (864.656.7554) for approval/assistance before ordering any drench equipment)
- For materials that may cause serious/severe injury to skin or eyes (this includes any material with a pH less than 2 or greater than 12), a standard eyewash/shower combination unit is required regardless of the quantity of the chemical being used.
- When installing units where emergency drench equipment does not presently exist, stand alone eyewash/shower combination units should be installed.
- These units may be activated by a ring, pull bar, chain, triangle, or treadle, but when possible they should always be uniform throughout the facility.
- Valves should be designed so that they remain open until they are intentionally shut off and they should activate in one second or less.
- Each emergency unit shall be identified with a highly visible sign. The area around the emergency unit shall be well lighted and highly visible.
- Emergency units must be readily accessible. A minimum of a 3ft. square area around the unit must be kept clear at all times. Marking off this area with brightly colored yellow tape is a good way to remind everyone to keep the area clear.

- The unit should be located as close to the hazard as possible without physically causing a hazard itself. The time required to reach the shower/eyewash should be no more than 10 seconds, and they should be located no further than 25ft from the hazard site.
- Eyewash nozzles shall be protected from airborne contaminants. Whatever means is used to afford such protection, its removal shall not require a separate motion by the operator when activating the unit.

The apparatus shall be located on the same level and the path shall not be impeded by doors, equipment stock, or any tripping hazards.

All units must provide a copious flow of water for a minimum of 15 minutes.

Equipment shall be protected from freezing, deterioration, and physical damage through an inspection and maintenance program.

All safety shower and eyewash equipment must be inspected routinely. Safety showers should be inspected monthly. These inspections must include activating the unit for a period of time sufficient to ensure complete flushing of the lines (a minimum of 1-2 minutes or longer if necessary for water to run clear). Records must be kept indicating the date of inspection and initials or name of the inspector. Eyewash/face wash units must be inspected weekly to include activating for a period of time sufficient to ensure complete flushing of the lines (minimum of three minutes). These flushing requirements are necessary to ensure that infections caused by Acanthamoebae do not occur. These Amoebae are found routinely in eyewash stations when tested. These amoebae can cause serious eye infections, and clinical treatments with most antibiotics are ineffective against this amoeba. If this program has not been in place in the past, maintenance should be contacted prior to activating any shower that has not been flushed recently. The valves on these units may have corroded and may not shut off readily. You must also prepare for the collection of a large volume of water (20-50 gal.) in order to properly flush the lines. Written records of routine testing must be kept and posted near the drench equipment. Records should include date of flushing/inspection and initials of person conducting the testing.

All employees who might be exposed to chemical splash shall be instructed in the location and proper use of emergency shower and eyewash equipment before beginning work in the laboratory.

- For most chemical spills/splashes, a minimum 15-minute flush of all exposed areas (contaminated clothing and shoes should be removed while flushing). There are a few exceptions to this (i.e., HF—see Appendix K). Employees must be aware of chemicals with specific first aid requirements by reading MSDS and other available literature for the chemicals that they will be handling.
- When addressing the flushing of the eyes, instruction should be given to hold the eyelids open and roll the eyeballs so that water will flow on all surfaces of the eye and under the eyelid.
- Medical examination/treatment should be sought immediately after flushing.

## **OSHA Hazard Communication Standard**

(29 CFR 1910.1200)

If accessing this document from the Clemson University EHS website, the complete Hazard Communication Standard can be found at:

[http://www.osha-slc.gov/OshStd\\_data\1910\\_1200.html](http://www.osha-slc.gov/OshStd_data\1910_1200.html).