



# ***UA LITTLE ROCK***



**UA LITTLE  
ROCK**

**Workplace Safety Manual**

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Thank you for taking the time to review Environmental Health & Safety's Workplace Safety Manual. EH&S's hope with this manual is to provide general safety guidelines to assist in reducing and/or eliminating risk in the workplace.

Much, if not most of this information can be found in OSHA, ANSI, and other universal workplace standards and requirements. All faculty and staff on the UA Little Rock campus should maintain compliance with OSHA standards for workplace safety. This document does not supersede, nor take the place of federal standards and guidelines, but only serves as a helpful guide in each of the covered areas.

This manual is a general guide and should not be used to assess compliance with the Occupational Safety and Health Act of 1970 (OSH Act) or federal OSHA standards. This handbook does not provide legal interpretations of the requirements in OSHA standards, nor does it create any additional compliance requirements for employers. OSHA will not cite employers under the General Duty Clause in Section 5(a)(1) of the OSH Act for not following the handbook's recommendations\*\*.

\*\* Arkansas is under federal OSHA jurisdiction which covers most private sector workers within the state. While State and local government workers are not covered by federal OSHA, employees may benefit from using this manual.

If you cannot find a safety resource, please feel free to contact Environmental Health & Safety at (501) 916-6351 or [ehs@ualr.edu](mailto:ehs@ualr.edu).

### **ACKNOWLEDGEMENT OF SAFETY RESPONSIBILITIES**

**UA Little Rock:** It is the goal of UA Little Rock to ensure a safe, healthful workplace for all its employees. Injury and illness losses from incidents are costly and preventable. UA Little Rock will take steps to reduce preventable accidents and illnesses, and eliminate workplace hazards for its students, staff, faculty, and visitors,

**Management:** Management is accountable for preventing workplace incidents, injuries and illnesses. Management will provide top-level support of safety program initiatives. Management will consider all employee suggestions for achieving a safer, healthier workplace. Management also will keep informed about workplace safety and health hazards.

**Supervision:** Supervisors are responsible for supervising and training workers in safe work practices. Supervisors must enforce company safety rules and work to eliminate hazardous conditions. Supervisors shall lead safety efforts by example.

**Environmental Health & Safety (EH&S):** EH&S will help recommend safety and health improvements in the workplace. EH&S is also responsible for identifying hazards and unsafe work practices, and removing obstacles to accident and illness prevention.

**Employees:** All employees are expected and encouraged to participate in safety and health program activities including the following: reporting hazards, unsafe work practices and accidents immediately to their supervisors or an EH&S representative; wearing required personal protective equipment; and participating in and supporting safety committee activities.

## **AERIAL LIFTS**

This section applies to all employees and subcontractors working within UALR's controlled worksites, and are to provide training and qualification guidelines for the safe operation of aerial lifts and powered manned platforms.

### **Qualification Requirements**

All aerial lift operators are required to be fully qualified and competent in the operation of each piece of equipment they are required to operate. All New Hire operators are required to do the following:

1. Provide proof of training and or experience valid within one (1) year and pass an examination prior to acceptance or
2. Successfully complete the Aerial Lift Training Program. (Ref. Section 2.0)  
Acceptable forms of proof of training and or experience are:
  1. Previous employers' certification card dated (some facilities do not recognize proof of training from other facilities)
  2. Verification of ABC class room training
  3. Verification of any participating Safety Council class room training

### **Aerial Lift Training Program**

The Aerial Lift Training Program is intended for all operators. This program is generic in nature and is supplemented with manufacturer's Operating and Safety Handbook and video. The training program consists of the following:

1. OSHA Standards Overview
2. Overview of manufacturers operation manual
3. Viewing of video-tape training film
4. Written examination
5. Satisfactory check out by a qualified person  
Successful completion of this program requires the following:
  1. Classroom instruction
  2. Written examination; A score of between 70% and 100% will require a review of missed questions, if any, and the score corrected to 100%. A score of below 70% will require complete retraining and testing.
  3. Field evaluation

### **OSHA Standards Overview**

Standards [29 CFR 1910.67](#) and [1926.453](#) of the Occupational Safety and Health Administration (OSHA) covers the operation of vehicle-mounted elevating and rotating work platforms and aerial lifts. In summary, these standards spell out specific requirements as to the construction, modification, and safe use of the equipment and training of operators. For more information concerning these standards, ask the Site Safety Supervisor for assistance, or contact the nearest [OSHA office](#).

### **References**

1. Manufacturer's Operation and Safety Handbook
2. Manufacturer's Operator Training Video

### **Aerial Lift Vocabulary & Parts**

Aerial platform lifts are used as man-lifts whenever work is being performed overhead, such as painting tanks, working on pipelines, etc. The aerial platform lift is one of the first tools to consider when performing the job.

As with most specialized equipment, aerial platform lifts have a vocabulary of their own. Before you start learning about platform lifts, you need to make sure that you know the different parts

and terms. Reference the manufacturer's "Operating and Safety Handbook" for aerial platform lift parts. Some common aerial lift terms are as follows:

*Auxiliary Power.* Control used to lower the basket in an emergency.

*Basket.* Enclosed area where operator controls the aerial platform lift and performs all necessary work from this area.

*Basket Controls.* Controls usually located in the front middle of the basket area.

*Basket Rotate Left.* Control used to only rotate the basket left.

*Basket Rotate Right.* Control used to only rotate the basket right.

*Choke.* Control used to help start the gas engine when it is cold.

*Deadman Switch.* Foot switch that must be depressed before any of the controls on the aerial platform lift will operate.

*Drive Forward.* Control used to move the aerial platform forward.

*Drive Reverse.* Control used to move the aerial platform backwards.

*Drive Speed.* Control used to set the speed to which the aerial platform will travel.

*Emergency Lowering Valve.* Valve used to lower the basket when the aerial platform lift has no power.

*Emergency Stop.* Control used to kill the aerial platform lift in an emergency situation.

*Engine Speed.* Control used to set the engine speed.

*Extending Axles.* Axles that extend, used to stabilize the aerial platform lift.

*Forward & Reverse Arrows.* Arrows used to indicate travel direction.

*Ground Controls.* Controls used to operate the aerial lift from the ground in case of an emergency (also known as auxiliary controls).

*Level Warning Light.* Light that indicates that the base is 5 degrees or more out of level-don't swing, raise, or scope if out of level.

*Lift Down.* Control used to lower the boom down.

*Lift Up.* Control used to lift the boom up.

*Maximum Weight Placard.* Placard on the aerial platform lift used stating the amount of weight the lift can handle.

*On/Off Ignition.* Control used to turn the ignition on or off.

*Outriggers.* Stabilizing devices used to stabilize the aerial platform lift.

*Start Button.* Button used to start the aerial platform lift.

*Steer Left.* Control used to turn the aerial platform left when traveling.

*Steer Right.* Control used to turn the aerial platform right when traveling.

*Swing Left.* Control used to swing the boom to the left.

*Swing Right.* Control used to swing the boom to the right.

*Telescope In.* Control used to retract the boom.

*Telescope Out.* Control used to extend the boom.

*Tilt Down.* Control used to tilt the basket down.

*Tilt Up.* Control used to tilt the basket up.

### **Operating Procedures**

1. Reference the manufacturer's video.
2. Reference the manufacturer's "Operating and Safety Handbook".

### **General Safety Rules**

1. Only authorized, trained employees shall operate an aerial lift.
2. Lower basket to grade level to gain access to the platform.
3. Aerial lifts operated near energized overhead lines shall be operated so that a minimum clearance of 10ft. (305 cm) is maintained.
4. Lift controls shall be tested prior to use to determine that such controls are in safe working condition. See the [Aerial Lift Operator's Daily Checklist](#).
5. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.
6. Employees shall always stand firmly on the floor of the basket. They shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.
7. A full body harness shall be worn and a lanyard attached to the boom or basket when working from an aerial lift.
8. Boom and basket load limits specified by the manufacturer shall not be exceeded.
9. Outriggers, when used, shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline.
10. Climbers shall not be worn while performing work from an aerial lift.
11. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
12. Do not travel with the boom elevated or extended. However, it may be necessary to extend the boom while moving a few feet to position it.
13. Aerial lifts may not be "field modified" for uses other than those intended by the manufacturer.
14. Do not exceed the machine placard maximum platform load.
15. Always look in the direction you are moving the unit, and be aware of everything above, below and around you. Never move the unit without a ground person.
16. Do not attach wires or cables to the platform. Many aerial lifts have a place to plug in an electrical cord.
17. Other personnel should be restricted from passing or working underneath the raised platform.
18. A malfunctioning lift shall be shut down and removed from service until repaired.

## **CONFINED SPACE ENTRY PERMIT**

The Confined Space Entry Permit is the most essential tool for assuring safety during entry into confined spaces with known hazards or with unknown or potentially hazardous atmospheres. The entry permit process guides the supervisor and workers through a systematic evaluation of the space to be entered. The permit should be used to establish appropriate conditions. Before each entry into a confined space, an entry permit will be completed by Environmental Health & Safety (EHS). EHS will then communicate the contents of the permit to all employees involved in the operation and post the permit conspicuously near the work location. A standard entry permit shall be used for all entries.

### **Definitions**

By OSHA definition, a *confined space*:

1. Is large enough for an employee to enter fully and perform assigned work
2. Is not designed for continuous occupancy by the employee
3. Has a limited or restricted means of entry or exit

These spaces may include underground vaults, tanks, storage bins, pits and diked areas, vessels, silos, and other similar areas.

By OSHA definition, a *permit-required confined space* has one or more of the following characteristics:

1. Contains, or has the potential to contain, a hazardous atmosphere
2. Contains a material with the potential to engulf someone who enters the space
3. Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section
4. Contains any other recognized serious safety or health hazards

### **Key Elements of Entry Permits**

A standard entry permit shall contain the following items:

1. Space to be entered
2. Purpose of entry
3. Date and authorized duration of the entry permit
4. Name of authorized entrants within the permit space
5. Means of identifying authorized entrants inside the permit space (i.e., rosters or tracking systems)
6. Name(s) of personnel serving as Attendant(s) for the permit duration
7. Name of individual serving as Entry Supervisor, with a space for the signature or initials of the Entry Supervisor who originally authorized the entry
8. Hazards of the permit space to be entered
9. Measures used to isolate the permit space and to eliminate or control permit space hazards before entry (i.e., lockout/tagout of equipment and procedures for purging, ventilating, and flushing permit spaces)
10. Acceptable entry conditions
11. Results of initial and periodic tests performed, accompanied by the names or initials of the testers and the date(s) when the tests were performed
12. Rescue and emergency services that can be summoned, and the means of contacting those services (i.e., equipment to use, phone numbers to call)
13. Communication procedures used by authorized entrants and Attendant(s) to maintain contact during the entry

14. Equipment to be provided for compliance with this Confined Space Program (i.e., PPE, testing, communications, alarm systems, and rescue)
15. Other information necessary for the circumstances of the particular confined space that will help ensure employee safety
16. Additional permits, such as for hot work, that has been issued to authorize work on the permit space

### **Permit Scope & Duration**

A permit is only valid for one shift. For a permit to be renewed, the following conditions shall be met before each reentry into the confined space:

1. Atmospheric testing shall be conducted, and the results should be within acceptable limits. If atmospheric test results are not within acceptable limits, precautions to protect entrants against the hazards should be addressed on the permit and should be in place.
2. *EHS* shall verify that all precautions and other measures called for on the permit are still in effect.
3. Only operations or work originally approved on the permit shall be conducted in the confined space.

A new permit shall be issued, or the original permit will be reissued if possible, whenever changing work conditions or work activities introduce new hazards into the confined space. *EHS* shall retain each canceled entry permit for at least one (1) year to facilitate the review of the Confined Space Entry Program. Any problems encountered during an entry operation shall be noted on the respective permit(s) so that appropriate revisions to the confined space permit program can be made.

## **CONFINED SPACE PROGRAM**

### **Purpose**

The purpose of the UA Little Rock Confined Space Program is to set procedures that will ensure workers safe entry into confined spaces and permit-required confined spaces to perform routine tasks associated with their employment. This procedure is designed to provide the minimum safety requirements in accordance with the Occupational Safety and Health Administration's (OSHA), [Confined Space Standard 1910.146](#).

### **Background**

A confined space is defined as any location that has limited openings for entry and egress, is not intended for continuous employee occupancy, and is so enclosed that natural ventilation may not reduce air contaminants to levels below the threshold limit value (TLV). Examples of confined spaces include: manholes, stacks, pipes, storage tanks, trailers, tank cars, pits, sumps, hoppers, and bins. Entry into confined spaces without proper precautions could result in injury, impairment, or death due to the following:

1. An atmosphere that is flammable or explosive
2. Lack of sufficient oxygen to support life
3. Contact with or inhalation of toxic materials
4. General safety or work area hazards such as steam or high-pressure materials

### **Responsibilities**

In administering the Confined Space Program, *UA Little Rock* is responsible for:

1. Monitoring the effectiveness of the program
2. Providing atmospheric testing and equipment as needed
3. Providing personal protective equipment as needed
4. Providing training to affected employees and supervisors
5. Providing technical assistance as needed
6. Reviewing and updating the program on at least an annual basis or as needed



*Environmental Health & Safety (EHS)* is responsible for:

1. Ensuring that a list of confined spaces at all UA Little Rock worksites is maintained
2. Ensuring that canceled permits are reviewed for lessons learned
3. Ensuring training of personnel is conducted and documented
4. Coordinating with outside responders
5. Ensuring that equipment is in compliance with standards
6. Ensuring that the EHS Officer(s) or Department Supervisor in charge of confined space work performs the duties listed in the following section.

The *EHS Officer(s) or Department Supervisor in charge of confined space work* are responsible for:

1. Ensuring requirements for entry have been completed before entry is authorized
2. Ensuring confined space monitoring is performed by personnel qualified and trained in confined space entry procedures
3. Ensuring a list of monitoring equipment and personnel qualified to operate the equipment is maintained by the Safety and Occupational Health Office
4. Ensuring that the rescue team has simulated a rescue in a confined space within the past twelve (12) months
5. Knowing the hazards that may be faced during entry, including the mode (how the contaminant gets into the body), signs or symptoms, and consequences of exposure
6. Filling out a permit
7. Determining the entry requirements
8. Requiring a permit review and signature from the authorized Entry Supervisor
9. Notifying all involved employees of the permit requirements
10. Posting the permit in a conspicuous location near the job
11. Renewing the permit or have it reissued as needed (a new permit is required every shift)
12. Determining the number of Attendants required to perform the work
13. Ensuring all Attendant(s) know how to communicate with the entrants and how to obtain assistance
14. Posting any required barriers and signs
15. Remaining alert to changing conditions that might affect the conditions of the permits (i.e., require additional atmospheric monitoring or changes in personal protective equipment)
16. Changing and reissuing the permit, or issuing a new permit as necessary
17. Ensuring periodic atmospheric monitoring is done according to permit requirements
18. Ensuring that personnel doing the work and all support personnel adhere to permit requirements
19. Ensuring the permit is canceled when the work is done
20. Ensuring the confined space is safely closed and all workers are cleared from the area

The EHS Officer(s) or Department Supervisors(s) shall serve as the Entry Supervisor(s) and shall be qualified and authorized to approved confined space entry permits. The *Entry Supervisor(s)* are responsible for:

1. Determining if conditions are acceptable for entry
2. Authorizing entry and overseeing entry operations
3. Terminating entry procedures as required
4. Serving as an Attendant, as long as the person is trained and equipped appropriately for that role
5. Ensuring measures are in place to keep unauthorized personnel clear of the area
6. Checking the work at least twice a shift to verify and document permit requirements are being observed (more frequent checks shall be made if operations or conditions are anticipated that could affect permit requirements)

7. Ensuring that necessary information on chemical hazards is kept at the worksite for the employees or rescue team
8. Ensuring a rescue team is available and instructed in their rescue duties (i.e., an onsite team or a prearranged outside rescue service)
9. Ensuring the rescue team members have current certification in first aid and cardiopulmonary resuscitation (CPR)

The EHS Officer(s) or Department Supervisors(s) shall function as an Attendant(s) and shall be stationed outside of the confined workspace. The *Attendants* are responsible for:

1. Being knowledgeable of and being able to recognize potential confined space hazards
2. Maintaining a sign-in/sign-out log with a count of all persons in the confined space and ensuring all entrants sign in and out
3. Monitoring surrounding activities to ensure the safety of personnel
4. Maintaining effective and continuous communication with personnel during confined space entry, work, and exit
5. Ordering personnel to evacuate the confined space if he/she
  - a. Observes a condition which is not allowed on the entry permit
  - b. Notices the entrants acting strangely, possibly as a result of exposure to hazardous substances
  - c. Notices a situation outside the confined space which could endanger personnel
  - d. Notices a hazard within the confined space that has not been previously recognized or taken into consideration
  - e. Must leave his/her work station
  - f. Must focus attention on the rescue of personnel in some other confined space that he/she is monitoring
6. Immediately summoning the Rescue Team if crew rescue becomes necessary
7. Keeping unauthorized persons out of the confined space, ordering them out, or notifying authorized personnel of an unauthorized entry

*Rescue Team Members* are responsible for:

1. Completing a training drill using mannequins or personnel in a simulation of the confined space prior to the issuance of an entry permit for any confined space and at least annually thereafter
2. Responding immediately to rescue calls from the Attendant or any other person recognizing a need for rescue from the confined space
3. In addition to emergency response training, receiving the same training as that required of the authorized entrants
4. Having current certification in first aid and CPR

*Employees who are granted permission to enter a confined space* are responsible for:

1. Reading and observing the entry permit requirements
2. Remaining alert to the hazards that could be encountered while in the confined space
3. Properly using the personal protective equipment that is required by the permit
4. Immediately exiting the confined space when
  - a. They are ordered to do so by an authorized person
  - b. They notice or recognize signs or symptoms of exposure
  - c. A prohibited condition exists
  - d. The automatic alarm system sounds
5. Alerting Attendant(s) when a prohibited condition exists and/or when warning signs or symptoms of exposure exist

## **Training**

The UA Little Rock EHS office shall provide training so that all employees whose work is regulated by this Confined Space Program acquire the understanding, knowledge, and skills necessary for the safe performance of their duties in confined spaces. The training shall establish employee proficiency in the duties required in this program, and shall introduce new or revised procedures, as necessary, for compliance with this program. *Training Frequency* EHS shall provide training to each affected employee:

1. Before the employee is first assigned duties within a confined space
2. Before there is a change in assigned duties
3. When there is a change in permit space operations that presents a hazard for which an employee has not been trained
4. When the UA Little Rock EHS Officer(s) or Department Supervisor(s) has reason to believe that there are deviations from the confined space entry procedures required in this program or that there are inadequacies in the employee's knowledge or use of these procedures

#### *General Training.*

All employees who will enter confined spaces shall be trained in entry procedures. Personnel responsible for supervising, planning, entering, or participating in confined space entry and rescue shall be adequately trained in their functional duties prior to any confined space entry.

Training shall include the following:

1. Explanation of the general hazards associated with confined spaces
2. Discussion of specific confined space hazards associated with the facility, location, or operation
3. Reason for, proper use, and limitations of personal protective equipment and other safety equipment required for entry into confined spaces
4. Explanation of permits and other procedural requirements for conducting a confined space entry
5. A clear understanding of what conditions would prohibit entry
6. Procedures for responding to emergencies
7. Duties and responsibilities of the confined space entry team
8. Description of how to recognize symptoms of overexposure to probable air contaminants in themselves and co-workers and method(s) for alerting the Attendant(s)

Refresher training shall be conducted as needed to maintain employee competence in entry procedures and precautions.

#### *Specific Training.*

Training for *atmospheric monitoring personnel* shall include proper use of monitoring instruments, including instruction on the following:

1. Proper use of the equipment
2. Calibration of equipment
3. Sampling strategies and techniques
4. Exposure limits (PELs, TLVs, LELs, UELs, etc.)

Training for *Attendants* shall include the following:

1. Procedures for summoning rescue or other emergency services
2. Proper utilization of equipment used for communicating with entry and emergency/rescue personnel

Training for *Emergency Response Personnel* shall include the following:

1. Rescue plan and procedures developed for each type of confined space that is anticipated to be encountered
2. Use of emergency rescue equipment
3. First aid and CPR techniques
4. Work location and confined space configuration to minimize response time

### *Verification of Training*

Periodic assessment of the effectiveness of employee training shall be conducted by EHS. Training sessions shall be repeated as often as necessary to maintain an acceptable level of personnel competence.

### **Identification of Confined Spaces**

EHS shall ensure a survey of the worksite is conducted to identify confined spaces. This survey can be partially completed from initial and continuing site characterizations, as well as other available data (i.e., blueprints and job hazard analyses). The purpose of the survey is to develop an inventory of those locations and/or equipment at UA Little Rock that meet the definition of a confined space. This information shall be communicated to personnel, and appropriate confined space procedures shall be followed prior to entry. The initial surveys shall include air monitoring to determine the air quality in the confined spaces. The potential for the following situations shall be evaluated by EHS:

1. Flammable or explosive potential
2. Oxygen deficiency
3. Presence of toxic and corrosive material

### **Hazard Reevaluation**

EHS shall identify and reevaluate hazards based on possible changes in activities or other physical or environmental conditions that could adversely affect work. A master inventory of confined spaces shall be maintained. Any change in designation of a confined space will be routed to all affected personnel by EHS.

### **Pre-Entry Hazard Assessment**

A hazard assessment shall be completed by EHS prior to any entry into a confined space. The hazard assessment should identify the following:

1. The sequence of work to be performed in the confined space
2. The specific hazards known or anticipated
3. The control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level

No entry shall be permitted until the hazard assessment has been reviewed and discussed by all persons engaged in the activity. Personnel who are to enter confined spaces shall be informed of known or potential hazards associated with said confined spaces.

### **Hazard Controls**

Hazard controls shall be instituted to address changes in the work processes and/or working environment. Hazard controls must be able to control the health hazards by eliminating the responsible agents, reduce health hazards below harmful levels, or prevent the contaminants from coming into contact with the workers. The following order of precedence shall be followed in reducing confined space risks.

1. *Engineering Controls*: Engineering controls are those controls that eliminate or reduce the hazard through implementation of sound engineering practices. Ventilation is one of the most common engineering controls used in confined spaces. When ventilation is used to remove atmospheric contaminants from a confined space, the space shall be ventilated until the atmosphere is within the acceptable ranges. Ventilation shall be maintained during the occupancy if there is a potential for the atmospheric conditions to move out of the acceptable range. When ventilation is not possible or feasible, alternate protective measures or methods to remove air contaminants and protect occupants shall be determined by *EHS* prior to authorizing entry. When conditions necessitate and can accommodate continuous forced air ventilation, the following precautions shall be followed:

- a. Employees shall not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
  - b. Forced air ventilation shall be directed to ventilate the immediate areas where an employee is or will be present within the space.
  - c. Continuous ventilation shall be maintained until all employees have left the space.
  - d. Air supply or forced air ventilation shall originate from a clean source.
2. *Work Practice (Administrative) Controls*: Work practice (administrative) controls are those controls which eliminate or reduce the hazard through changes in the work practices (i.e., rotating workers, reducing the amount of worker exposure, and housekeeping).
  3. *Personal Protective Equipment (PPE)*: If the hazard cannot be eliminated or reduced to a safe level through engineering and/or work practice controls, PPE should be used. EHS shall determine the appropriate PPE needed by all personnel entering the confined space, including rescue teams. PPE that meets the specifications of applicable standards shall be selected in accordance with the requirements of the job to be performed.

### **Entry Procedures**

When entry into a confined space is necessary, either the Entry Supervisor or EHS may initiate entry procedures, including the completion of a confined space entry permit. Entry into a confined space shall adhere to the following standard entry procedure. *Prior to Entry* The entire [confined space entry permit](#) shall be completed before a standard entry. Entry shall be allowed only when all requirements of the permit are met and it is reviewed and signed by an Entry Supervisor. The following conditions must be met prior to standard entry:

1. Affected personnel shall be trained to establish proficiency in the duties that will be performed within the confined space.
2. The internal atmosphere within the confined space shall be tested by the *Entry Supervisor* with a calibrated, direct-reading instrument.
3. Personnel shall be provided with necessary PPE as determined by the Entry Supervisor.
4. Atmospheric monitoring shall take place during the entry. If a hazardous atmosphere is detected during entry:
  - a. Personnel within the confined space shall be evacuated by the Attendant(s) or Entry Supervisor until the space can be evaluated by EHS to determine how the hazardous atmosphere developed.
  - b. Controls shall be put in place to protect employees before reentry.

### *Opening a Confined Space.*

Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed. When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent anyone from falling through the opening. This barrier or cover shall protect each employee working in the space from foreign objects entering the space. If it is in a traffic area, adequate barriers shall be erected.

### *Atmospheric Testing.*

Atmospheric test data is required prior to entry into a confined space. Atmospheric testing is required for two distinct purposes: (1) evaluation of the hazards of the permit space, and (2) verification that acceptable conditions exist for entry into that space. If a person must go into the space to obtain the needed data, then Standard Confined Space Entry Procedures shall be followed. Before entry into a confined space, the EHS Officer(s) or Entry Supervisor shall conduct testing for hazardous atmospheres. The internal atmosphere shall be tested with a calibrated, direct-reading instrument for oxygen, flammable gases and vapors, and potential toxic air contaminants, in that order. Testing equipment used in specialty areas shall be listed or approved for use in such areas by EHS. All testing equipment shall be approved by a nationally recognized laboratory, such as Underwriters Laboratories or Factory Mutual Systems.

1. *Evaluation Testing.* The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity. The analysis shall identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data and development of the entry procedure should involve a technically qualified professional (i.e., consultant, certified industrial hygienist, registered safety engineer, or certified safety professional).
2. *Verification Testing.* A confined space that may contain a hazardous atmosphere shall be tested for residues of all identified or suspected contaminants. The evaluation testing should be conducted with specified equipment to determine that residual concentrations at the time of testing and entry are within acceptable limits. Results of testing shall be recorded by the person performing the tests on the permit. The atmosphere shall be periodically retested (frequency to be determined by EHS) to verify that atmospheric conditions remain within acceptable entry parameters.
3. *Acceptable Limits.* The atmosphere of the confined spaces shall be considered to be within acceptable limits when the following conditions are maintained:
  - a. Oxygen: 19.5 percent to 23.5 percent
  - b. Flammability: less than 10 percent of the Lower Flammable Limit (LFL)
  - c. Toxicity: less than recognized American Conference of Governmental Industrial Hygienists (ACGIH) exposure limits or other published exposure levels [i.e., OSHA Permissible Exposure Limits (PELs) or National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs)]

#### *Isolation & Lockout/Tagout Safeguards.*

All energy sources that are potentially hazardous to confined space entrants shall be secured, relieved, disconnected, and/or restrained before personnel are permitted to enter the confined space. Equipment systems or processes shall be locked out and/or tagged out as required by the UA Little Rock Lockout/Tagout Program [which complies with [OSHA 29 CFR 1910.147](#) and American National Standards Institute (ANSI) Z244.1-1982, Lockout/Tagout of Energy Sources] prior to permitting entry into the confined space. In confined spaces where complete isolation is not possible, EHS shall evaluate the situation and make provisions for as rigorous an isolation as practical. Special precautions shall be taken when entering double-walled, jacketed, or internally insulated confined spaces that may discharge hazardous material through the vessel's internal wall. Where there is a need to test, position, or activate equipment by temporarily removing the lock or tag or both, a procedure shall be developed and implemented to control hazards to the occupants. Any removal of locks, tags, or other protective measures shall be done in accordance with the UA Little Rock Lockout/Tagout Program.

#### *Ingress/Egress Safeguards.*

Means for safe entry and exit shall be provided for confined spaces. Each entry and exit points shall be evaluated by EHS to determine the most effective methods and equipment that will enable employees to safely enter and exit the confined space. Appropriate retrieval equipment or methods shall be used whenever a person enters a confined space. Use of retrieval equipment may be waived by EHS if use of the equipment increases the overall risks of entry or does not contribute to the rescue. A mechanical device shall be available to retrieve personnel from vertical confined spaces greater than five (5) feet in depth.

#### *Warning Signs & Symbols.*

All confined spaces that could be inadvertently entered shall have signs identifying them as confined spaces. Signs shall be maintained in a legible condition. The signs shall contain a warning that a permit is required before entry. Accesses to all confined spaces shall be prominently marked.

## Emergency Response

### *Emergency Response Plan.*

EHS shall maintain a written plan of action that has provisions for conducting a timely rescue of individuals within a confined space should an emergency arise. The written plan shall be kept onsite where the confined space work is being conducted. All affected personnel shall be trained on the Emergency Response Plan.

### *Retrieval Systems & Methods of Non-Entry Rescue.*

Retrieval systems shall be available and ready when an authorized person enters a permit space, unless such equipment increases the overall risk of entry, or the equipment would not contribute to the rescue of the entrant. Retrieval systems shall have a chest or full-body harness and a retrieval line attached at the center of the back near shoulder level or above the head. If harnesses are not feasible, or would create a greater hazard, wristlets may be used in lieu of the harness. The retrieval line shall be firmly fastened outside the space so that rescue can begin as soon as anyone is aware that retrieval is necessary. A mechanical device shall be available to retrieve personnel from vertical confined spaces more than five (5) feet deep.

## Definitions

*Acceptable Entry Conditions.* The conditions that must exist in a confined space to allow entry to and ensure that employees involved with confined space entry can safely enter into and work within the space.

*Attendant.* An individual stationed immediately outside one or more permit-required confined spaces who monitors the authorized entrants and who performs all attendants' duties assigned in this program.

*Authorized Entrant.* An employee who is authorized by the Environmental Health and Safety Office to enter a permit-required confined space.

*Combustible Dust.* Solid particles that if in sufficient concentration will ignite and burn rapidly.

*Confined Space.* A space that is large enough and so configured that an employee can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. Examples of confined spaces include boilers, storage tanks, sewer manhole, electrical manholes, crawl spaces, ventilation and exhaust ducts, pits, vats, vessels, vaults, pump or lift stations, septic tanks, pipelines, tunnels, elevator pits, trenches and excavations.

*Control Measures.* A system or device used, or action taken, to control or prevent the introduction of physical or chemical hazards into a confined space.

1. *Blanking or Blinding.* The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
2. *Double Block & Bleed.* The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.
3. *Inerting.* The displacement of the atmosphere in a permit-required confined space by a noncombustible gas to such an extent that the resulting atmosphere is noncombustible. Note: inerting creates an oxygen deficient atmosphere.
4. *Isolation.* The process by which a permit-required confined space is removed from service and completely protected against the release of energy and material into

the space by such means as blanking or blinding, misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

5. *Line Breaking.* The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.
6. *Lockout/Tagout.* Placing locks or tags on the energy isolating device to prevent the unauthorized re-energizing of the device or circuit while work is being performed by personnel.
7. *Zero Mechanical State.* The mechanical potential energy of all portions of the machine or equipment is set so that the opening of the pipe(s), tube(s), hose(s), or actuation of any valve, lever, or button will not produce a movement which could cause injury.

*Department.* Any university or research foundation department that performs work in a confined space or permit-required confined space.

*Emergency.* Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit-required confined space that could endanger entrants.

*Employee.* Any person hired by the university or research foundation as full or part-time personnel, including administrators, faculty, staff, students, and work study students.

*Engulfment.* The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

*Entrant.* Any employee who enters a confined space.

*Entry.* The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

*Entry Permit.* The written or printed document that is provided by the company to allow and control entry into a permit-required confined space.

*Entry Supervisor.* An employee from the Environmental Health and Safety Office (EHS), or their designate, responsible for determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as necessary. An entry supervisor may also be an employee from a department other than the EHS who has received advanced training and authorization from the EHS Manager to be an entry supervisor. An entry supervisor may act as an authorized entrant as long as that person is trained for such role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.



*Ground-Fault Circuit-Interrupter.* A device designed to disconnect an electric circuit when it seeks ground through a person or grounded object, thus preventing electric shock and fires.

*Hazardous Atmosphere.* An atmosphere that may expose employees to the risk of death, incapacitation, and impairment of ability to self-rescue (that is escape unaided from a permit- required confined space), injury, or acute illness from one or more of the following causes:

1. An oxygen deficient atmosphere containing less than 19.5% oxygen by volume or an oxygen enriched atmosphere containing more than 23.5% oxygen by volume
2. A flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL) or lower explosive limit (LEL); a hazardous atmosphere of airborne combustible dust
3. Having a concentration of any toxic substance above the VOSH permissible exposure limit (PEL) or the ACGIH threshold limit value (TLV)
4. Any other atmospheric condition that is immediately dangerous to life or health

*Hot Work Permit.* The university's written authorization to perform operations (for example, riveting, welding, cutting, burning and heating) capable of providing a source of ignition.

*Immediately Dangerous to Life or Health (IDLH).* Any condition that poses an immediate or delayed threat to life, that would cause irreversible adverse health effects, or that would interfere with an individual's ability to escape unaided from a permit-required confined space.

*Non-Permit Confined Space.* A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

*Permit-Required Confined Space.* A confined space that:

1. Has limited or restricted means of exit and contains, or has the potential to contain, a hazardous atmosphere or a potential for engulfment and is not intended for continuous employee occupancy, and/or
2. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a small cross section or contains any other recognized serious safety and health hazard

*Purge.* To clear a substance from the object that it is contained in; for example, purging an explosive atmosphere from a tank so that work can be performed safely in the tank.

*Qualified Person.* An entry supervisor who is trained to recognize and evaluate the anticipated hazard(s) of the confined space and who shall be capable of specifying necessary control measures to assure worker safety.

*Rescue Team.* Those persons designated by the EHSO prior to any permit-required confined space entry to perform rescues from confined spaces.

*Retrieval System.* The equipment used for non-entry rescue of persons from permit- required confined spaces, including retrieval lines, chest or full body harness, and a lifting device or anchor. A retrieval line is primarily used in vertical confined spaces and shall not be used in confined spaces consisting of horizontal tunnels or spaces where obstructions could increase the hazard to the entrant during emergency non-entry removal.

*Testing.* The process by which the hazards that may confront entrants to a permit-required confined space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit-required confined space.

## **COMPRESSED GAS CYLINDERS**

### ***Statement***

All compressed gas cylinders used on the UA Little Rock campus should maintain compliance with OSHA standards for compressed gas cylinders. This document serves as a helpful guide only in this area.

### ***Purpose***

Depending on the particular gas, there is a potential for simultaneous exposure to any of the following types of hazards:

1. Decompression
2. Flammability and explosion
3. Asphyxiation
4. Toxicity
5. Cryohazard
6. Physical hazard (e.g. weight)

### ***Who Needs to Know***

Everyone who uses and works around compressed gas cylinders needs to be aware of OSHA standards for compressed gas cylinder safety.

### ***Responsibilities***

*Managers and Supervisors* are responsible for:

1. Ensuring that all requirements listed in the written program for CGC are met
2. Ensuring new and existing employees are familiar with the CGC program as applicable to their job duties
3. Identifying CGC hazards, with the assistance of Environmental Health and Safety (EHS)
4. Arranging for required training of UA Little Rock employees in the use of CGCs

*University Employees who work with CGC* are responsible for:

1. Complying with the rules of operations and accepted safety practices outlined within this written program.

The *Environmental Health and Safety Manager* is responsible for:

1. Conducting periodic visits to locations where CGC are used, with purpose of these visits being to inspect equipment and to observe employees' procedures while working with CGC
2. General oversight of this program

### ***Identification***

No compressed gas cylinder shall be accepted for use that does not legibly identify its contents by name. Color-coding is not a reliable means of identification. Cylinder colors vary with the

supplier, and labels on caps have little value as caps are interchangeable. If the labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked “contents unknown” and returned directly to the manufacturer.

### **Caps**

To protect the valve during transportation, the cover cap should be screwed on hand tight and remain on until the cylinder is in place and ready for use. Remove the valve cap only after the cylinder has been safely installed.

### **Transport**

Cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. They are built to be as light as possible while remaining safe and durable. Do not drop cylinders or otherwise allow them to strike each other. Such misuse can seriously weaken the cylinder and render it unfit for further use or transform it into a rocket having sufficient thrust to drive it through masonry walls. Cylinders should never be rolled or dragged. When moving large cylinders, they should be strapped to a properly designed wheeled cart or hand truck to ensure stability. Never transport a cylinder with a regulator in place. Always protect the valve during transport by replacing the valve cover. Only one cylinder should be handled at a time. Pulling cylinders by their valve caps, rolling them on their sides, or dragging or sliding them can cause damage. Rolling cylinders on their bottom edge (“milk churning”) may be acceptable only for very short distances, as when moving a cylinder into place or onto a cart.

### **Restraint**

Since gas cylinders are tall and narrow, they should be secured in an upright position at all times to prevent tipping. Never lay any cylinders, especially those containing flammable gases, on their sides. Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage, or have a non-slip base attached. Cylinders should be affixed with a bracket to a permanent building fixture such as a bench or wall during use. Brackets that can be screwed into the mounting surface are preferred over clamp-type brackets. It is recommended that cylinders be secured at two locations, at the lower and upper portion of the tank or at a single position where toppling or sliding out from underneath is not probable.

Cylinders containing flammable gases such as hydrogen shall not be stored in close proximity to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present. An open flame shall never be used to detect leaks of flammable gases. All cylinders containing flammable gases should be stored in a well-ventilated area. Store oxidizing gases at least 20 feet away from fuel gases or other combustible materials, or separate them with an approved firewall. Check the reactivity information and storage requirement sections of the MSDS for details about which materials are incompatible with a particular compressed gas. Cylinders should be placed with the valve accessible at all times. The main cylinder valve should be closed as soon as it is no longer necessary that it be open (i.e., it should never be left open when the equipment is unattended or not operating). This is necessary not only for safety when the cylinder is under pressure, but also to prevent the corrosion and contamination resulting from diffusion of air and moisture into the cylinder.

If compressed gas cylinders are stored outside, use a well-drained, securely fenced area. Keep them on a level, raised concrete pad or non-combustible rack. To prevent excessive pressure buildup, never expose cylinders to temperatures above 52°C (125°F). Some rupture devices will release at approximately 65°C. Do not subject them to temperatures below -29°C (-20°F), unless they are designed for this. Cylinders that become frozen to a surface can be freed by using warm water (less than 52°C). Never apply direct heat to a cylinder.

### Regulators

Discharge compressed gases safely using devices (i.e., pressure regulators) approved for the particular gas. Standard cylinder-valve outlet connections have been devised by the Compressed Gas Association (CGA) to prevent mixing of incompatible gases. The outlet threads used vary in diameter; some are internal, some are external; some are right-handed, some are left-handed. In general, right-handed threads are used for non-fuel and water-pumped gases, while left-handed threads are used for fuel and oil-pump gases. To minimize undesirable connections, only CGA standard combinations of valves and fittings should be used in compressed gas installations; the assembly of miscellaneous parts should be avoided.

The following table, reprinted from an article entitled “Gas Cylinder Safety, Part II – Setup and Use” in LCGC North America magazine, Volume 20, Number 7, July, 2002, lists CGA designations for gas cylinders commonly used in the laboratory. *These CGA fitting designations can be found inscribed on the inlet nut of the regulator.*

Table II: Compressed Gas Association fitting designations for common GC gas cylinders.

Gas	Fitting Designation
Helium	CGA-580
Hydrogen	CGA-350
Air, synthetic	CGA-590
Argon	CGA-580
Nitrogen	CGA-580

The threads on cylinder valves, regulators, and other fittings should be examined to ensure they correspond and are undamaged. Never force connections or use homemade adapters. Do not lubricate any cylinder valves, fittings, or regulator threads or apply jointing compounds and tape. Use only lubricants and sealants recommended by the gas supplier. After the regulator is attached, the cylinder valve should be opened just enough to indicate pressure on the regulator gauge (no more than one full turn) and all the connections checked with a soap solution for leaks. Never use oil or grease on the regulator of a cylinder valve. Carefully check all cylinder-to-equipment connections before use and periodically during use to be sure they are tight, clean, in good condition, and not leaking. Carefully open all valves, slowly, pointed away from you and others, and using the proper tools. Close all valves when cylinders are not in use. Never tamper with safety-relief devices in cylinders, valves, or equipment. Grit, insects, dirt, oil, or dirty water can cause gas leaks if they get into the cylinder valve or gas connection. Use a lint-free tissue to remove any dirt or rust. (Never open the high-pressure cylinder valve to clean the fitting seat.) Never open a damaged valve. Contact your gas supplier for advice. If you suspect the regulator is leaking, return it to the vendor for repair. Never attempt to repair a regulator, valve, or safety device yourself.

### Tubing

The instrument connecting tubing and fittings must also be rated to the gas used. They must be able to withstand the highest possible pressure to which they could be subjected in the event of pressure regulator failure.

### **General Information**

Read the SDS and labels for all of the materials you work with. Know all of the hazards (i.e., fire/explosion, health, chemical reactivity, corrosivity, and pressure) of the materials you work with. Always use safety glasses (preferably a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines. Handle “empty” cylinders safely as you would a full cylinder. Leave a slight positive pressure (approximately 200 psi) in them to prevent contamination of the interior of the cylinder. When the cylinder needs to be removed or is empty, close all cylinder valves, bleed remaining gas from the system (when it is safe to do so), disassemble equipment properly and replace cylinder protection caps. Mark cylinders “empty” or “MT,” and store them separately from full cylinders until they are picked up by the supplier.

In the event of any emergency involving a compressed gas cylinder, *evacuate the entire building immediately* by sounding the fire alarm, and follow the procedures for general evacuation as outlined in the laboratory’s Chemical Hygiene Plan.

Please reference the Occupational Safety and Health Administration (OSHA) regulations governing the use of compressed gases in the workplace ([29 CFR, Parts 1910.101 through 1910.105](#)).

### **Reporting Requirements**

1. Representatives of Environmental Health and Safety are authorized to document unsafe acts, advise employee’s supervisor, and stop unsafe work from continuing.
2. Supervisors may counsel or take other corrective action to address failure to adhere to guidelines of this program.
3. Employees shall report any safety concerns to their supervisor and/or Environmental Health and Safety.

### **Training Requirements and Competency Assessment**

Under no circumstances will any university employee work with compressed gas cylinders until he/she has attended training in the safe use of these devices. This includes all new employees regardless of previous experience. The training program includes but is not limited to:

1. Identification of the different types of compressed gas cylinders
2. How hazards are to be controlled – engineering controls, administrative controls (use of caps, restraints, regulators), Personal Protective Equipment (PPE)
3. Policies and procedures for working around compressed gas cylinders
4. The written Compressed Gas Cylinder Manual
5. Enforcement of rules and corrective actions to be taken for noncompliance

*Documentation of training will be kept at the following location:*

Environmental Health and Safety  
UA Little Rock Facilities Management  
2801 S. University Avenue  
Little Rock, AR 72204

*Records should include the following information:*

1. Date of training
2. Employee printed name and signature
3. The agenda or a list of the topics covered

### **Program Evaluation**

The EH&S Committee will evaluate the written CGC Program annually, and periodic audits will be conducted by EH&S. All updates, changes, and additions will be documented and will be kept with the written program. When evaluating the program, the following items will be reviewed to measure the program's overall effectiveness:

1. Accident/incident reports
2. Medical records
3. Management/employee compliance
4. Recommendations
5. Inspections
6. Training records
7. Administrative/Engineering controls

### Contact Information

Contacts	Telephone	E-mail
Shawn Bayouth, EHS Director	501-916-6351	<a href="mailto:SBAYOUTH">SBAYOUTH</a>
Leslie Hutchins, Associate Vice Chancellor	501-916-6347	<a href="mailto:LKHUTCHINS">LKHUTCHINS</a>

### Related Information

Compressed Gas Cylinders authority and references:

1. [OSHA 29 CFR 1910.101 \(Compressed Gases – General Requirements\)](#)
2. [OSHA 29 CFR 1910.102 \(acetylene\)](#)
3. [OSHA 29 CFR 1910.103 \(hydrogen\)](#)
4. [National Fire Protection Agency \(NFPA\) \(compressed gas\)](#)

### Definitions

*Asphyxiation.* Liquefied gases may expand as much as 1000-fold in volume when vaporized. When the content of a large cylinder is vented very rapidly, symptoms of oxygen deficiency or even asphyxiation may occur through atmospheric displacement.

*Cryohazard.* Liquefied gases such as carbon dioxide and nitrogen can cause immediate frost burns on exposed skin. Even very brief contact with a cryogenic liquid is capable of causing tissue damage similar to that of thermal burns. Prolonged contact may result in blood clots that have potentially serious consequences. In addition, surfaces cooled by cryogenic liquids can cause severe damage to the skin. Gloves and eye protection (preferably a face shield) should be worn at all times when handling cryogenic liquids.

*Decompression.* Sudden decompression can propel a cylinder with enough force to penetrate building walls. When the gas pressure is released rapidly through an opening the size of the valve stem, a cylinder can reach velocities of close to 66 mph. Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb capable of causing catastrophic property damage, personal injury, and death if they are not handled properly.

*Flammability or Explosion.* If the gas is flammable, flash points lower than room temperature present a danger of fire or explosion. Even breathing air can pose a hazard as a combustion accelerator. Adequate ventilation must always be used to prevent the build-up of vapors of flammable gases such as hydrogen, methane, and acetylene. Adequate ventilation is also required when using gases such as nitrogen, helium, or

hydrogen. In these cases, oxygen can be condensed out of the atmosphere creating a potential for explosive conditions.

*Physical Hazard.* An empty cylinder can weigh up to 200 lbs. or more depending on the size of the cylinder and the density of the gas contained within. No one should attempt to lift a cylinder that weighs more than 50 lbs. For this reason, all cylinders used in this lab pose a heavy lifting hazard. The following table, reprinted from an article entitled “Gas Cylinder Safety, Part I – Hazards and Precautions” in LCGC North America magazine, Volume 20, Number 6, June 2002, categorizes these hazards per gas type.

*Toxicity.* Generally, the gases encountered in this lab are not considered toxic; that is to say, once a victim has been removed from an area of exposure, the immediate effects of the gas exposure (e.g. dizziness or difficulty breathing) will diminish rapidly. However, the MSDS must always be consulted for toxicological information prior to working with any gas.

Table I: Hazard classes for commonly used GC gases and other gases found in the laboratory

Gas	Decompression	Flammability	Asphyxiation	Toxicity	Cryohazard
Acetylene	X	X	X		
Air	X				
Argon	X		X		X *
CO2	X		X	X	X *
Chemical Reagents (reactive)	X	X	X	X	
Helium	X		X		X *
Hydrogen	X	X	X		X *
Nitrogen	X		X		X *
Oxygen	X	X+			X *
Propane	X	X	X		

\*Liquefied gas

+Accelerates combustion

## **ELECTRICAL SAFETY**

### **Purpose**

The purpose of this program is to prevent injuries and accidents and to protect University employees from electrical hazards. Work unit specific safety procedures for preventing electric shock, or other injuries resulting from direct/indirect electrical contact, to employees working on or near energized or de- energized parts will be developed and implemented as required.

## Scope

This program applies to all work operations at UA Little Rock involving electrical systems where employees may be exposed to live parts and/or those parts that have been de-energized. Any work on energized equipment may be done only after it has been determined that this type of work must be performed with the equipment energized. While some lab and Facilities Management employees may work with equipment in the 120 to 600-volt range, most University employees normally work in areas with electrical appliances that operate at 120 volts or less.

## Definitions

*Current.* Term used to describe electric flow measured in amps/ampereage. It is current that can cause electric shock.

*De-Energized.* Electrical devices that are disconnected from all energy sources including direct electric connections, stored electric energy such as capacitors, and stored non-electrical energy in devices that could reenergize electric circuit parts.

*Energized Electrical Work.* Work conducted by an employee on or near an exposed energized circuit greater than 50 volts and typically less than or equal to 600.

*FM.* Factory Mutual –An independent product safety testing and certification company.  
*GFCI.* Ground Fault Circuit Interrupter, which provides additional protection from shocks by shutting off current to equipment when a change in electricity is sensed.

*Grounding.* Provides a safe path between electricity and the earth, preventing leakage of current; the creation of a conductive path for electricity between a circuit and the equipment to ground.

*High Voltage.* Electrical systems or equipment operating at or intended to operate at a sustained voltage of more than 600 volts.

*Low Voltage.* Electrical systems or equipment operating at or intended to operate at a sustained voltage of 600 volts or less.

*Polarized Plug.* Helps reduce the potential for shock with easily identifiable plugs. One prong is wider than the other and can only be inserted into outlets one way.

*Qualified Electrical Worker.* A qualified person who by reason of a minimum of two years of electrical training and experience with high voltage circuits and equipment and who has demonstrated by performance familiarity with the work to be performed and the hazards involved. Only a Qualified Electrical Worker is allowed to work on energized conductors or equipment connected to energized high-voltage systems.

*Qualified Person.* A person, designated by UA Little Rock, who by reason of experience or instruction has demonstrated familiarity with the operation to be performed and the hazards involved. Whether a person is considered to be a “qualified person” will depend upon various circumstances in the workplace. It is possible and, in fact, likely for an individual to be considered “qualified” with regard to certain equipment in the workplace, but “unqualified” as to other equipment. An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a



qualified person is considered to be a qualified person for the performance of those duties.

*Resistance.* The ease with which electricity flows through the material (conductor). Materials (conductors) with higher resistance properties can become hot. (Measured in ohms)

*UL.* Underwriters Laboratories is an independent product safety testing and certification organization.

*Voltage.* Electric potential or potential difference assigned to a circuit or system expressed in volts.

## **Responsibilities**

*UA Little Rock Employees* are responsible for:

1. Being aware of electrical safety issues
2. Complying with safe operating procedures when working with electrical equipment
3. Attending appropriate safety training
4. Reporting safety concerns

*Managers* are responsible for:

1. Ensuring staff are trained, qualified, and authorized to work on electrical equipment
2. Conducting periodic hazard analysis of work areas
3. Correcting identified safety hazards

*EHS* is responsible for:

1. Providing assistance in identifying electrical safety issues
2. Providing electrical safety training for campus staff
3. Reviewing electrical equipment safe operating procedures as necessary

*Facilities Management* is responsible for:

1. Ensuring that all authorized or qualified persons have received appropriate levels of training
2. Ensuring appropriate Personal Protective Equipment is provided to authorized or qualified staff who work with electrical equipment

## **General Precautions for All Staff**

All employees use electric powered equipment and systems throughout the campus. Whether in an office, lab, or workshop, electricity is used continuously, usually without incident. Voltages as low as 12 volts can be dangerous. When working with or around electrical equipment, one may inadvertently become part of an electrical circuit. Only trained and authorized or qualified individuals should do any repair or work on electrical equipment. All staff should abide by the following:

1. Never work on “hot” or energized equipment unless it is necessary to conduct equipment troubleshooting.
2. Use extension cords only as temporary power sources.
3. Do not connect too many pieces of equipment to the same circuit or outlet as the circuit or outlet could become overloaded.
4. Be sure that ground-fault circuit interrupters (GFCI) are used in high-risk areas such as wet locations. GFCI’s are designed to shut off electrical power within as little as 1/40 of a second.
5. Plug strips, such as those used on computers, should be plugged directly into outlets and not into extension cords or other plug strips.

6. Inspect all equipment periodically for defects or damage.
7. All cords that are worn, frayed, abraded, corroded, or otherwise damaged must be replaced.
8. Grasp the plug to remove it from a socket. Never pull the cord.
9. Keep all cords away from heat, oil, and sharp edges.
10. Always follow the manufacturer's instructions for use and maintenance of all electrical tools and appliances.
11. Keep equipment operating instructions on file.
12. Never touch an electrical appliance and plumbing at the same time.
13. Always unplug electrical appliances before attempting any repair or maintenance.
14. All electrical devices must be properly grounded with approved three wire plugs unless they are "double insulated". Grounding provides a safe path for electricity to the ground, preventing leakage of current in circuits or equipment.
15. All electrical equipment used on campus should be UL or FM approved.
16. Keep cords out of the way of foot traffic so they don't become tripping hazards or become damaged by traffic.
17. Never use electrical equipment in wet areas or run cords across wet floors.
18. Ensure energized parts of electrical equipment operating at 50 volts or more are guarded against accidental contact.
19. Only properly trained employees should work on electrical equipment.
20. Know how to respond to emergencies such as electric shock incidents or fires.

### **Localized Electrical Outage**

In the event of an electrical outage, please do the following:

1. Immediately report electrical outages to Facilities Management by calling 501-916-3390.
2. If possible, identify the defective equipment or the cause of the failure, and remove it from service.
3. Report this information to Facilities Management personnel upon their arrival.

### **Labs & Facilities Management**

1. **Never** work with electricity greater than 600 volts without specific permission, training, and written procedures. Notify your supervisor immediately if you have any questions.
2. Be able to recognize electrical safety hazards in your work area.
3. Ensure that all authorized or qualified persons have received appropriate training in order to operate or repair equipment.
4. Keep equipment in good working order to help prevent electrical accidents.
5. Maintain a three-foot clearance around electrical panels.
6. Electrically operated equipment must be de-energized before work may commence.
7. Always follow lockout/tag-out procedures when working on electrical equipment (Lockout/Tag-out Program), and wear appropriate Personal Protective Equipment (PPE) such as safety glasses, rated rubber gloves, rated rubber sleeves, insulated boots, or face shield.
8. Never override safety devices such as electrical interlocks.
9. Remove all rings, key chains, or other metal objects when working around electricity.
10. Wear appropriate personal protective equipment, such as eye protection or insulated gloves, as needed.
11. Never use metal ladders when working near energized wiring.
12. Damp or wet environments may be dangerous when working with electricity.
13. Damp or wet environments may be dangerous when working with electricity.
14. Employees working with lasers, performing hardware or software testing, or other activities that do not require direct contact with electrical components, should be aware of electrical safety issues and be alert to the possibility of other employees conducting energized work in the area.

## Reporting Requirements

Report malfunctioning equipment or devices to your supervisor or to Facilities Management by calling 501-916-3390. Do not attempt to repair any electrical equipment yourself unless you are properly trained and authorized to do so. Typical issues include the following:

1. Damaged cords, plugs, or outlets
2. Receiving a shock when touching the equipment
3. Arcing, sparking, smoking, or otherwise malfunctioning equipment

Any electrical equipment not operating properly should be:

1. Taken out of service immediately
2. Tagged or labeled as “Do Not Use”
3. Reported to the appropriate department or individual for repair

If safety issues persist, please notify your supervisor.

## Training Requirements & Competency Assessment

Training Requirement	Target Audience	Frequency
Basic Electrical Safety Awareness	All UA Little Rock Employees	At time of employment and periodically thereafter as part of the UA Little Rock Safety Training Program
Advanced Electrical Safety	UA Little Rock employees who work directly with electrical systems from 50 to 600 volts, Qualified or Authorized Persons	Annually
Lock Out/Tag Out	UA Little Rock employees who work directly with electrical systems from 50 to 600 volts, Qualified or Authorized Persons	Annually
Hazardous Electrical Voltage Safety	UA Little Rock employees who work with or in the proximity of electrical equipment or systems over 600 volts, Qualified Electrical Worker (QEW)	Annually

Work unit specific training may also be required for specific workplace activities or equipment. Notify your supervisor if you have any questions. For more information, please contact EHS at 501-916-6351.

## **ELEVATOR RESCUE**

### **Purpose**

This procedure is to ensure safe, effective rescue of trapped personnel from elevator cars throughout UALR.

### **Scope**

This procedure covers all elevators throughout UALR campuses.

### **Procedure**

When an elevator malfunctions and passengers are trapped inside an elevator car, the following procedure will be followed:

- Only qualified elevator maintenance personnel from the elevator maintenance service company are authorized to perform rescues.
- Exception – if the elevator car is within 18 inches above or below the floor landing, trained Facilities Management personnel may follow the Elevator Entrapment Extraction Procedure.
- If Public Safety is contacted first via the elevator phone, Public Safety will notify the Facilities Management Operations Center or Facilities Management personnel on duty, depending on the time of day. Facilities Management or Public Safety will dispatch the corresponding elevator service company to the scene.
- If Facilities Management is contacted first, the front office will notify Public Safety, the corresponding elevator company, the EH&S Office and the Assistant Director of Building Operations.
- Facilities Management or Public Safety will obtain an estimated time of arrival (ETA) from the elevator service company. This information will be passed on to responding personnel.
- Public Safety, a certified elevator technician, and Facilities Management maintenance personnel will be dispatched to the scene. Public Safety/ Facilities Management personnel will maintain communication with the passenger(s) during the entrapment and inform the passenger(s) of the procedure that will follow. The officer/Facilities Management personnel at the scene will inform the passenger(s) not to attempt to open the elevator doors or the overhead hatch and stand back away from the doors. The officer/Facilities Management personnel on the scene will assess the situation and determine physical and emotional stress. The officer/Facilities Management personnel will also assure the passenger(s) that they are not in any danger and that help is on the way. If immediate medical attention is required, the officer/Facilities Management personnel will call 911 to activate the City of Little Rock Emergency Response System. After 911 has been activated, a Facilities Management employee trained and certified in First Aid should be immediately called to the scene.

UALR employees are not authorized to help rescue the trapped passenger(s), ONLY a certified service technician from UALR's elevator service company has the authority to open the elevator doors and help rescue the trapped passenger(s).

The responding Public Safety officer will remain at the scene until all passengers are rescued safely.

Facilities Management maintenance personnel will remain at the scene unless another priority/emergency situation arises that would require immediate response. If Facilities Management personnel leave the scene, continual contact should be made available with the responding Public Safety officer.

If Facilities Management personnel respond to an entrapment and no one is trapped inside the elevator car, the following steps will be followed:

1. Determine if the elevator is in working condition. If the elevator car is running safely, leave the elevator car in operation.

2. If the elevator car is not working properly, one of two scenarios must be followed:
  - A. If the call is during normal working hours, 7:30-4:30 Monday through Friday and a non-holiday, Facilities Management personnel will contact the Assistant Director of Building Operations with appropriate information (building, elevator car number). The Assistant Director will determine the urgency of having the elevator car repaired based on operational needs and/or campus activities.
  - B. If the call is during off-hours or a scheduled holiday, Facilities Management personnel on duty/public safety officer will attempt to contact the Assistant Director of building operations to determine if the elevator service company should be called. If the Assistant Director is unable to be reached, the Director of Environmental Health & Safety will be contacted. Unauthorized personnel may not issue an order to repair an elevator outside of normal business hours. In the case that authorization cannot be obtained, the Facilities Management personnel on duty will take the elevator car out of service and notify Public Safety and his/her supervisor at the first opportunity. If the repair can wait until normal working hours (if the building has another operational elevator(s)), the Facilities Management personnel on duty will remove the car from service and signify the need for Facilities Management to contact the elevator service company on his/her nightly report(s). In all cases, if the failed elevator is the only elevator serving the building, the elevator service company must be notified immediately and repairs must be expedited.

During off-hours, weekends and holidays, the elevator service company responding to the call must notify Public Safety (916-3400) to inform the University they are on the scene to investigate and resolve the problem. The Public Safety officer or the Facilities Management personnel on duty will accompany the elevator service technician to the scene. If the elevator cannot be restored to service, the Public Safety Officer or Facilities Management Personnel on duty will contact the Director of Building Operations or the Director of EH&S immediately.

## **EMERGENCY EYEWASH & SAFETY SHOWERS**

### **Introduction**

The purpose of this program is to ensure that all safety eyewashes, drench hoses, and safety showers supply clean, potable water and are in proper working order. This program describes procedures for emergency use, selection, installation and placement, guidelines for activation, inspection, testing, and maintenance of emergency eyewash and shower equipment.

This program applies to all emergency eyewash and shower units in UA Little Rock buildings. Annual flow rate testing will be conducted by Environmental Health & Safety (EHS) personnel or others; monthly/quarterly sanitation testing will be performed by the workplace personnel.

### **Definitions**

*Emergency Shower.* A unit that cascades water over the whole body.

*Eyewash.* A unit that flushes water specifically to the eyes.

*Eye/Face Wash.* An eye/face wash is capable of flushing both the eyes and the face.

*Drench Hose.* Hand-held units that are intended to supplement existing shower and eyewash units (but do not replace them).

*Combination Units or Safety Stations.* Units that consist of both the emergency shower and an eye/face wash.

*Hands-Free or Stay-Open Valve.* A valve that opens and closes the water supply to the emergency units and stays open until it is manually turned off.

*Activation.* A routine test procedure conducted on an eyewash or safety shower to ensure operation, access, and hygiene conducted by unit personnel (e.g. lab supervisor or designee).

*Flow Test.* An annual test procedure to assess flow, temperature, and pressure characteristics conducted by EHS personnel.

### **Authority**

OSHA 29 CFR 1910.151(c)

*“Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.”*

This regulation specifies where and when emergency eye wash and shower equipment must be available. These regulations do not specify minimum operating requirements, installation requirements, or maintenance requirements.

ANSI Z358.1 (most recent version, 2014 currently)

Tampering with safety equipment is a violation of UA Little Rock policy. OSHA considers emergency showers, eyewashes, and other flushing or drenching equipment first aid. Anyone who disables, modifies, or tampers with emergency safety equipment may face disciplinary action up to and including termination.

### **Emergency Procedures**

All affected personnel are expected to know and understand the hazards associated with chemicals and other materials that may require emergency flushing and drenching. Workers must review all safety datasheets (SDS) frequently to know and understand all hazards prior to an accident happening.

#### **Eyewashes, Drench Hoses, and Eyewash/Facewash Units**

1. Assist the victim to get to the unit. Sight may be impaired.
2. Activate the unit using the hands-free valve.
3. Hold the eyelids open with the fingers if necessary.
4. Place the eyes in the stream of water.
5. Flush for 15 minutes.
6. Get medical attention.

#### **Emergency Showers and Drench Hoses**

1. Assist the victim to the shower. Do not let them slip and fall.
2. Activate the unit using the hands-free valve.
3. Put modesty aside. Remove contaminated clothing first if possible. (Rinsing contaminated clothing will wash chemicals out of the clothing and onto the skin). If this is not possible, remove contaminated clothing during the flushing process.
4. Flush for 15 minutes.
5. Get medical attention.

### **Notes**

1. Assist the victim with procedures. Shield them using blankets or by closing doors if necessary. Provide alternative clothing (lab coats, scrubs, blankets, etc) as necessary).
2. The contaminated water from a deluge shower or eyewash is very dilute. Use standard housekeeping precautions when cleaning the area.
3. Drains are not always installed under emergency showers intentionally. Sanitary sewer drains from any fixture (floor drains, sinks, etc.) have a P-trap that contains a small amount of water to prevent sewer gas from entering the buildings. Because of the infrequent use of an emergency shower, drains under emergency showers will go dry and allow sewer gas into the building. If one is present, pour some water down the drain at regular intervals.

### **Application & Installation**

Because the eyes provide a rapid route of entry into the body, emergency eyewash and shower units should be installed in work areas where there is a potential for exposure to the skin or eyes with any hazardous chemical (in addition to corrosives). The OSHA definition of a hazardous chemical includes the following:

- Carcinogens
- Corrosives
- Reproductive toxins
- Irritants
- Hepatotoxins
- Sensitizers
- Nephrotoxins
- Agents which act on the hematopoietic system
- Neurotoxins
- Agents which damage the lungs, skin, eyes, mucous membranes
- Toxic & highly toxic agents

### **Equipment Selection**

Equipment selection should be based upon the hazard. Consider the population, the frequency of activities, the nature of the activities, particulates, and the chemicals used. In general:

1. Full sized showers and eyewash stations should be used in active workplaces with daily activities generating particulates or using high hazard chemicals (i.e. large quantities and concentrated hazardous chemicals).
2. Dual purpose drench hose and eyewash installations should be used in moderately hazardous areas with daily or less frequent activities (i.e. smaller quantities and dilute solutions or less hazardous chemicals).
3. Faucet mounted eyewashes and drench hoses should be used in low hazard workplaces with infrequent activities (i.e. small quantities or low hazard chemicals).
4. Single nozzle drench hoses are intended to supplement the existing eyewash and shower facilities and are not considered a substitute in place of suitable eye and body wash equipment.
5. Gravity fed or squirt bottle eyewash stations should only be considered for field work or temporary installations where they will be replaced by plumbed fixtures. Eyewash solutions must be changed according to the manufacturer's recommendations.

### **Location & Placement**

The emergency eyewash and shower unit must be placed in a location no more than a maximum of 10 seconds travel time for an injured person through an unobstructed pathway. All safety equipment should be located in a low hazard area of the workplace, typically near the exit away from higher hazard activities.

Specific placement requirements are listed below:

1. *Eyewash and eye/face wash units:* Nozzles must be positioned between 33-45 inches from the floor. A minimum distance of 6 inches from the nearest obstruction is required.
2. *Drench hose units:* The head of the hose must be placed 33-45 inches from the floor with a clearance of 6 inches from the wall. Dual purpose bench mounted eyewash/drench hose units should be positioned toward the front of the bench so that the user can bend over and place their eyes in the water stream in a hands-free fashion without straining to reach the back of the bench.
3. *Emergency Showers:* The distance of showerhead to the floor must be between 82-96 inches. Activator handle height must be no higher than 69 inches from the floor. Also, showers must have a clearance from obstructions 16 inches from the center of the water column.
4. *Combination Units or Safety Stations:* Refer to the dimensions above for distance and clearance of the eye/face wash and shower units.

Eye wash and shower units must be completely free from obstructions or other potential hazards such as chemical bottles that could be tipped over while locating the eyewash with impaired vision.

Do not place or store any items under or near eyewash and shower stations. No electrical devices may be placed or stored near emergency eye wash and shower locations.

### Signage

The location of all emergency equipment must be identified with a highly visible sign. Signs must be conspicuously posted using universal symbols or text that describes the installed equipment appropriately.



### Activation/Hygiene & Flow Testing

It is important to understand that “Activation/Hygiene Testing” and “Flow Testing” are different procedures that occur at different intervals. The ANSI standard recommends weekly activation testing and annual flow testing for both eyewash and safety showers. Because of the difficulty of activating some installations, periodic activations are recommended to maintain clean water in the units. EHS encourages and recommends weekly activation of eyewashes and showers; however, it is not mandatory by statute or OSHA regulations. Minimally, eyewashes and drench hoses must be activation/hygiene tested monthly and safety showers quarterly and the test documented. Unit supervisors may choose to perform these tests at shorter intervals at their discretion.

### Eyewashes and Dual-Purpose Eyewash/Facewash/Drench Hoses

*Monthly Activation/Hygiene Test:*



1. Visual inspection of the unit:
  - a. Look for corrosion, leaks, or pipe damage and proper placement of protective covers. This should be done prior to activation in order to avoid risk of injury, damage to the unit, or creating a spill.
  - b. Ensure that the unit is clean and free of any nearby obstructions.
  - c. Verify that your eyewash has been tested annually on the log or hang tag on the unit.
2. Activate unit: Ensure that the water flow is continuous, estimate that the unit can maintain flow for 15 minutes by judging adequate and continuous water pressure for at least 60 seconds, and is not over pressurized as to injure the user's eyes or face.
  - a. Valve activator must stay on unless manually turned off and must activate water flow in one second or less.
  - b. If the eye wash station has protective caps, make sure they pop off automatically when the eye wash is turned on. Return the caps to the proper position after flushing. If caps are missing, contact EHS.
  - c. For eyewashes, controlled flow must be provided to both eyes simultaneously. Uneven flow to one eye or the other indicates a malfunction or simple blockage of the filters underneath the spray cap (remove and rinse filters or report malfunction for maintenance).
  - d. Observe the flow. Check for balance of the water stream. They should be equal; minor differences are not a problem. Each stream should be about 6 inches long and both streams should cross each other in the center. (Report low or high flow to EHS or if you need assistance to determine flow).
3. Sanitize water supply through flushing: Activate or flush the unit until the water runs clear to discharge rust, bacteria, or other contaminants (minimum of 60 seconds).
4. Documentation: Keep an eye wash test record log in your laboratory. Record the activation/hygiene test and post it near the unit.

#### *Annual Flow Test:*

Annual flow tests will be conducted by EHS personnel and requires specialized equipment to conduct the test.

1. Flow rate of the device will be conducted annually: Following established procedures let the water run for one minute to collect at least 1.5 liters (0.4 gallon) of water.
2. Documentation: Ensure an appropriate tag is on unit and document test with dates and initials on the unit tag after test.

#### Emergency Showers

##### *Quarterly Activation:*

Quarterly flush tests are to be conducted by the laboratory or workplace personnel. Equipment will be provided by EHS to collect the flushed water.

1. Visual inspection of the unit:
  - a. Look for corrosion, leaks, or pipe damage. This should be done prior to activation in order to avoid risk of injury, damage to the unit, or creating a spill.
  - b. Ensure that the unit is clean and free of any nearby obstructions. Verify actuator is attached and in position.
  - c. Verify that your shower has been tested annually on the log or hang tag on the unit.
2. Activate unit: Ensure that the water flow is continuous, estimate that the unit can maintain flow for 15 minutes.
  - a. Valve activator must stay on unless manually turned off and must activate water flow in one second or less.
  - b. Observe the flow. The unit must be capable of delivering not less than 20 gallons per minute (report low or high flow for maintenance).

3. Sanitize water supply through flushing: Activate or flush the unit until the water runs clear to discharge rust, bacteria, or other contaminants. Record the activation flushings in your record book or posted on the wall.

#### *Annual Flow Test:*

Annual flow tests will be conducted by EHS personnel and requires specialized equipment to conduct the test.

1. Flow rate of the device will be conducted annually: Following established procedures let the water run for one minute to collect at least 75.5 liters (20 gallons) of water.
2. Documentation: Ensure an appropriate tag is on all units and document test with dates and initials on unit tag after test.

### **Test Failures, Malfunctions, & Deficiencies**

Corrective actions must be performed when deficiencies are noted by any personnel at any time.

Malfunctions or deficiencies noted during periodic activations, inspections, or normal daily activities must be reported immediately to EHS. Inform your supervisor.

If use of the equipment is not possible, tag the unit "DO NOT USE." The supervisor must notify EHS for repair or replacement.

Annual test failures must be corrected immediately. Malfunctions will be reported to supervisors and facility managers.

### **Training**

Employees receive training during laboratory and chemical safety training on the proper procedure for eyewash and shower use during an emergency.

Training to perform periodic activation and maintain minimum performance requirements for eyewash and shower equipment is provided during annual testing or safety inspections in the lab or workplace.

## **EXCAVATION & TRENCHING**

### **Introduction**

The primary hazard associated with excavation and trenching activities is cave-in. A cave-in may result in entrapment and eventual suffocation or workers in an unprotected excavation. Associated hazards include falls, falling loads, mobile equipment, water accumulation, hazardous atmospheres, and access and egress obstructions.

### **Purpose**

The Occupational Health and Safety Administration (OSHA) requires employers who engage in safe excavation and trenching activities to protect employees from potential hazards. This policy has been developed to assist UA Little Rock in complying with the minimum safety standards adopted by OSHA and Arkansas Department of Labor.

### **Scope**

This policy shall serve only as a minimum for *all* university excavation and trenching activities performed by any department engaged in such activities, and therefore, does not prohibit additional levels of protection deemed necessary by a particular activity.

### **Definitions**

*Angle of Repose.* The greatest angle above the horizontal plane at which a material lies without sliding.

*Benching System.* A method of protecting employees from cave-in by excavating the sides of an excavation to form one or a series of horizontal steps with near-vertical surfaces between the levels.

*Competent Person.* One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The competent person must have had specific training in and be knowledgeable of the OSHA standard: one who has not had appropriate training or does not have specific knowledge cannot be capable of identifying existing and predictable hazards in excavation work or take prompt corrective measures.

*Excavation.* Any man-made cut, cavity, trench, or depression in earth's surface formed by earth removal.

*Shield System.* A structure (permanent or portable) designed to withstand a cave-in. These structures can be pre-manufactured or job-built in accordance with [OSHA 29 CFR 1926.652\(c\)\(3\) or \(c\)\(4\)](#). These systems are often referred to as "trench boxes" or "trench shields".

*Shoring System.* A Mechanical or timber structure designed to prevent cave-in of an excavation.

*Sloping System.* A Method of preventing cave-in by forming sides inclined at an angle away from the excavation. The angle of incline varies with soil type.

*Trench.* A narrow excavation made below the surface of the ground in which the depth is greater than the width and the width does not exceed 15 feet. NOTE: For the purposes of this policy and OSHA requirements, the same requirements apply to all excavations, including trenches.

## **Program**

1. Prior to beginning any trenching operation, all surrounding hazards must be evaluated, including the location of trees, large rocks, buildings, and sidewalks. These items should either be removed or made safe.
2. Prior to digging, the location of underground utilities including telephone, electrical, sewer, water, tanks, etc., must be estimated and identified. The appropriate utility companies must be identified prior to digging. On any UA Little Rock campus, Facilities Management and Environmental Health and Safety must be notified prior to any excavation for evaluation and approval. The "Competent Person" shall ensure that appropriate measures are taken to protect the underground installations and safeguard employees from potential hazards associated with the installation.
3. Any excavation greater than four (4) feet in depth must comply with [OSHA 29 CFR 1926 Subpart P](#) and this policy.
4. Excavations less than (5) feet that have been determined by the "competent person" to be safe from cave-in are not required to be shored.
5. All walls and faces of excavations to which employees are exposed must be guarded by a shoring system, sloping of the ground, or other equivalent means.
6. All excavations must have adequate means of egress, including steps or ladders, and must be provided within 25 feet travel distance.

7. All slopes shall be excavated to the angle of repose.
8. All excavations shall be sloped at an angle no steeper than 34 degrees from the horizontal as defined in [OSHA Option 1, 29 CFR 1926.652\(b\)](#). Steeper slopes may be used if options 2, 3, and 4 are utilized following referenced appendices in 29 CFR 1926.
9. A registered professional engineer, as described in Option 4, may design excavations different from those noted in item 8 above if appropriate documentation is provided and maintained as described in [1926.652\(b\)\(4\)\(ii\)](#).
10. Manufacturer designed support systems may be used if that use is in accordance with the manufacturer's tabulated data. Any uses deviating from that tabulated data must be in writing from the manufacturer and be present on the job site.
11. The removal of support systems at the end of an excavation project shall be performed in a manner that will not jeopardize the safety of the workers. The removal of supports shall begin at the bottom of the excavation and progress upward simultaneously with backfilling operations.

### **Safety Considerations**

1. Prior to beginning, complete the [Trenching & Excavation Checklist & Permit](#) Form. This form contains information that should be considered prior to working in an excavation and provides documentation of the project. The form should be signed by the "Competent Person" and all workers involved with the trenching operation.
2. Employees shall not be allowed to work on sloped or benched areas of excavations above other employees unless those employees at the lower level are adequately protected.
3. Structural ramps and runways associated with the excavation project shall be designed by a person qualified in structural design and constructed as to design. Structures to be used for employee access only may be designed and constructed by a "Competent Person".
4. If excavation work is within 25 feet of a roadway, employees must be protected by reflective vests in addition to roadway barricades.
5. All excavation sites must be adequately barricaded, using at a minimum fencing and flashing barricades on all sides in which work is not in progress. Public thoroughfares (sidewalks, common paths, etc.) shall be barricaded a minimum of ten (10) feet from the excavation work site. Any excavation greater than four (4) feet deep which is to be left unattended for greater than 24 hours, or is subject to water retention, must be fenced to a height of at least four feet using appropriate fencing materials.
6. Employees may not be under loads being handled by lifting or excavation equipment.
7. Employees must stand away from any vehicle being loaded or unloaded.
8. Hazardous Atmospheres – Employees working in excavations which have, or have the potential of having hazardous (i.e. oxygen deficiency or toxic/flammable gases) shall be entered under procedures outlined in the "Permit Required" Confined Space Entry Policy. These procedures shall include atmospheric testing, mechanical ventilation, lifelines, respirators, and emergency rescue preparation.
9. Welding operations have the potential of creating a hazardous atmosphere in an excavation. The competent person shall ensure that additional safety factors are incorporated into any welding operation by completing a "HOT WORK PERMIT" and checklist. This form shall be signed by the workers and the "Competent Person" and/or supervisor and attached to the excavation permit form. One copy shall be retained by the "Competent Person", and one copy shall be forwarded to the UA Little Rock Environmental Health and Safety Office.
10. Water Accumulation – Employees may not work in an excavation in which water has accumulated unless control devices are activated and employees are equipped with harnesses and lifelines.
11. All materials and equipment must be kept at least two (2) feet from the edge of the excavation.

12. All persons working within the excavation must wear a harness with a life line attached.
13. The “Competent Person” must inspect the job site prior to beginning the excavation and prior to actual work within the excavation. Additionally, daily inspections must be conducted on all safety and support systems and more frequent inspections after rainfall and other unusual circumstances that may pose additional hazards for the employees.

## **Training Requirements**

### *Competent Person*

For the purposes of this policy, the “competent person” must have a minimum of eight (8) hours (formal) initial training in the hazards of excavation and trenching operations and two (2) hours of annual training thereafter.

### *Workers*

All workers involved with excavation and trenching operations must have a minimum of two (2) hours annual training. This training may be formal, video tape, or a combination of the two.

## **FACILITY SAFETY**

### **Purpose**

The following policies, procedures and Standard Operating Procedures (SOPs) are in place to assure safe and compliant research at The University of Arkansas at Little Rock (UA Little Rock) and to protect Human Health and the Environment.

### **Occupational Safety & Health**

Safety is the responsibility of each employee at the university. In addition, each person of authority at the university is responsible for those employees under his or her supervision. This responsibility begins with the Chancellor and flows down to each person within the structure of the university. The personal and collective safety and health of students and employees are of primary importance. Cooperation among the administration, faculty members, staff members, and student body is necessary for the development and preservation of an enviable safety record. Effective standards, as well as proper attitudes, are required for the maintenance of workplace safety.

The Arkansas Department of Labor regulates the University with regard to occupational safety and health: [Act 556 of 1991, Public Employees’ Chemical Right to Know](#). UA Little Rock applies the Occupational Safety and Health Administration (OSHA) standards as found in the Code of Federal Regulations (CFR).

Facilities Management in cooperation with the Environmental Health and Safety Committee develops guidelines to help departments comply with the occupational safety and health standards. This help is meant to provide to all employees at UA Little Rock the proper guidelines to prevent workplace accidents. Under all circumstances, employees must be properly trained to perform their required tasks. These guidelines are to be used as building blocks for individual units to properly provide adequate safety and health protection for their workers. Their purpose is to create an overall awareness of the hazards of the job as well as to offer guidelines for safe work practices. Employees should review, be familiar with, and understand the information set forth in the guidelines.

### **Responsibilities**

*Environmental Health & Safety* is responsible for:

1. Recommending university policy concerning environmental and safety issues
2. Developing and communicating a clear vision for the University’s/College’s safety program
3. Establishing broad safety goals for departments to attain
4. Evaluating the University’s/College’s progress toward meeting those goals

Facilities Management and Environmental Health & Safety (EHS) are responsible for:

1. Enforcing compliance with federal, state, local and university policies concerning occupational safety and health
2. Investigating occupational safety and health concerns
3. Providing consultation to departments for compliance with standards and policies
4. Reporting environmental and safety concerns to the Environmental Health & Safety Committee, as well as, Federal, State and local public agencies, as required by law

The *Department Head or Director of each individual department* is responsible for:

1. Implementing safe work practices
2. Adhering to occupational safety and health regulations and policies
3. Reporting any occupational safety and/or health problems to Facilities Management and EHS
4. Reporting any work-related accidents to the Department of Human Resources
5. Reporting any near-accidents or near-misses to Facilities Management and EHS

*Each employee* is responsible for:

1. Knowing, understanding, and following the guidelines and being continually on guard to prevent unsafe work practices for themselves and others working around them
2. Reporting to the Department Head or Director any work related accidents, near-accidents, or occupational safety and health problems that need to be addressed

The *university* is responsible for:

1. Providing a safe workplace for its employees

## **Guidelines**

Facilities Management and EH&S try to develop rules or guidelines specific for UA Little Rock. In other cases, when no additional written rules or guidelines exist, Facilities Management and EH&S will rely on OSHA Standards as found in [29 CFR 1910](#), [1926](#), and [1928](#). In addition, Facilities Management and EHS will use national standards such as those found in the [National Institute of Occupational Safety and Health \(NIOSH\)](#), the [American Conference of Governmental Industrial Hygienists \(ACGIH\)](#), the [American National Standards Institute \(ANSI\)](#), the [American Society of Heating, Refrigeration, and Air Conditioning Engineers \(ASHRAE\)](#), the [American Industrial Hygiene Association](#), the [National Fire Protection Association](#), and other organizations.

The safety measures and procedures provided by the various rules and guidelines are designed to aid in maintaining a safe and healthful work and study environment on the UA Little Rock campus. Facilities Management and EHS can provide assistance in the pursuit of that goal.

## **Hazardous Chemicals**

Central to the management of hazardous chemicals in the research laboratory is the university's [Hazard Communication](#) program and the [Chemical Hygiene Plan](#) compliant with [OSHA CFR 29 1910.1200](#) and [1910.1450](#). These are performance-based programs which require:

1. The maintenance of MSDS's throughout the colleges
2. Chemical bottles and containers are appropriately labeled
3. Written Standard Operating Procedures are maintained in each laboratory
4. A Chemical Hygiene Plan is maintained in each department

These requirements ensure that faculty and staff are aware of the protective measures and procedures in place to protect employees and students from the hazards of working with chemicals, biological material and animal carcasses.

## Fire Protection

The university has access to trained personnel to provide fire protection and additional hazardous materials protection via the Little Rock Fire Department. In addition, buildings are protected by smoke detection and fire alarms, fire extinguishers, and sprinkler systems in some cases. Fire safety training and the use of fire extinguishers training is conducted by the EHS Supervisor and offered to all University personnel.

## Emergency Response

The Department of Public Safety (DPS) operates a 911 Emergency Dispatch Station. First response to an accident or injury is normally provided by EHS who have trained and certified first responders. These, and other appropriate staff, have bloodborne pathogen training. Post incident clean up or routine attention to pathogenic waste is managed by the Facilities Management custodial staff who maintain a core of specifically trained staff for this purpose.

## Environmental Management

Environmental concerns are addressed by Facilities Management and EHS, which oversees programs required under the [Clean Water Act](#), the [Clean Air Act](#), the [Resource Conservation and Recovery Act](#), the [Comprehensive Environmental Response, Compensation, and Liability Act](#), the [Superfund Amendments and Reauthorization Act](#), and the [Toxic Substances Control Act](#). The Departments also maintain the proper permits as may be required under these Acts.

## Research with Animals

The use of laboratory animals carries with it unique professional, ethical, and moral obligations. UA Little Rock is committed to ensuring that all institutional animal use is responsible, judicious, and humane. The UA Little Rock animal care and use program is in full compliance with the [Animal Welfare Act](#) (and its subsequent amendments) and the [Health Research Extension Act of 1985](#). Standards for housing and care of research animals at UA Little Rock meet or exceed these federal laws and guidelines. The UA Little Rock Basic Animal Services Unit is accredited by the [Association for the Assessment and Accreditation of Laboratory Animal Care, International](#) (AAALAC).

UA Little Rock utilizes the [United States Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training](#) guidelines for appropriate animal use in a research and teaching setting. UA Little Rock files an Assurance Statement with the National Institute of Health (NIH) [Office of Laboratory Animal Welfare](#) (OLAW) which assures our adherence to quality care and use principles in animal facilitated research and teaching. This document further demonstrates UA Little Rock's commitment to regulatory compliance in its animal care and use program. UA Little Rock's Animal Welfare Assurance Number is A-3313-01. UA Little Rock is registered with the United States Department of Agriculture (USDA) [Animal & Plant Inspection Service](#) (APHIS) as an approved research facility. UA Little Rock's USDA Certificate Number is 71-R- 0012.

Animal care and use is heavily regulated by the federal government, and it requires targeted, documented training for personnel involved in those activities. It is the responsibility of the institution and the [Institutional Animal Care and Use Committee](#) (IACUC) to ensure adequate training for personnel in topics pertinent to ongoing animal care and use programs. The UA Little Rock animal care and use program training and education modules provide a significant part of that material. These training modules are mandatory for anyone working with animals in research, training, or teaching. The USDA and the NIH's OLAW have ruled that training be "ongoing". Consequently, evidence of formal training in pertinent animal care and use will be required at a minimum of every 3 years.

UA Little Rock is committed to performing animal facilitated research in a humane and compliant manner. The UA Little Rock [IACUC](#) is empowered by the federal government to “review and if warranted, investigate concerns involving animal care and use resulting from public complaints, or reports of noncompliance from laboratory or research facility employees or personnel”.

### **Research with Microbiological Agents, Recombinant DNA, or Biological Toxins**

University research is permitted using microbiological agents, recombinant DNA, or biological toxins. Guidelines for this research are found in the [Biosafety in Microbiological and Biomedical Laboratories](#) (BMBL) as published by the Center for Disease Control (CDC)/NIH. All of the research falls under the requirements of Biosafety Level (BSL) 1. There are no research projects which fall under BSL2, BSL3, or BSL 4. The University currently has status with the CDC as having the potential for research using Select Agents. The CDC routinely inspects the University for compliance with the Public Health Security and Bioterrorism Preparedness Act and the Agricultural Bioterrorism Protection Act.

The [EHS Committee](#) (EHSC) provides a comprehensive and compliant Biosafety program for researchers, students, and potential human subjects. The EHSC is mandated by federal laws and regulations, and it is responsible for oversight of all activities involving research with microbiological agents, recombinant DNA, or toxins of biological origin.

The university provides adequate training and oversight for researchers who use infectious agents and/or rDNA. The [EHSC](#) performs the oversight function by reviewing proposed activities and approving Registration Documents for using infectious agents and/or rDNA. All personnel listed in the EHSC Registration Document as proposing to work with infectious agents and/or rDNA at UA Little Rock must complete the applicable training modules prior to final EHSC approval of the project. Facilities Management and EHS issues a Certificate of Completion of Training and maintains a permanent record of training in a database. The training is largely based on information found in the BMBL and [The NIH Guidelines for Research Involving Recombinant DNA Molecules](#).

The principle investigator (PI) or laboratory director is responsible for providing technical and agent specific training for all personnel using infectious agents or rDNA in their activity. It is also the responsibility of the PI or laboratory director to ensure that all new collaborators or employees that participate in a project using infectious or recombinant DNA agents complete the applicable EHS training modules. The training is in addition to any agent and/or technique/procedure specific training required from the P.I. or laboratory director. In addition, UA Little Rock’s Department of Public Safety follows procedures/policies set forth in the Emergency Action Plan to reduce a terroristic threat.

### **Facility Hazard Mitigation Equipment**

Each laboratory is equipped as necessary with fumes hood(s), biological safety cabinets, emergency showers and eye wash stations, fire extinguishers, emergency respirators, autoclaves, flammable storage cabinets, corrosive storage cabinets, gas storage safety cabinet, flammable storage and explosion proof refrigerators/freezers, radiation detectors and chemical detectors, and personal protective equipment, including laboratory coats, aprons, eye glasses or goggles, face shield, and chemical resistant gloves. Training for all equipment is the responsibility of the research department with assistance from Facilities Management and EHS.

### **Hazard Analysis**

Hazard analysis is performed on a case by case basis by the researcher. The properties of the materials and reagents to be utilized are reviewed. Accordingly, appropriate local measures and



procedures are enacted to minimize risks to safe levels. Investigators are responsible to provide all necessary personal protective equipment.

### **Environmental Health & Safety Committee**

The Environmental Health & Safety Committee (EHSC) acts as an umbrella committee to other safety committees to coordinate safety-related activities on campus. The committee serves to promote, create, and maintain a safe and healthful environment by conducting inspections for fire safety, industrial safety, and chemical safety in campus buildings. The committee makes policy as is appropriate. In addition to acting as an umbrella committee, the EHSC is responsibilities include the following:

1. Insuring that necessary educational programs on AIDS, ARC, and other communicable diseases are implemented, that these programs are up-to-date on current scientific information about the diseases, and that the university guidelines are carefully followed. This committee may recommend changes in the guidelines, policies, or procedures as medical, scientific, or legal changes take place in the future
2. Formulating and implementing University policies regarding the use of biohazardous materials including the practices for constructing and handling of recombinant DNA molecules as well as organisms and viruses containing recombinant DNA molecules, according to the U.S. Department of Health and Human Services. The committee also has the responsibility for oversight into the proposed use of infectious agents.
3. Formulating and implementing university policies regarding the use of human subjects in any research project performed by either university employees or students. Responsibilities include reviewing all protocols involving use of human subjects, independent of whether such project is funded, either by an internal or an external sponsor. Committee also serves as the Institutional Review Board established in compliance with federal regulations

### **Institutional Animal Care & Use Committee**

The Institutional Animal Care & Use Committee formulates policies governing laboratory animal care, advises on animal housing requirements, inspects animal care practices, and reviews all protocols involving the use of animals at the university. Committee also has responsibility for providing assurances to external agencies of compliance with federal regulations.

### **University Radiation Safety Committee**

The University Radiation Safety Committee formulates university policies and regulations concerning the acquisition, use, and disposal of radioactive materials as in accordance with the Arkansas Department of Health, License # ARK-421-BP-02-10. It is also responsible for radiation safety aspects of activities conducted under the university's Radioactive Materials License.

## **FALL PROTECTION**

### **Statement**

This safety program has been implemented to prevent employee injuries suffered as a result of falls while working on elevated surfaces.

### **Purpose**

The purpose of this program is to specify procedures and training for the safety of the University of Arkansas at Little Rock (UA Little Rock) employees while working on elevated surfaces and ladders. Employees are required to be familiar with UA Little Rock's fall protection program. Additionally, those employees working on aerial platforms, powered lifts, or other elevated platform equipment must receive training on the use of such equipment prior to use. Other possible hazards include but are not limited to the following:

1. Excavations

2. Leading edges
3. Open-sided floors
4. Uneven floors
5. Ramps
6. Roofs
7. Skylights
8. Ladders
9. Window ledges
10. Permit required confined spaces

### **Who Needs to Know**

This program applies to all UA Little Rock employees who perform duties on any elevated work surface and may be exposed to fall hazards during their daily activities.

The following exemptions exist where employees may be allowed to work without fall protection:

1. At the working sides of loading docks
2. At the exposed perimeters of theater stages
3. When using portable ladders up to 6 feet in length
4. When working on the edge of an excavation up to 6 feet in depth

Additionally, this program shall apply to all employees in order to minimize slips, trips, and falls on the same elevation. All employees shall control fall hazards in their work area by maintaining good housekeeping and shall report conditions that may lead to slips, trips, and falls to the appropriate supervisory personnel.

### **Responsibilities**

*Managers and Supervisors* are responsible for:

1. Ensuring that all requirements listed in the written program for fall protection are met
2. Ensuring new and existing employees are familiar with the fall protection program as applicable to their job duties
3. Identifying fall hazards with the assistance of Environmental Health & Safety (EHS)
4. Arranging for required training of University employees in fall protection and in the safe use of elevating personal platforms

*University Employees working at elevated locations* are responsible for:

1. Complying with the rules of operations and accepted safety practices outlined within this written program

The *Environmental Health & Safety Manager* is responsible for:

1. Conducting periodic visits to elevated work locations. The purpose of these visits is to inspect equipment and to observe employees' procedures while working at elevated levels.
2. Evaluating other elevated work locations identified by managers and supervisors for fall protection requirements
3. Providing general oversight of this program

### **Program Components**

The following work situations are covered by this program for fall protection:

1. *Ladders*: fixed, free standing, temporary, or roll away type
2. *Elevating Personal Platforms*: scaffolds, aerial platforms, scissors lifts, forklift- mounted platforms, cherry pickers, etc.
3. *Elevated Surfaces*: roofs (closer than 6 feet to the edge), catwalks, skylights, boilers, chillers, etc.
4. *Vertical Opening*: ground level entry into excavations, trenches, holes, pits, vessels, and other confined spaces

Fall protection is required whenever work is performed in an area 6 feet above its surroundings and can generally be provided through the use of fall protection systems including:

1. *Guardrails*: Standard guardrails consist of a top rail, located 42 inches above the floor, and a mid-rail. Screens and mesh may be used to replace the mid-rail, so long as they extend from the top rail to the floor.
2. *Personal Fall Arresting Systems*: Components of a personal fall arresting system include a body harness, lanyard, lifeline, connector, and an anchorage point capable of supporting at least 5000 pounds.
3. *Positioning Device Systems*: Positioning device systems consist of a body belt or harness rigged to allow work on a vertical surface, such as a wall, with both hands free.
4. *Warning Line Systems*: Warning line systems are made up of lines or ropes installed around a work area on a roof. These act as a barrier to prevent those working on the roof from approaching its edges.
5. *Covers*: Covers are fastened over holes in the working surface to prevent falls.

Where it can be clearly demonstrated that the use of these systems is infeasible or creates a greater hazard, alternative fall protection measures may be implemented.

### **Situation Specific Guidelines**

The following are guidelines for University employees using specific equipment:

#### *Ladders*

Employees who work on ladders shall be knowledgeable of the following:

1. How to inspect ladders for visible defects
2. How to use ladders properly

#### *Fall Arrest Systems*

Employees who use personal fall arresting systems to control fall hazards in their work area shall be knowledgeable of the following:

1. The application limits of the equipment
2. The proper hook-up, anchoring, and tie-off techniques including determination of elongation and deceleration distance
3. Methods of use, inspection, and storage of equipment

Personal fall arrest components including harnesses and lanyards shall be inspected prior to each use for mildew, wear, damage, and other deterioration. Defective components shall be removed from service. Fall arrest systems including harnesses shall be inspected at least twice each year or according to manufacturers' recommendations. Records shall be kept and maintained showing date of purchase, dates when attachments were renewed, and dates when the entire harness assembly was inspected and by whom. Each department/shop will be responsible for maintaining these records. Copies of these records should be forwarded to the Environmental Health and Safety Office.

#### *Aerial Lifts*

Employees who use aerial lifts shall be knowledgeable of the following:

1. The manufacturer's operating instructions
2. Pre-start inspection of the lift
3. Inspection of the work area for dangerous conditions such as uneven surfaces, overhead obstructions such as power lines, or other hazards
4. Load capacities of the equipment
5. How to safely move the equipment
6. How to prevent falls and use appropriate fall protection personal protective equipment
7. Minimum safe approach distances to energized power lines

### *All Working Surfaces*

All employees should be aware of the following guidelines to minimize slips, trips, and falls on the same elevation of walking/working surfaces:

1. To prevent slipping, tripping, and falling, all work environments including passageways, storerooms, and service areas must be kept clean, orderly, and in a sanitary condition.
2. The floor of every work area will be maintained in a clean and, so far as possible, dry condition.
3. Where wet processes are used, drainage will be maintained and false floors, platforms, mats, or other dry standing places are provided where necessary.

### **Reporting Requirements**

Constant awareness of and respect for fall protection procedures and compliance with all applicable safety rules of UA Little Rock is mandatory.

1. Representatives of Environmental Health and Safety are authorized to issue warnings to employees and stop unsafe work from continuing.
2. Supervisors may issue warnings and implement disciplinary actions for failure to follow the guidelines of this program.
3. Employees shall report any safety concerns to their supervisor and/or Environmental Health and Safety.

### **Training Requirements & Competency Assessment**

Under no circumstances will any university employee work in areas of high fall hazards, perform work requiring fall protection devices, or use fall protection devices until he/she has attended training in fall protection. This includes all new employees regardless of previous experience.

The training program includes but is not limited to:

1. The fall hazards in the workplace: how to identify hazards and how to report them
2. How hazards are to be controlled – engineering controls, administrative controls or fall protection systems
3. Policies and procedures for working around fall hazards
4. The written Fall Protection Program
5. Enforcement of rules and disciplinary action to be taken for noncompliance
6. Personal fall protection systems: how to use, maintain, and inspect

*Employees will require retraining under any of the following conditions:*

1. Changes in the workplace render previous training obsolete
2. Changes in the types of fall protection systems or equipment to be used render previous training obsolete
3. Inadequacies in an employee's knowledge of use of fall protection systems or equipment or observed behavior indicate that the employee has not retained the required training

*Documentation of training will be kept at the following location:*

Environmental Health and Safety  
UA Little Rock Facilities Management  
2801 S. University Avenue  
Little Rock, AR 72204

*Records should include the following information:*

1. Date of training
2. Employee printed name and signature
3. The agenda or a list of the topics covered

### **Program Evaluation**

The written Fall Protection Program will be evaluated on a continual basis and at least annually. All updates, changes, and additions will be documented and will be kept with the written program. When evaluating the program, the following items will be reviewed to measure the programs overall effectiveness:

1. Accident/incident reports
2. Medical records
3. Management/employee compliance
4. Recommendations
5. Inspections
6. Training records
7. Contractor guidelines
8. Administrative/Engineering controls

### Related Information

Fall Protection authority and references:

1. [OSHA 29 CFR 1926 Subpart M – Fall Protection](#)
2. [OSHA 29 CFR 1910 Subpart D – Walking and Working Surfaces](#)
3. [OSHA 29 CFR 1910 Subpart F – Powered Platforms, Vehicle-Mounted Platforms](#)
4. [OSHA 29 CFR 1926 Subpart L – Scaffolds](#)
5. [OSHA 29 CFR 1910.67 – Vehicle-Mounted Elevating and Rotating Work](#)
6. [Platforms OSHA 29 CFR 1926.453 – Aerial Lifts](#)

### Definitions

*Aerial Lift Device.* Equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extendable boom platforms, aerial ladders, articulating boom platforms, vertical towers, and powered industrial truck platforms.

*Anchor Point.* A secure point of attachment for lifelines, lanyards, or deceleration (grabbing) devices.

*Body Harness (also referred as Full-body harness).* An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

*Deceleration Device.* Any mechanism, such as a rope, grabbing device, rip stitch lanyard, specially woven lanyard, or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

*Deceleration Distance.* The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

*Designated Area.* A space which has a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves also to designate an area where work may be performed without additional fall protection.

*Fixed Ladder.* A ladder, including an individual rung ladder, which is permanently attached to a structure, building, or equipment.

*Guardrail.* A barrier at least 42 inches high erected to prevent personnel from falling from working levels more than 30 inches above the floor, ground, or other working areas of a building.

*Hole.* A void or gap 2 inches or more in its least dimension in a floor, roof, or other walking/working surface.

*Ladder.* A device typically used to gain access to a different elevation consisting of two or more structural members crossed by rungs, steps, or cleats.

*Lanyard.* A flexible line of rope or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchor point.

*Lifeline.* A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline) or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline). This serves as a means for connecting other components of a personal fall arrest system to the anchorage.

*Lower Levels.* Those areas or surfaces to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits tanks, material, water, equipment, structures, or portions thereof.

*Opening.* A gap or void 30 inches or more high and 18 inches or more wide in a wall or partition through which personnel can fall to a lower level.

*Personal Fall Arrest System.* A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

*Positioning Device System.* A body harness system rigged to allow an employee to be supported on an elevated vertical surface such as a wall and work with both hands free while leaning.

*Restraint Line.* A device that is attached between the employee and an anchorage to prevent the employee from walking or falling off an elevated surface.

*Roof.* Exterior surface on the top of a building.

*Rope Grab (grabbing device).* A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

*Scaffold.* Any temporary elevated or suspended platform, and its supporting structures, used for supporting employees or materials or both.

*Self-retracting Lifeline/Lanyard.* A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal movement and which, after onset of a fall, automatically locks the drum and arrests the fall (usually within two feet or less).

*Snap Hook.* A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released automatically, closes to retain the object. Only locking snap hooks are permitted.

*Standard Railing.* A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

*Tie-Off.* A procedure of connecting directly or indirectly to an anchorage point.

*Toe Board.* A low protective barrier that prevents material and equipment from falling to lower levels and which protects personnel from falling.

*Unprotected Sides and Edges.* Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 42 inches high.

*Vertical Lifeline.* A component consisting of a vertically hanging flexible line for connection to an anchor point at one end that serves as a means for connecting other components of a personal fall arrest system to the anchor point.

*Walking/Working Surface.* Any surface, whether horizontal or vertical, on which an employee walks or works including, but not limited to floors, roofs, ramps, bridges and, runways.

*Work Area.* That portion of a walking/working surface where job duties are being performed.

## **FORKLIFT SAFETY**

### **Introduction**

Material handling is a significant safety concern. During the movement of products and materials, there are numerous opportunities for personal injury and property damage if proper procedures and caution are not used. This program applies to all powered industrial trucks, including forklifts, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines. The information in this program and applicable standards should be used to train prospective industrial truck operators and provide the basis for refresher and annual retraining.

### **Responsibilities**

The *EH&S Director* is responsible for:

1. Developing, implementing, and administering the forklift safety program
2. Reviewing the forklift safety program annually and making recommendations for revisions if necessary
3. Ensuring that all employees who operate or work near forklifts are properly trained

*Supervisors* are responsible for:

1. Ensuring that their employees follow safe operating procedures when using forklifts

*Employees who operate forklifts* are responsible for:

1. Following the safe operating procedures specified in this program

### **Pre-qualifications for Powered Industrial Truck Operators**

All candidates for powered industrial truck (PIT) operators must meet the following basic requirements prior to starting initial or annual training:

1. Have a driver's license and good driving record
2. No adverse vision problems that cannot be corrected by glasses or contacts

3. No adverse hearing loss that cannot be corrected with hearing aids
4. No physical impairments that would impair safe operation of the PIT
5. No neurological disorders that affect balance or consciousness
6. Not taking any medication that affects perception, vision, or physical abilities

### **Training & Evaluation**

The EH&S Department will conduct training for powered industrial truck (PIT) operators. All operational training must be conducted under close supervision. All training and evaluation must be completed before an operator is permitted to use a PIT without continual and close supervision.

Trainees may operate a powered industrial truck only:

1. Under the direct supervision of persons, selected by the EHS Department Manager, who have the knowledge, training, and experience to train operators and evaluate their competence
2. Where such operation does not endanger the trainee or other employees

Training consists of a combination of formal instruction, practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

#### *Initial Training*

As specified in the [OSHA standard CFR 1910.178](#), PIT operators must receive initial training in the following *truck-related* topics:

1. Operating instructions, warnings, and precautions for the type of truck the operator will be authorized to operate
2. Differences between the truck and automobiles
3. Truck controls and instrumentation
4. Engine or motor operation
5. Steering and maneuvering
6. Visibility (including restrictions due to loading)
7. Fork and attachment adaptation, operation, and use limitations
8. Vehicle capacity
9. Vehicle stability
10. Vehicle inspection and maintenance that the operator will be required to perform
11. Refueling and/or charging and recharging of batteries
12. Operating limitations
13. Operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate

PIT operators must also receive initial training in the following *workplace-related* topics:

1. Surface conditions where the vehicle will be operated
2. Composition of loads to be carried and load stability
3. Load manipulation, stacking, and unstacking
4. Pedestrian traffic in areas where the vehicle will be operated
5. Narrow aisles and other restricted places where the vehicle will be operated
6. Hazardous (classified) locations where the vehicle will be operated
7. Ramps and other sloped surfaces that would affect the vehicles' stability
8. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
9. Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

#### *Refresher Training & Evaluation*



Refresher training, including an evaluation of the effectiveness of that training, must be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely. Refresher training in relevant topics must be provided to the operator in the following situations:

1. The operator has been observed operating the vehicle in an unsafe manner
2. The operator has been involved in an accident or near-miss incident
3. The operator has received an evaluation that reveals that the operator is not operating the truck safely
4. The operator is assigned to drive a different type of truck
5. A condition in the workplace changes in a manner that could affect safe operation of the truck
6. Once every three years, an evaluation will be conducted of each powered industrial truck operator's performance

### **Safe Operating Procedures**

1. Only authorized and trained personnel will operate powered industrial trucks (PITs).
2. All PITs will be equipped with a headache rack, fire extinguisher, rotating beacon, back-up alarm, and seat belts. The operator will wear seatbelts at all times.
3. The operator will perform daily pre- and post-trip inspections.
4. Any safety defects (such as hydraulic fluid leaks; defective brakes, steering, lights, or horn; and/or missing fire extinguisher, lights, seat belt, or back-up alarm) will be reported for immediate repair, or the PIT will be taken out of service.
5. Operators will follow the proper recharging or refueling safety procedures.
6. Loads will be tilted back and carried no more than six inches from the ground. Loads that restrict the operator's vision will be transported backwards.
7. PIT operators will obey plant speed limits and slow down on wet floors and going around turns.
8. PIT operators in high lift areas will wear hard hats.
9. Operator will sound the horn and use extreme caution when meeting pedestrians, making turns, and cornering.
10. Passengers may not ride on any portion of a PIT. Only the operator will ride PITs.
11. If PITs are used as a man lift, an appropriate man lift platform (cage with standard rails and toe-boards) will be used.
12. Aisles will be maintained free from obstructions, marked, and wide enough (six-foot minimum) for vehicle operation.
13. Lift capacity will be marked on all PITs. Operators will assure the load does not exceed rated weight limits.
14. When unattended, PITs will be turned off, forks lowered to the ground, and the parking brake applied.
15. All PITs (with the exception of pallet jacks) will be equipped with a multi-purpose dry chemical fire extinguisher.
16. Operators must report all accidents, regardless of fault and severity, to the supervisor.

### **Changing & Charging Storage Batteries**

1. Battery charging installations must be located in areas designated for that purpose.
2. Facilities must be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.
3. A conveyor, overhead hoist, or equivalent material handling equipment must be provided for handling batteries.
4. Reinstalled batteries must be properly positioned and secured in the truck.
5. A carbon filter or siphon must be provided for handling electrolyte.

6. When charging batteries, acid must be poured into water. Water must not be poured into acid.
7. Trucks must be properly positioned and brake applied before attempting to change or charge batteries.
8. Care must be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) must be open to dissipate heat.
9. Smoking is prohibited in the charging area.
10. Precautions must be taken to prevent open flames, sparks, or electric arcs in battery charging areas.
11. Tools and other metallic objects must be kept away from the top of uncovered batteries.

### **Operations**

1. If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck must be taken out of service until it has been restored to safe operating condition.
2. Trucks must not be driven up to anyone standing in front of a bench or other fixed object.
3. No person will be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
4. Unauthorized personnel may not ride on powered industrial trucks.
5. Arms or legs may not be placed between the uprights of the mast or outside the running lines of the truck.
6. When a powered industrial truck is left unattended, load engaging means must be fully lowered, controls neutralized, power shut off, and brakes set. Wheels must be blocked if the truck is parked on an incline.
7. A safe distance must be maintained from the edge of ramps or platforms while on any elevated dock, platform, or freight car. Trucks must not be used for opening or closing freight doors.
8. There must be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
9. An overhead guard must be used as protection against falling objects. An overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
10. A load backrest extension must be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.
11. Trucks must not be parked so as to block fire aisles, access to stairways, or fire equipment.

### **Traveling**

1. The driver must slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver must travel with the load trailing.
2. The driver must look in the direction of and keep a clear view of the path of travel.
3. Grades must be ascended and descended slowly. When ascending or descending grades in excess of 10 percent, loaded trucks must be driven with the load upgrade. On all grades, the load and load engaging means must be tilted back if applicable, and raised only as far as necessary to clear the road surface.
4. Under all travel conditions the truck must be operated at a speed that will permit it to be brought to a stop in a safe manner.
5. Stunt driving and horseplay are prohibited.
6. The driver must slow down on wet and slippery floors.

7. Dock board or bridge plates must be properly secured before they are driven over. Dock board or bridge plates must be driven over carefully and slowly and their rated capacity never exceeded.
8. Avoid running over loose objects on the roadway surface.
9. While negotiating turns, reduce speed to a safe level by turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel must be turned at a moderate, even rate.

### **Loading**

1. Only stable or safely arranged loads can be handled. Exercise caution when handling off-center loads that cannot be centered.
2. Only loads within the rated capacity of the truck can be handled.
3. Only loads within the rated capacity of the truck can be handled.
4. Trucks equipped with attachments must be operated as partially loaded trucks when not handling a load.
5. A load engaging means must be placed under the load as far as possible. The mast must be carefully tilted backward to stabilize the load.
6. Use extreme care when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated is prohibited except to pick up a load. An elevated load may not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

### **Fueling Safety**

1. Fuel tanks may not be filled while the engine is running. Avoid spillage.
2. Spillage of oil or fuel must be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.
3. No truck can be operated with a leak in the fuel system until the leak has been corrected.
4. Do not use open flames for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

### **Maintenance**

1. Any power-operated industrial truck not in safe operating condition must be removed from service. Authorized personnel must make all repairs.
2. Those repairs to the fuel and ignition systems of industrial trucks that involve fire hazards must be conducted only in locations designated for such repairs.
3. Trucks in need of repairs to the electrical system must have the battery disconnected before such repairs.
4. Only parts equivalent as to safety with those used in the original design must replace all parts of any such industrial truck requiring replacement.
5. Industrial trucks must not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer. They also cannot be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts. Additional counter-weighting of fork trucks must not be done unless approved by the truck manufacturer.
6. Industrial trucks must be examined before being placed in service, and must not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination must be made at least daily. Where industrial trucks are used on a round-the-clock basis, they must be examined before each shift. Any defects must be immediately reported and corrected.
7. When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle must be removed

from service and not returned to service until the cause for such overheating has been eliminated.

8. Industrial trucks must be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 degrees F) solvents must not be used. High flash point (at or above 100 degrees F) solvents may be used.

## **LADDER SAFETY**

### **Purpose**

The purpose and scope of this document is to put forth the regulations regarding Ladder Safety procedures and training at UA Little Rock. [OSHA regulation CFR 1926, 1050-1060 Subpart X](#) contains specific information on these rules.

### **Scope**

All employees or students who might be expected to use a ladder during the course of work should be familiar with this document. This standard operating procedure covers all types of ladders, including step, extension, and fixed ladders. Ladder users must be able to recognize and avoid ladder hazards and be aware of safe practices in setting up, storing, moving, and working from this equipment.

### **Responsibilities**

*Supervisors, Department Managers, Faculty, and Staff\** are responsible for:

1. Assuring that all staff and students at UA Little Rock who may use a ladder read and understand this document
2. Assuring that all ladders being used at UA Little Rock are free from defects and that all the moving parts are working properly
3. Maintaining records on departmental ladder training

*Environmental Health and Safety (EH&S)* is responsible for:

1. Providing basic ladder training safety information to all departments in need of that training
2. Maintaining records of EH&S Ladder Safety training sessions when they occur

\* Refers to Supervisors, Department Managers, Faculty, and Staff who have employees or students under their supervision who may have occasion to use any type of ladder during the performance of the work.

### **Definitions**

*CFR.* Code of Federal Regulations

*Ladder Categories.*

1. Type IA-300 pounds extra heavy duty
2. Type I-250 pounds, heavy duty
3. Type II-225 pounds, medium duty
4. Type III-200 pounds, light duty

*Fixed Ladder.* A ladder that cannot be easily moved or carried, and may be an integral part of a structure

### **Policy**

1. All UA Little Rock employees and students who use ladders should have Ladder Safety Training.
2. Ladder Safety Training will consist of recognition of possible hazards associated with ladder use, proper maintenance and safety precautions to be taken when using ladders.

3. All employees and students who use ladders at UA Little Rock must inspect them for defects or possible hazards before the ladders are used. Ladders with loose parts or faulty rungs should be taken out of service immediately.
4. Ladders that are taken out of service should be tagged “Defective” and removed from the work area.
5. Whenever possible have someone within shouting distance while on a ladder.

#### *Safe Ladder Setup*

1. All ladders must be placed on firm ground.
2. Do not set ladders on boxes, blocks or other objects that might move.
3. Do not lean or reach out while standing on ladders.
4. Secure ladders whenever a danger of slippage might occur.
5. Do not use ladders in high wind or during inclement weather conditions.
6. Never set up ladders in front of or around doors unless the door is posted or locked.
7. Do not sit on ladders.
8. Use safety shoes or other rubber sole shoes when climbing a ladder.

#### *Climbing and Standing on Ladders Safely*

1. Always face a ladder when climbing up or down.
2. Avoid carrying materials or tools when climbing a ladder. Climb the ladder first then pull up the materials with a rope.
3. Rungs and steps should be clear of grease, oil, wet paint, snow, and ice before climbing.
4. Do not climb onto a ladder from the side.
5. Do not slide down a ladder.
6. Climb or stand on a ladder with your feet in the center of the rung.
7. Do not stand on the top rung or step of a ladder.

#### *Proper Use and Care of Ladders*

1. Never use metal ladders near exposed electrical wires.
2. Place warning signs or setup barriers around a ladder before use.
3. Do not move a ladder while someone is on it.
4. Never use a ladder when under the influence of alcohol or prescription medications.
5. Do not leave tools or materials on top of ladders.
6. Only one person should be on a ladder at a time.
7. Do not use a ladder on a scaffold.
8. Do not try to rock a ladder to move it.
9. Store wood ladders where they will not be exposed to the elements.
10. Make sure ladders are properly secured when transported.
11. Do not paint wood ladders. Painting could hide potentially dangerous defects.
12. Remove defective ladders from service.

#### *Step Ladder Safety*

1. Never use a stepladder over 20 feet in length.
2. Always open a stepladder completely and make sure the spreader is locked before use.
3. Do not stand higher than the second step from the top of a step ladder.
4. Do not straddle a stepladder.

#### *Extension Ladder Safety*

1. The sections of an extension ladder should overlap enough to retain the strength of the ladder (see Table 1A).
2. Never splice or tie two short ladders together.

3. When using a ladder for access to a landing, it must extend 3 rungs or 3 feet above the landing.
4. The top of an extension ladder should rest against a flat, firm surface.
5. Elevate and extend these extension ladders only from the ground.
6. When practical, secure extension ladders at both the base and the top.

*Extension Ladder Setup*

1. Lay the ladder on the ground when it is collapsed.
2. Have someone foot the ladder or make sure it is braced against something.
3. Pick up the ladder, and walk it to an upright position, making sure it will not be obstructed by trees or wires.
4. Slide the bottom of the ladder outwards to the proper angle and set the feet correctly.
5. Then extend the ladder by pulling the extension line.
6. Make sure the rungs on the upper half of the ladder are properly secured by the locking mechanism.
7. If possible, tie the ladder off or have someone steady the ladder as you climb it.

*Fixed Ladder Safety*

1. Fixed ladders must be secured to the object they are attached to.
2. Fixed ladders over 20 feet must have a safety cage surrounding the ladder.
3. The safety cage should have 15" clearance to all points from the center.
4. Defects in fixed ladders should be repaired as soon as possible.
5. When a defect is not repairable, the ladder must be taken out of service.

Table 1A

Length of Ladder	Required Overlap
Up to 36'	3 Feet
Over 36' to 48'	4 Feet
Over 48' to 60'	5 Feet

**LOCKOUT-TAGOUT**

**Scope**

This program specifically outlines the purpose, authorization, rules, and techniques to be utilized by UA Little Rock employees on a daily basis to guard against the unexpected energizing, start-up, or release of stored energy, which could cause injury. It shall be the duty of each employee to become familiar with the contents of this program and ensure compliance with its procedures. Heads of departments shall ensure that employees under their supervision receive training in the contents of this program and ensure records of this training are maintained.

**Purpose**

The purpose of this program is to establish procedures for affixing appropriate lockout or tagout devices to energy-isolating devices and to otherwise disable machines or equipment to prevent

unexpected energizing, start-up or release of stored energy in order to prevent injuries to employees.

## Definitions

*Affected Employee.* An employee whose job requires them to operate or use a machine or piece of equipment on which servicing is being performed under lockout or tagout or whose job requires them to work in an area in which such servicing or maintenance is being performed.

*Authorized Employee.* A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or piece of equipment which must be locked or a tagout system implemented.

*Energy Source.* Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

*Lockout.* The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

*Lockout Device.* A device that utilizes a positive means, such as a lock, to hold an energy-isolating device in the safe position and prevent the energizing of a machine or piece of equipment.

*Normal Production Operations.* The utilization of a machine or piece of equipment to perform its intended production function.

*Primary Authorized Employee.* The authorized employee who has been vested with responsibility for a set number or group of employees performing service or maintenance on machines or equipment subject to lockout or tagout procedures.

*Servicing and/or Maintenance.* Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment, and making adjustments or tool changes where the employee may be exposed to the unexpected energizing, start-up of the equipment, or release of hazardous energy.

*Tagout.* The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed.

## Authorizations

A designated UA Little Rock representative may authorize the use of this program by any and all facilities, departments, and individuals associated with the control of hazardous energy on any designated UA Little Rock campus.

Department Heads or Supervisors will implement the program and ensure that the personnel under their supervision are trained in accordance with the procedures established herein. This responsibility may be delegated to another person or persons within the department providing it


is done so in writing and the designated person is qualified and competent. This person will authorize employees to implement the locking and tagging system procedure.

*An employee who has been authorized by his or her department head or supervisor as the designated individual shall lock or implement a tagout system procedure on machines or equipment to perform servicing or maintenance or on a machine which the unexpected energizing, or start-up of the machine or equipment, or release of stored energy could cause injury.*

## Rules

1. Each department utilizing the UA Little Rock program for the control of hazardous energy shall establish and document site-specific procedures for energy isolation. Specialized lockout devices shall be obtained and kept within the department for its use.
2. If an energy-isolating device is capable of being locked out, the authorized employee shall utilize lockout unless the department head, supervisor, or their designated representative can demonstrate that utilization of a tagout system will provide full employee protection.
3. When a tagout device is used on an energy-isolating device, which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached.



4. A standard tag as suggested by the illustration at  right shall accompany lockout devices used for the implementation of this program.
5. These devices shall be used for no other purpose than lockout and shall be substantial enough to prevent removal without the use of excessive force or unusual techniques. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.
6. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.
7. The Environmental Health & Safety (EHS) office or designated representative shall conduct periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of [29 CFR 1910.147\(c\)\(6\)](#) are being followed.

## Training

The department heads, supervisors, or their designated representatives are required to ensure training is provided for the purpose and function of the energy control program are understood by employees. Through training, employees will be required to possess the knowledge and



skills required for safe application, usage, and removal of energy controls. Training shall include the following:

1. Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
2. Each affected employee shall be instructed in the purpose and use of the energy control procedure.
3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized shall be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked-out or tagged-out.

When tagout systems are used, employees shall also be trained in the following limitations of tags:

1. Tags are essentially warning devices affixed to energy-isolating devices and do not provide the physical restraint on those devices that is provided by lockout.
2. When a tag is attached to an energy-isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
3. Tags must be legible and understandable by all employees whose work operations are or may be in the area in order to be effective.
4. Tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.
5. Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
6. Tags must be securely attached to energy-isolating devices so that they cannot be inadvertently or accidentally detached during use.

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or process that presents a new hazard, or when there is a change in energy control procedures. Retraining shall establish employee proficiency and introduce new or revised control methods and procedures as necessary. The department heads, supervisors, or their designated representatives shall certify that employee training has been accomplished and is being kept up-to-date. The certification shall contain each employee's name and dates of training.

### **Techniques**

*Implementation of the lockout or tagout system shall be performed only by authorized employees.* Affected employees shall be notified by department heads, supervisors, or their designated representatives of the application and removal of lockout or tagout devices. Notification shall be given before the controls are applied and after they are removed from the machine or equipment.

The established procedure for the application of energy control shall cover the following elements and actions and shall be done in the following sequence:

1. *Preparation for shutdown.* Before an authorized or affected employee turns off a machine or piece of equipment, they shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
2. *Machine or equipment shutdown.* An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of equipment de-energizing.

3. *Machine or equipment isolation.* All energy- isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
4. *Lockout or tagout device application.* Authorized employees shall affix lockout or tagout devices to each energy-isolating device. Lockout devices, where used, shall be affixed in a manner that will hold the energy in a “safe” or “off” position. Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy-isolating devices from the “safe” or “off” position is prohibited.
  - a. Where tagout devices are used with energy- isolating devices designed with the capability of being locked, the tag shall be fastened at the same point at which the lock would have been attached.
  - b. Where a tag cannot be affixed directly to the energy-isolating device, the tag shall be located as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.
5. *Stored Energy.* Following the application of lockout or tagout devices to energy-isolating devices, all potentially hazardous stored energy shall be rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.
6. *Verification of Isolation.* Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energizing of the machine or equipment has been accomplished.
7. *Release from Lockout or Tagout.* Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:
  - a. *The Machine or Equipment.* The work area shall be inspected to ensure that nonessential items have been removed and that machine or equipment components are operationally intact.
  - b. *Employees.* The work area shall be checked to ensure that all employees have been safely positioned or removed. Before lockout or tagout devices are removed and before machines or equipment are energized, affected employees shall be notified.
8. *Lockout or Tagout Device Removal.* Each lockout or tagout device shall be removed from each energy-isolating device by the employee who applied the device. When the authorized employee who applied the lockout or tagout device (installer) is *not* available to remove it, that device may be removed *under the direction of the installer’s immediate supervisor*. Specific training and procedures for such removal shall be provided by each department involved in lockout or tagout operations. The procedures and training shall be documented. The documentation shall demonstrate that safety equivalent to the original process of having only the installer remove the device is maintained. The specific procedure shall include at least the following elements:
  - a. Verification by the immediate supervisor that the employee who applied the device is not at the facility
  - b. Making all reasonable efforts to contact the authorized employee to inform them that his/her lockout or tagout device has been removed
  - c. Ensuring that the authorized employee has this knowledge before they resume work at the facility
9. *Testing or Positioning of machines, equipment, or components thereof.* In situations where lockout or tagout devices must be temporarily removed from the energy-isolating device and the machine or equipment energized to test or position the equipment or component thereof, the following sequence of actions shall be followed:
  - a. Clear the machine or equipment of tools and materials.
  - b. Remove employees from the machine or equipment area.

- c. Remove the lockout or tagout devices.
  - d. Energize and proceed with testing or positioning.
  - e. De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance.
10. *Outside Personnel (contractors, etc.)*. Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this program, the designated UA Little Rock representative and the outside employer shall inform each other of their respective lockout or tagout procedures. The designated UA Little Rock representative shall ensure that his/her personnel understand and comply with restrictions and prohibitions of the outside employer's energy control procedures. If the outside employer has no documented lockout or tagout procedures, they shall ensure that their personnel understand and comply with the procedures established in this program.
11. *Group Lockout or Tagout*. When servicing and/or maintenance is performed by a crew or department, they shall utilize a procedure that affords their employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. This shall be accomplished by:
- a. The application of a multi-lock accepting device by the primary authorized employee to the energy- isolating device
  - b. The primary authorized employee attaching his/her lock to the multi- accepting device
  - c. Each authorized employee shall affix a personal lockout or tagout device to the multi-lock accepting device when they begin work and shall remove those devices when they stop working on the machine or equipment being serviced or maintained.
  - d. The primary authorized employee removing his/her lock and the multi-lock accepting device when all service or maintenance has been completed
12. *Shift or Personnel Changes*. To insure the orderly transfer of lockout or tagout devices between shift changing employees and minimize exposure to hazards from unexpected energizing, start-up of the machine or equipment, or release of stored energy, these procedures shall be followed:
- a. The on-coming personnel shall notify the off-going personnel that they are ready to begin work on the machine or equipment.
  - b. All lockout and/or tagout devices attached to the machine or equipment by the off-going personnel shall be removed and immediately replaced with like devices by the on-coming authorized personnel.
  - c. The primary authorized employee shall insure that all pertinent co-ordination between shift changing personnel has been completed before the on-coming authorized personnel begin work on the machine or equipment and that all necessary energy has been rendered safe.

## **MACHINE GUARDING**

### **Purpose**

This policy document is designed to ensure that UA Little Rock employees and students follow procedures which assure that equipment or machines are operated safely and meet state, federal, and industry machine guarding standards.

### **Application**

This policy applies to all employees and students who may work with, or adjacent to, equipment or machines that may pose a safety hazard. "Machines" include, but are not limited to, fans, compressors, bench grinders, fuel pumps, dumpsters, trash compactors, and table saws. Any machine part, function, or process that may cause injury must be safeguarded. When the operation of a machine or accidental contact with it can injure the operator or others in the vicinity, the hazards must be either controlled or eliminated. A "machine hazard" occurs at the

point of operation where the actual work is performed and can be created by: components which transmit energy, such as pulleys, belts, chains, gears, couplings, or flywheels; or other parts which move while the machine is working, including reciprocating, rotating, and transverse parts.

### **Responsibilities**

*Environmental Health and Safety (EHS)* is responsible for:

1. Developing policies for ensuring that guards are on facility equipment and machines operated by Facilities Management
2. Preparing and updating the written Machine Guarding Policy
3. Responding to any employee or student machine guarding concern or question

*Personnel* are responsible for:

1. Knowing, understanding, and applying these policies to ensure that safeguards are kept in place and used as originally designed by the manufacturer

*Lab and Shop Supervisors* are responsible for:

1. Overseeing daily activity and ensuring that all equipment meets operational safety standards
2. Ensuring guards on machines operated by personnel or students under their supervision are kept in place and used as originally designed

*Operators of Machines and Equipment* are responsible for:

1. Inspecting safety guards and the general safe operating condition of all machines, tools, and equipment prior to each use

*All Affected Employees and Students* are responsible for:

1. Reporting any unguarded machine hazard to their supervisor immediately
2. Forwarding any student concerns or observations regarding the lack of machine guarding to their supervisor

### **Hierarchy of Guarding**

Machine guarding decisions should be made in the following order of preference:

1. Design out or eliminate the hazard.
2. Physically “engineer out” the exposure to the hazard.
3. Guard the hazard – Require personal protective equipment.
4. Use warning devices, or make the danger “manifest”.
5. Use warning signs.
6. Use safe working practices and procedures.

### **Inspections & Audits**

Machines that require guarding will be inspected regularly by Environmental Health & Safety (EHS). Based on the results of these inspections, maintenance or replacement of guards will be conducted as necessary. EHS will audit the program annually and recommend appropriate corrective actions.

### **Training**

Any person who works near or adjacent to any sort of machine will receive necessary training before he or she can begin operating machinery. Affected employees receive machine guarding training specific to the hazards being controlled on the piece of equipment. The shop supervisor must train students in using machines. Employees performing maintenance related activities will receive machine guarding training on an annual basis.

### **Record Keeping**

EHS maintains records of machine guarding training and copies of the annual inspection checklists.

## Key References

The following references may be obtained from Environmental Health & Safety or online:

1. [OSHA Machine Guarding Standard — 29 CFR 1910.212](#)
2. [See Lockout/Tagout section](#)

## **MOTOR VEHICLE OPERATION**

### **Purpose**

The purpose is to establish standards for the safe use and operations of a Golf Cart/Utility Vehicle on UA Little Rock premises.

### **Background**

Departments at UA Little Rock provide Golf Cart/Utility Vehicles to employees so job related duties can be fulfilled. Golf Cart/Utility Vehicles are used to transport equipment and people, patrol the campus grounds, make deliveries, and provide campus maintenance activities. This policy establishes consistent procedures regarding the following:

1. Vehicle Operating Procedures
2. Supervisors Responsibilities
3. Department and Driver Responsibilities
4. Operator Requirements
5. Golf Cart/Utility Vehicle Condition and Standard Safety Features
6. Accident Reporting

Compliance with these standards will ensure the safe operation of these vehicles for the campus community; including but not limited to Golf Cart/Utility Vehicle drivers, vehicle operators, cyclists and pedestrians.

### **Policy**

Golf Cart/Utility Vehicles owned by UA Little Rock may only be used for official department/university business by university employees, student employees, and university approved volunteers associated with a university department. Golf Cart/Utility Vehicles may not be used for personal business. If operated on a city street, knowledge of and compliance with applicable City of Little Rock laws, rules, regulations and policies regarding use are the responsibility of the driver; noncompliance may result in citation and/or suspension of user privileges.

### **Vehicle Operating Standards**

1. In order to operate a Golf Cart/Utility Vehicle, employees must be trained. The Golf Cart/Utility Vehicle training program will be provided by Environmental Health and Safety with assistance from the Motor pool.
2. Golf Cart/Utility operators are subject to the rules of the road, including stopping, turning, and safe operation. Golf Cart/Utility Vehicle operators observed in violation of these rules can be cited.
3. Drivers must have a valid Arkansas Driver's license with a satisfactory driving record and an updated driver's authorization on file with no major traffic offenses.
4. Golf Cart/Utility Vehicles are to be operated at speeds no greater than 10 MPH or as safety concerns demand. Operators should always consider the terrain, weather conditions, and existing pedestrian and vehicular traffic, which may affect the ability to operate the Golf Cart/Utility Vehicle Safely.
5. Golf Cart/Utility Vehicle operators will stop at all "blind intersections" and then proceed with caution.
6. Golf Cart/Utility Vehicles will be operated only within the confines of University property.
7. Golf Cart/Utility Vehicles are to be driven on an improved surface unless a non-improved surface is the only available way to gain access to the specific area where work is being performed. If the Golf Cart/Utility Vehicle must be on a landscaped area in order to allow a

pedestrian(s) the proper right of way, it should be brought to a full stop, then immediately returned to the designated driving surface as soon as the area is clear.

8. Golf Cart/Utility Vehicles will be operated in such a manner that does not impede or interfere with normal pedestrian or vehicular traffic flow on sidewalks, ramps, or roadways. In that respect, Golf Cart/Utility Vehicles will be operated on service roads and perimeter sidewalks whenever possible rather than on internal campus sidewalks designed primarily for pedestrian use.
9. Golf Cart/Utility Vehicles will be operated with the utmost courtesy, care, and consideration for the safety of pedestrians.
10. Pedestrians will be given the right-of-way at all times.
11. Golf Cart/Utility Vehicles that are equipped with the manufacturer's seat belt will be utilized by both the operator and passenger.
12. Golf Cart/Utility Vehicles will not be parked:
  - a. In fire lanes
  - b. In metered parking spaces
  - c. In reserved parking
  - d. Within 20 feet of the main entrance/exit of any building in any manner that would impede the normal flow of pedestrian traffic
  - e. On sidewalks or ramps that would impede handicap accessibility

### **Supervisor Responsibilities**

1. Supervisors will assure that each employee in their department, who operates a Golf Cart/Utility Vehicle, is properly advised of this policy.
2. Supervisors are responsible for obtaining a signed copy of the Golf Cart/Utility Vehicle Safety Guidelines [Acknowledgement Sheet](#) from each employee in their department who operates a Golf Cart/Utility Vehicle, attesting to the employee's knowledge and understanding of, and agreement to abide by, the Golf Cart/Utility Vehicle policy. This signed Acknowledgement Sheet must be completed and maintained by the Supervisor and a copy provided to EHS.
3. Drivers must have a valid drivers' license with a satisfactory driving record and an updated drivers' authorization on file with the HR Coordinator.
4. If an accident or incident occurs and once other priority notifications have been completed, notify EHS as soon as possible.

### **Operator Requirements**

1. No one under the age of eighteen (18) may operate a Golf Cart/Utility Vehicle.
2. Golf Cart/Utility Vehicle operators are responsible for the security of ignition keys during the time a Golf Cart/Utility Vehicle is assigned to them. Any time a Golf Cart/Utility Vehicle is unattended, the ignition will be turned off, and the key will be removed from the ignition and kept in the possession of the authorized operator.
3. Golf Cart/Utility Vehicle operators are not permitted to drive while under the influence of alcohol or drugs, with open beverage containers, or while wearing devices that impede hearing, e.g., stereo headsets, earplugs, etc.
4. All passengers must be in seats designed for such use. No passengers are allowed to be transported in the beds or on the sides of Golf Carts/Utility Vehicle with the exception of the transport of an injured person on a backboard.
5. Cell phone usage while driving a Golf Cart/Utility Vehicle is strictly prohibited unless responding to an emergency (use caution and speaker phone if feasible).
6. When the Golf Cart/Utility Vehicle is not in use, make sure to engage the parking brake.

### **Golf Cart/ Utility Vehicle Condition and Standard Safety Features**

1. Golf Cart/Utility Vehicles owned by the University will be equipped and maintained with working headlights and taillights, if equipped.

2. Golf Cart/Utility Vehicles that do not have any lights will only be operated during the daylight hours.
3. Golf Carts/Utility Vehicles should be in good working condition.
4. Reflective tape will be placed on the front and rear bumpers for easier visibility at night. Golf Cart/Utility Vehicles will not be modified in any manner that affects the recommended mode of operation, speed, or safety of the Golf Cart/Utility Vehicle.

### **Accident Reporting**

1. All accidents involving a Golf Cart/Utility Vehicle will be reported immediately to the supervisor of the department to which the Golf Cart/Utility Vehicle is assigned, regardless of whether property damage or personal injury occurred.
2. The Environmental Health and Safety Office will investigate accidents and incidents.
3. Upon completion of the investigation, depending on the severity, the driver may lose all privileges to operate Golf Cart/Utility Vehicles on campus.

### **Golf Cart/Utility Vehicle Maintenance Responsibility**

1. Each Golf Cart/Utility Vehicle operator is responsible for providing timely notification of safety and maintenance concerns to the supervisor of the department to which the Golf Cart/Utility Vehicle is assigned.
2. Each Golf Cart/Utility Vehicle operator is responsible for performing weekly checks before putting the Golf Cart/Utility Vehicle into operation. This checklist will be maintained with the Golf Cart/Utility Vehicle at all times.

### **Safety Checklist**

Before operating the cart/vehicle at the beginning of each shift, the operator will check the following items:

1. Proper tire condition and inflation
2. Proper operation of brakes
3. Indication of battery fluid leaks such as wet spots under the unit; for gas operated carts, verify that the correct amount of fluids are in the cart and that there are no leaks.
4. If the cart is in need of repair or maintenance, it should not be driven.

### **Battery Recharge**

When recharging the batteries, the following safety rules shall be observed:

1. Only an approved battery charger will be used to recharge the batteries (designed to shut off automatically when the batteries are fully charged).
2. Do not recharge near an open flame or source of ignition.
3. Pour baking soda on all spilled battery acid before cleaning up the spill. You should wash skin thoroughly with cold water if it comes in contact with battery acid.
4. Disconnect all battery charger cords before using the cart.

### **Training**

Methods of training may include any combination of hands-on training, email distribution, and video. Training will be coordinated by Environmental Health & Safety with the affected departments.

1. *Student Workers*: Upon implementation of this policy, all student workers must receive training via hands-on and/or a video presentation. Thereafter, returning student workers will be required to review the policy and sign the [Acknowledgement Sheet](#). All sheets shall be maintained by Environmental Health & Safety.
2. *Faculty & Staff*: The entire Faculty and Staff shall be provided a copy of the policy via email upon implementation of this policy and annually thereafter. In departments where carts are used on a regular basis, additional training using the video and/or hands-on training is recommended.

See the UA Little Rock System Vehicle Safety Program found under the Vice Chancellor for Finance and Administration's webpage, located here:

<https://ualr.edu/vcfa/university-of-arkansas-system-vehicle-safety-program/>

Click below to find the "AUTHORIZATION TO OPERATE STATE VEHICLES AND PRIVATE VEHICLES ON STATE BUSINESS"

<chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/https://ualr.edu/vcfa/files/2013/07/Authorization-to-Operate-a-Motor-Vehicle-PDF-FILL-IN-May-2017.pdf>

## **POWERTOOL SAFETY**

### **Purpose**

The purpose of this policy is to outline The Power Tool Safety Policy in accordance with OSHA regulations cited below.

### **Policy**

It is the policy of the University to notify all affected employees of the elements of the Power Tool Safety program and to expect those employees to follow safe practices when using power tools.

### **Responsibility**

Each department shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees.

### **Program**

Environmental Health & Safety (EHS) is requesting that the person in charge of power tools within their departmental shops implement a safety training program featuring the following elements:

1. *Shop Regulations.* Regulations will include hours that shop may be used, persons permitted to use equipment, supervision required, recommended personal protective equipment, and any other pertinent information regarding the safe operation of the tools and equipment within the shop. A copy of the regulations should be posted in the shop and used as part of your training program.
2. *Employee/Student Training.* All employees and students should receive instruction on shop regulations and the safe use of each power tool. Train employees to select the right tools for each job. The training should be conducted on an annual basis for employees and each semester for students. No persons should be permitted to use any power tools until they have received such training. The tool's operation manual should be made available to employees/students. The Office of Risk Management is available to conduct power tool safety training.
3. *Training/Documentation.* All students/employees must sign an Acknowledgement Training Form after receiving training. The original copy should be maintained by the trainer and a second copy forwarded to Risk Management.
4. *Inspection/Maintenance.* Tools shall be inspected at regular intervals and shall be repaired in accordance with the manufacturers' specification. Before using a tool, the operator shall inspect it to determine that all operating moving parts operate and that is clean. Power tools shall be maintained in accordance with the manufacturer's specifications.
5. *Inventory Form.* The Office of Risk Management has developed a power tool inventory form to assist departments in listing their tools.



## Regulations

[OSHA 29 CFR 1910.242 – Hand and Portable Powered Tools and Other Hand-Held Equipment](#)

[OSHA 29 CFR 1910.243 – Guarding of Portable Powered Tools](#)

[OSHA 29 CFR 1910.244 – Other Portable Tools and Equipment](#)

## **PERSONAL PROTECTIVE EQUIPMENT**

### Introduction

Personal protective equipment (PPE) for the eyes and face is designed to prevent or lessen the severity of injuries to workers. The employer must assess the workplace and determine if hazards that necessitate the use of eye and face protection are present, or are likely to be present, before assigning PPE to workers. If such hazards are present, the employer shall adhere to OSHA CFR [1910.132d](#) when selecting PPE equipment.

### Hazard Assessment

A hazard assessment should determine the risk of exposure to eye and face hazards, including those which may be encountered in an emergency. Employers should be aware of the possibility of multiple and simultaneous hazard exposures and be prepared to protect against the highest level of each hazard in accordance with OSHA CFR [1910 Subpart I App B](#). Below is a hazard assessment table adopted from OSHA.

Hazard Type	Example of Hazard	Common Related Tasks
Impact	Flying objects such as large chips, fragments, particles, sand, and dirt	Chipping, grinding, machining, masonry work, wood working, sawing, drilling, chiseling, powered fastening, riveting, and sanding
Heat	Anything emitting extreme heat	Furnace operations, pouring, casting, hot dipping, and welding
Chemicals	Splash, fumes, vapors, and irritating mists	Acid and chemical handling, degreasing, plating, and working with blood
Dust	Harmful dust	Woodworking, buffing, and general dusty conditions
Optical Radiation	Radiant energy, glare, and intense light	Welding, torch-cutting, brazing, soldering, and laser work

### Classes of PPE

Use of an appropriate ensemble of personal protective equipment (PPE) creates a second line of defense against exposure to hazardous chemicals. Engineering controls, such as fume hoods and other ventilation devices, are used to create a first line of defense. When engineering controls are not adequate to minimize exposures to acceptable levels, UA Little Rock departments must provide employees with adequate PPE. Components selected for an adequate ensemble of PPE vary with the route and degree of exposure and nature of the contaminant. General classes of PPE, with specific examples, are discussed below. Upon request, EHS will provide guidance on the selection of the appropriate classes and specific types of PPE.

1. **Respirators.** When engineering controls are not sufficient to reduce air contaminants to an acceptable level, respirators may be required. Many types of respirators are available, ranging from nuisance masks to self-contained breathing apparatuses. The appropriate type of respirator depends on the concentration of contaminants, as well as the form of contaminants (e.g., dusts, mists, fumes, etc.). Regardless of the type of respirator (with the exception of voluntary use of nuisance masks), respirator users must complete a medical exam, attend training, and participate in fit testing on an annual basis. See respiratory protection for additional information.
2. **Eye & Face Protection.** Safety glasses with side shields, goggles, or face shields may be required when there is potential for exposures to chemical splashes or fumes, dusts, flying projectiles, heat, or optical radiation. All protective eyewear must meet the American National Standard for [Eye Protection for Occupational and Educational Eye and Face Protection Z87.1.](#)
3. **Hand Protection.** Gloves provide protection for the hands from many types of hazards, including chemical absorption. Like other classes of PPE, many types of gloves are available, ranging in material of construction and thickness. Selection of an appropriate glove depends on specific chemicals to which the user is or may be exposed, as well as severity of exposure (e.g., incidental, or low hazard contact, verses immersion of the hands, or high hazard contact) and manual dexterity considerations. All glove manufacturers provide permeability data for specific gloves. It is imperative to review this data before selecting the appropriate glove. In general, examination-type gloves are very thin and provide protection only for incidental contact (e.g., unexpected small droplets). These types of gloves are disposable and should be removed immediately upon contamination, with the hands washed immediately after removal. It is best to avoid gloves constructed of latex because of associated allergy hazards. Silvershield gloves provide the broadest range of possible protection but are not suitable for operations where the hands are immersed in a chemical or when dexterity is of great importance. Long, thick gloves, constructed of butyl rubber or other material depending on the chemical of interest, must be used when immersing the hands in chemical solutions. Always try to avoid immersion of the hands in any chemical solution, regardless of glove use, by implementing engineered solutions (e.g., retrieval tongs, removable baskets, etc.).
4. **Body Protection.** Protective body apparel may be required when there is potential for accidental spills or splashes. To be effective in high-risk splash hazard situations, body apparel should fully cover the torso, arms, and legs. Material of construction varies with the type of garment selected. Cotton, flame-retardant laboratory smocks or coats provide protection in low hazard situations. More sophisticated apparel, such as Tyvek coveralls, may be necessary when working with large quantities or highly dangerous chemicals. Laboratory coats and other reusable outer garments (e.g., rubber suits) should be laundered frequently and not commingled with ordinary street clothing. Consider using a laundry service for washable outer garments. Most coveralls are disposable and need to be discarded when compromised through tears or rips or when contaminated. Consult the manufacturer's permeability data when selecting the material of construction, and follow the manufacturer's recommendations for cleaning or discarding.
5. **Foot Protection.** Protective footwear should be selected based on the degree of hazard. Street shoes are generally sufficient to provide protection in low-hazard operations (e.g., laboratory scale). Bare feet, sandals, and open-toed shoes are not permitted when working with chemicals. Shoe covers provide protection in medium-hazard operations (e.g., contact with chemicals is likely but risk of splash is low). Selection of the material of construction for shoe covers is very important. Like gloves, the material of construction and thickness determines the level of protection of the shoe cover. Formed boots provide the highest level of protection and are designed for operations with significant potential for contact with chemicals. Formed boots may also be necessary for medium-hazard activities that are not compatible with shoe covers because of the likelihood of damage to

the shoe cover (e.g., outdoors, abrasive floor coverings, etc.) and for activities that require good footing (e.g., slippery surfaces). Consult the manufacturer's permeability data when selecting the material of construction and follow the manufacturer's recommendations for cleaning or discarding.

All types of PPE have limitations and are only effective when in good condition. Ensure that selected PPE:

1. Is appropriate for the task at hand
2. Has a low permeability rating for the exposure chemical(s)
3. Is cleaned upon donning and doffing
4. Is routinely inspected for damage and is repaired or replaced as necessary
5. Is stored in a clean area that is protected from excessive light, cold, and heat when not in use

### **Responsibilities**

In accordance with the Revised American National Standard for Occupational and Educational Eye and Face Protection Devices, ANSI Z87.1, all students, faculty, staff, and visitors at UA Little Rock who observe or participate in any chemical laboratory course, research laboratory, or chemical demonstration event will wear appropriate protective eye goggles.

Departments are responsible to provide eye protection to all UA Little Rock employees. At the department's option, eye protection for students can be supplied at the department's cost, purchased and sold to the students at cost, made available for a moderate rental fee, or students may be required to supply their own.

In accordance with OSHA CFR [1910.133\(a\)\(3\)](#), [1915.153\(a\)\(3\)](#), and [1926.102\(a\)\(3\)](#), employers must ensure that employees who wear prescription (Rx) lenses or contacts use PPE that incorporates the prescription or use eye protection that can be worn over prescription lenses. Workers who wear prescription glasses must also wear required eye protection. Eye and face protection that fits comfortably over glasses is available. Safety goggles and spectacles may incorporate prescription lenses.

Dust and chemicals present additional hazards to contacts wearers. OSHA recommends that workers have an extra pair of contacts or eyeglasses in case of contact failure or loss. The employer shall 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.

### **Training**

According to OSHA CFR [1910.132\(f\)](#), employers must provide the following kind of training for each employee who is required to use PPE in the workplace:

1. All training should be conducted by a knowledgeable designated person.
2. All required training should be presented in a manner that the employee can understand.
3. Each affected employee shall demonstrate an understanding of the training specified and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.
4. Each employee shall 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. Limitations of the PPE
  - e. Proper care, maintenance, useful life, and disposal of the PPE

Employees must also be trained in the proper care, maintenance, useful life, and disposal of PPE in accordance with OSHA CFR [1910.132\(f\)\(1\)\(v\)](#).

#### *Maintenance.*

1. PPE must be used and maintained in a sanitary and reliable condition.
2. The use of equipment with structural or optical defects is prohibited.
3. Pitted lenses, like dirty lenses, can be a source of reduced vision. They should be replaced. Deeply scratched or excessively potted lenses are apt to break.
4. 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 below proper function.

#### *Cleaning.*

1. Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.
2. Eye and face protection equipment that has been previously used should be disinfected before being issued to another employee.
3. When employees are assigned protective equipment for extended periods, the equipment should be cleaned and disinfected regularly.
4. Several methods for disinfecting eye-protective equipment are acceptable. The most effective method is to disassemble the goggles or spectacles and thoroughly clean all parts with soap and warm water.
  - a. Carefully rinse all traces of soap, and replace defective parts with new ones.
  - b. Swab thoroughly or completely, and immerse all parts for 10 minutes in a solution of germicidal deodorant fungicide.
  - c. Remove parts from solution, and suspend them in a clean place for air drying at room temperature or with heated air.
  - d. Do not rinse after removing parts from the solution because this will remove the germicidal residue that retains its effectiveness after drying.

#### *Storage.*

1. Goggles 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.
2. Items should be placed in a clean, dust-proof container, such as a box, bag, or plastic envelope, to protect them until reissue.

### **Written Certification**

The employer shall 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 the subject of the certification.

### **Handling Emergencies**

If an eye injury occurs, quick action can prevent a permanent disability. For this reason:

1. Emergency eyewashes should be placed in all hazardous areas.
2. First-aid instructions should be posted close to potential danger spots.
3. Employees must know where the closest eyewash station is and how to get there with restricted vision.

### **PPE Requirements**

Eye and face protection must comply with the American National Standards Institute, ANSI Z87.1- 1989 standard if purchased after July 5, 1994 or ANSI Z87.1-1968 if purchased before July 5, 1994 and also must adhere to OSHA CFR [1910.133\(b\)\(1\)](#), [1915.153\(b\)](#),

and [1926.102\(a\)\(2\)](#). Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer in order to comply with OSHA CFR [1910.133\(a\)\(4\)](#).

The following minimum requirements must be met by all protective devices:

1. Provide adequate protection against the particular hazards for which they are designed
2. Be of safe design and construction for the work to be performed
3. Be reasonably comfortable when worn under the designated conditions
4. Fit snugly and not unduly interfere with the movements of the wearer
5. Be durable
6. Be capable of being disinfected
7. Be easily cleanable
8. Be distinctly marked to facilitate identification only of the manufacturer

### Safety Spectacles

Safety spectacles are intended to shield the wearer’s eyes from impact hazards such as flying fragments, objects, large chips, and particles. Workers are required to use eye safety spectacles with side shields when there is a hazard from flying objects. Non-side shield spectacles are not acceptable eye protection for impact hazards.

The frames of safety spectacles are constructed of metal and/or plastic and can be fitted with either corrective or plano impact-resistant lenses. Side shields may be incorporated into the frames of safety spectacles when needed. Consider each component of safety spectacles when selecting the appropriate device for your workplace.

Hazard	Protectors	Limitations
CHEMICAL – Liquids, acid and chemical handling, degreasing, plating		
Splash	Goggles, eyecup, and cover types. For severe exposure, use face shield.	Faceshields should only be worn over primary eye protection (spectacles or goggles). 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.
Irritating mists	Special-purpose goggles.	Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary. To provide adequate protection, ensure goggles fit tightly to the face.

Source: [ISEA Eye and Face Protection Selection Tool](#) and OSHA CFR [1910 Subpart I App B](#)

Please note the following when selecting eye and face protection:

1. 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) eyewear.
2. 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.
3. Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for “impact.”

### **Preferred Eyewear**

The Chemistry Department Safety Committee recommends Tomahawk® Eyewear TK110 (black frame), TK120 (blue frame), or TK130 (red/white/blue frame) with clear lenses. These glasses meet ANSI Z87.1-1989 standards. They have fully adjustable ratchet action temples and 99.9% UV protection. Beginning January 2006, the above style of protective eyewear will be the only type available for purchase through the UA Little Rock Chemistry Department ACS-SA. Safety glasses left in lab drawers or in labs will be appropriated. Students who want to use previously purchased eyewear may do so as long as the eyewear has the ANSI Z87.1 (or simply Z87) designation on the eyewear.

### **Proper Fitting of Eye Protection**

Consideration should be given to comfort and fit. Poorly fitting eye and face protection will not offer the necessary protection. The following should be done with regard to the fitting of eye protection:

1. Fitting of goggles and safety spectacles should be done by someone skilled in the procedure. Prescription safety spectacles should be fitted only by qualified optical personnel.
2. Devices with adjustable features should be fitted on an individual basis to provide a comfortable fit that maintains the device in the proper position.
3. Eye protection from dust and chemical splash should form a protective seal when fitted properly.
4. Welding helmets and face shields must be properly fitted to ensure that they will not fall off during work operations.

### **ANSI Z87.1**

ANSI Z87.1 is the product of [Accredited Standards Committee Z87](#), recognized by the American National Standards Institute. ISEA assumed the secretariat of this committee in June 2004; previously it was held by the American Society of Safety Engineers. ISEA now administers the committee, and will provide support it future revisions of the standard, as well as manage the process through which the committee provides interpretations of the standard.

[ANSI Z87.1](#) establishes performance criteria and testing requirements for devices used to protect the eyes and face from injuries from impact, non-ionizing radiation, and chemical exposure in workplaces and schools. It covers all types of protective devices, including spectacles (plano and prescription), goggles, faceshields, welding helmets and handshields, and full facepiece respirators. The standard includes descriptions and general requirements, as well as criteria for testing, marking, selection, use and care. Note that it does not apply to hazardous exposure to bloodborne pathogens, X-rays, high-energy particulate radiation, microwaves, high-frequency radiation, lasers, masers, or sports.

Copies of the standard are available from the [ISEA](#). Discounted rates for bulk orders are offered. ISEA also publishes an [Eye and Face Protection Selection Tool](#) as a companion to the standard.

## **ROOF ACCESS**

### **Purpose**

Due to their inherent danger, access to all roofs is restricted to authorized personnel only. This document sets out the intended policy for the safe access to roofs of University buildings.

### **Policy**

1. Working on university roofs has been identified as a potentially hazardous activity.

2. A formal procedure of roof access and safety management has been put in place to manage this risk.
3. Each roof must be specifically inspected and risk assessed so that anyone visiting a roof is not put at undue risk. See the [Roof Hazard Sheet](#).
4. Access to university roofs is via an authorization process.
5. Doors leading to roofs will be kept locked at all times. All locks and keys will be distributed by Facilities Management. Only certain personnel will be assigned keys.
6. Doors leading to roofs will have a warning sign "*Authorized Personnel Only*".
7. All work on roofs will require a written risk assessment.

## **SCAFFOLDS**

### **Purpose**

The purpose of this program is to provide directions and instructions for safety requirements to be implemented with the construction, erection, and dismantling of scaffolds and ladders.

### **Scope**

The scope of this program applies to all university jobsite locations where scaffolds and ladders may be used. The requirements, as set forth in this program, should be implemented to the fullest extent possible.

### **Responsibilities**

The *Supervisor, Foreman, or Leadman of record* is responsible for:

1. Implementing of the requirements of this program

The *EH&S Director or designee* is responsible for:

1. Providing for the monitoring of work activities to assure compliance to the requirements of this program
2. Complying to the contractor's (if applicable) safety requirements

*Supervisors* are responsible for:

1. Employee compliance to safety requirements. The project manager or foreman will be responsible for compliance in the case of contractors working on campus.

### **Requirements for All Scaffolds**

The following requirements are applicable to all scaffolds.

#### *Guardrails and Toeboards*

1. Guardrails shall be constructed of 2" X 4" lumber, 1/2 inch wire rope, angle iron, or the prefabricated rail(s) supplied by the scaffold manufacturer.
2. Toprails shall be approximately 42 inches above the working surface.
3. Midrails shall be approximately 21 inches above the working surface.
4. Wire rope top rails and midrails shall be stretched tight with no more than an approximate 2 inch deflection.
5. Toeboards shall extend a minimum of 4 inches above the working surface.
6. When the placement of the scaffold work platform prevents the installation of guardrails, other fall protection equipment shall be used.
7. Guardrails and toeboards shall be installed on all open sides and ends of scaffolds.
8. Scaffolds and work platforms 4 feet to 10 feet high with a working surface of less than 45 inches shall have standard guardrails installed on all open sides and ends of the scaffold or platform.

#### *Working Surfaces*

1. Working surfaces shall be constructed of scaffold plank, aluminum deck boards, or 3/4" construction grade plywood.
2. Scaffold planking shall be scaffold grades or equivalent as recognized by approved grading rules for the species of wood used under the American Lumber Standards.
3. Working surfaces shall be secured by nails, double wrap of #9 wire, or cleats.
4. Lumber sizes, when used in this program, refer to nominal size/thickness except where otherwise stated.
5. Scaffold planks shall extend a minimum of 6 inches and a maximum of 12 inches over the end supports.
6. If required, an access/egress ladder shall be provided.
7. Scaffold planks shall not span more than 8 feet between supports/vertical legs.
8. Scaffold planks and plywood shall be free of splits and burns.

#### *Scaffold Footing & Anchorage*

1. The footing or anchorage shall be capable of carrying the maximum intended load without settling or displacement.
2. The uprights/vertical legs shall be plumb and securely braced to prevent swaying and displacement.

#### **Requirements for Types of Scaffolds & Ladders**

##### *Tubular Welded Frame*

1. Scaffold shall be cross-braced to assure scaffold is plumb, square, and rigid.
2. Stacking pins shall only be secured with the manufacturer's pins or recommended bolts.
3. Cross braces shall be secured as designed by the manufacturer.
4. Stationary scaffolds must be secured horizontally, every 26 feet of height and 30 feet horizontally, to prevent tipping.
5. The height of rolling scaffolds, measured from the ground to the toprail, shall be no more than four times the minimum base dimension (length times the width).
6. All wheels/casters shall be the same size, equipped with a positive locking device, and in good working condition.
7. Wheels shall be locked while personnel are working from the scaffold.
8. Personnel shall not be permitted on mobile scaffold while the scaffold is being moved.

##### *Tube and Coupler (Tube-Lock)*

1. Uprights shall have a maximum spacing of 8 feet.
2. Uprights shall be placed on secure bases and maintained plumb.
3. Scaffolds shall be limited in heights and working levels to those permitted in Tables 2-10, 11, and 12 of [OSHA 29 CFR 1926.451](#).
4. Horizontal braces shall be installed completely around all exterior uprights and between interior uprights. Braces shall be installed every 6 feet of height.
5. Platform supports shall be coupled/clamped directly to the horizontal braces and extend 4 inches to 12 inches beyond the horizontal braces.
6. All horizontal bracing shall be coupled/clamped directly to the uprights.
7. Diagonal bracing shall be installed at alternating 45 degree angles beginning with the corner upright and repeating every 5th upright on the perimeter. An alternating bracing pattern should be used.

##### *One & Two Point Suspension Scaffolds*

1. Cable shall be securely anchored, and softeners shall be used when necessary.
2. Cable shall be insulated at the anchor point from the motor to 4 feet above the motor and wherever the cable comes in contact with metal to prevent electrical arcing.



3. Two-point suspension scaffold platforms shall remain level while being raised or lowered.
4. Each employee shall wear a full body harness and be tied off to an *independent lifeline*. A lifeline shall be supplied for each employee.

#### *Knee Brace/Cantilever*

1. Knee brace/cantilever scaffolding shall be welded by a qualified welder and visually inspected before use.

#### *Ladders*

1. Ladders shall extend 36 inches above the landing.
2. Extension and job-built ladders shall be secured to prevent movement or falling.
3. Manufactured ladders shall be Class I or Class IA with properly working feet.
4. The slope of the ladder from the base of the support shall be one(1) foot for every 4 feet of ladder length.
5. All ladders shall be set on a firm base to prevent shifting and tipping.
6. Ladders with broken or missing rungs or steps, broken or split side rails, or faulty or defective construction, shall not be used.
7. Metal ladders shall not be used.
8. Step ladders shall not be used as a leaning ladder.
9. Employees shall not work off the top two steps of a stepladder.
10. Personnel shall have both hands free of tools, materials, or equipment, while climbing and descending ladders.
11. Personnel shall face the ladder when climbing and descending.

#### **Training Requirements**

The Project Manager will be responsible for implementing the employee training and information program. The format for the program may include classroom instruction, safety tool box meetings, and other forms of group or singular instructions.

Instructions are normally communicated verbally or in writing through the employee's Supervisor. The Project Manager is responsible for assuring Supervisors are qualified or competent in the following areas:

1. Fall hazards and falling object hazards
2. Electrical hazards (protection from electrical hazards for erecting, maintaining, and dismantling)
3. Fall protection and protection systems
4. Proper and safe handling of materials
5. Trained in the maximum intended loads and load-carrying capacities
6. Any other pertinent requirements
7. That all employees will be trained in the above mentioned, along with any additional basic or site requirements.
8. That each employee follows the safety guidelines, as set forth in Safe Work Practices.