MESSIAH UNIVERSITY

# Safety Manual

**This manual contains programs and procedures that are intended to ensure the workplace safety of all employees and outlines the University's compliance with OSHA regulations.**

***Please note exceptions:***

- **Compliance with the OSHA Hazard Communication Standard is found in the Hazard Communication Program: Chemical Safety Manual.**
- **Compliance with the OSHA Bloodborne Pathogen Standard is found in the Exposure Control Plan.**
- **Compliance with the OSHA Standard on Occupational Exposure to Hazardous Chemicals in Laboratories is found in the Chemical Hygiene Plan for the School of Science, Engineering and Health.**

Messiah University strives to meet accepted guidelines and standards for accessibility and usability. If you require any information from this document in an alternate format, or are having any issues accessing the content, please contact the Office of Human Resources & Compliance at humanres@messiah.edu.

*This manual covers all locations of Messiah University.*

*If protocol differs for a specific location, it will be noted.*

# Contents

# Section 1 – AREA SAFETY RULES

## Break Room Safety Rules and Rules for Use of Appliances in Non-Residential Buildings

The University provides microwave ovens and refrigerators in University-approved employee break rooms/employee lounges. Prior approval must be obtained from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu) for employee-owned appliances in these areas.

In general, due to insurance liability, energy usage, and compliance with fire regulations, appliances for heating or cooking food and beverages are not permitted in employee offices, work rooms, etc. Prior approval must be obtained from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu) for appliances in any areas outside of University-approved employee break rooms.

1. This policy does not negate the possible need for completion, submission and approval of a Catering Policy Exception Request form.
2. Appliances in kitchens located in the Nutrition and Dietetics Department are not included in this policy.
3. In all break rooms/employee lounges:
    a. Clean up spills immediately. This includes spills on floors, countertops, tables, in microwaves and refrigerators.
    b. Dispose of food waste in the proper container. Dispose of recyclables in the proper containers.
    c. Do not leave dirty dishes, cutlery and mugs lying around.
    d. If federal and state Labor Law posters are displayed in the break room, do not cover them up with other materials or remove them.
4. The following rules apply to the use of **all** appliances and break rooms/employee lounges, regardless of ownership or location:
    a. Any appliances located in proximity to a sink must be plugged into a ground fault circuit interrupter (GFCI) outlet or an outlet with a GFCI breaker.
    b. Appliances should be plugged directly into electrical outlets whenever possible; extension cords should not be used for appliances; the use of surge protectors (with long cords) is permitted.
    c. Appliances must be Underwriters Labs (UL) approved, in good condition, with no modifications.
    d. Flammable or combustible materials should not be located near appliances when in use.
5. **Microwave ovens** should be kept clean. To help keep microwave ovens clean, place a cover over food when heating it. Do not put metal or foil coated items in the microwave. Each individual is responsible for cleaning the microwave oven of splatters and spills after use.
6. **Personal coffee makers** will not be permitted on campus. Coffee makers may be allowed in departments where they are maintained for guest hospitality. Such coffee

makers will need approval from the Vice-President/Provost of the area and from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu). In addition, they must be equipped with automatic shut off and turned off when not in use, including at the end of work shifts and when the coffee pot is empty (or near empty). They should not be utilized for the convenience of employees in the department.

7. **Refrigerators** should be kept clean and outdated food should be discarded. Refrigerators must be defrosted as needed. Campus and Building Services is not responsible for the cleaning of refrigerators; leadership in areas where refrigerators exist is responsible for ensuring that they are kept clean by assigning responsibility for this task as needed.
8. Employee-provided **toasters** may be used in employee lounges/break rooms (one per break room) only if prior approval has been obtained from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu). The toaster must be attended at all times during use and unplugged when not in use. It should be cleaned regularly by unplugging it and, when cooled, removing crumbs from bottom by either opening the bottom access panel or inverting the toaster and shaking out the crumbs into a trash can.
9. There are times when areas may have celebrations that require the use of **crock pots or similar appliances**. Such items may be used infrequently provided that they comply with rules listed above. They must be unplugged or turned off when empty or not in use. Prior approval for use must be obtained from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu).
10. The use of **electric skillets, electric griddles, electric frying pans, deep fryers, charcoal grills, gas grills and camping stoves** is prohibited except by dining services unless prior approval is obtained from the Fire and Safety Systems Coordinator at ext. 6022 (jnaccarato@messiah.edu) and the equipment is operated within the guidelines provided at the time. Under no circumstances is the use of charcoal grills, gas grills or camping stoves permitted in buildings; outside use is only permitted by authorized personnel (ex., Dining Services).
11. **Open flame food warmers/chafers** (with chafing fuel) are only permitted for use by Dining Services.

## Maintenance Shops (and Other Areas Using Shop Equipment) Safety Rules

This policy outlines the safety requirements for the use of shop (maintenance) equipment. The term “shop” equipment is based on the type of equipment found in a maintenance shop, and not on the area or department owning the equipment. Similar equipment found in areas not under the supervision of maintenance is still subject to these requirements.

1. When the potential exists for flying particles, OSHA requires the use of safety glasses. Therefore, when operating any powered shop equipment or portable power tools, safety glasses must be worn.

2. Most powered shop equipment (both stationary and portable powered equipment) will require the use of hearing protection. Area rules or areas signs should be reviewed for exceptions.
3. Baggy clothing, neckties/scarves, and open toed shoes should not be worn in shop areas. Long hair should be restrained (tied back and up). Jewelry such as long, dangling necklaces, bracelets, finger rings should be removed when operating equipment where it could become a safety hazard.
4. Avoid distractions while operating equipment. No horseplay shall be permitted.
5. Clean up equipment and work area when finished. Vacuuming or "wet" wipe up are the preferred methods of cleaning dusts to prevent airborne dissemination of the particles.
6. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment. (OSHA 1910.242(b)).
7. Where machines are equipped with guards, guards shall be used. No equipment interlocks shall be by-passed during operation.
8. Know the location of any emergency stops on the equipment before you use it.
9. Where exhaust or ventilation systems are supplied, they shall be used during operation of equipment. If the exhaust drop is part of an exhaust system that supplies drops to other equipment, the drop shall be closed when not in use to limit the drain put on the system and allow for maximum draw to other drops in use.
10. Except when facility maintenance work is being performed, power saws/sanders/grinders/welders and other power tools that can generate dusts or fumes should only be used in shop areas or areas where an exhaust is provided.
11. Only University owned power tools should be used on campus by employees and students. Employees and students should not be bringing their own tools to campus for use. The only exception is for contractors who, in most instances, will provide their own tools for their own use.
12. Grinders – When changing grinding wheels, a ring test must be completed to verify that the new wheel has not been damaged in transit or storage. Wheels shall be tapped gently with a light nonmetallic implement, such as the handle of a screwdriver for light wheels or a wooden mallet for heavier wheels. If they sound cracked (dead), they shall not be used. Wheels must be dry and free from sawdust when applying the ring test; otherwise the sound will be deadened. Tap wheels about 45 degrees each side of the vertical centerline and about 1 or 2 inches from the periphery. Then rotate the wheel 45 degrees and repeat the test. A sound and undamaged wheel will give a clear metallic tone. If cracked, there will be a dead sound and not a clear ring. It should be noted that organic bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels.

    The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel. Work rests shall be kept adjusted closely to the wheel with a maximum opening of 1/8" to prevent the work from being jammed between the wheel and the rest, which may cause wheel breakage. Adjustments shall not be made with the wheel in motion. The maximum opening between the wheel and the top guard shall not exceed ¼".

13. Hot work (welding, cutting, brazing) requires the completion of a Hot Work Permit. Information regarding this policy may be found in Section 3 of this manual.
14. Rules pertaining to student use of shop equipment are available from the school departments. As a minimum, all students must be trained on the proper use of shop equipment. Equipment training must be completed (and documented) before students may begin work using shop equipment. Students must be familiar with the safety rules/policies for the shop area/equipment.
15. Areas may have their own safety rules; however, they cannot be less stringent than these and cannot negate or leave out any of these rules.

## Office Area Safety Rules

1. Keep all emergency exits, stairs and walkways clear of any obstruction. Maintain a minimum space of three (3) feet wide where people need to walk.
2. Keep fire extinguishers and fire pull alarms free of obstructions. Maintain a clearance of three (3) feet.
3. Fire safety is important no matter where you are. Know where the exits are in your work area and where the closest fire-pull alarm is located.
4. Report any unlit exit lights to maintenance. At Winding Hill, contact Danielle Rutherford at drutherford@cra-architects.com.
5. Keep electric panel doors shut at all times and unblocked for easy access.
6. Maintain good housekeeping. Pick up any garbage or papers off the floor. Especially look out for staples or tacks on the floor that someone may step on.
7. Dispose of spoiled food and avoid open drinks to prevent spills. Avoid storing liquids around any electronics.
8. The storage of empty boxes should be kept to a minimum.
9. Broken or worn flooring which may cause a tripping hazard should be reported to maintenance. At Winding Hill, contact Danielle Rutherford at drutherford@cra-architects.com.
10. Ensure that electrical cords, phone cords, and computer cables/wires do not create a tripping hazard.
11. No equipment should be used if the cables, plugs or sockets are damaged. Promptly disconnect and replace cracked, frayed or broken electrical cords.
12. Do not overload power outlets. Do not “daisy chain” power cords. Don’t use light weight extension cords; heavy duty extensions with ground interrupters should be used. Use safety caps in unused outlets so that items such as paperclips and staples can’t fall into the openings.
13. Open only one drawer of a filing cabinet at a time. Close drawers when not in use as they can present a tripping hazard.
14. Always stack objects from heaviest to lightest, and make sure desks, shelves and tables can hold the weight you're putting on them. Avoid storing heavy items on higher shelves.
15. Never stand on chairs or desks when reaching for height. Use a step stool or ladder.
16. Do not lean back in chairs. Keep all legs of the chair on the ground. Keep your feet on the ground; do not prop your feet on a table, desk or other items.

17. Inspect chairs occasionally for missing casters, shaky legs, loose parts, broken welds. Do not use if problems are found.
18. Keep paper cutters closed when not in use.
19. Store sharp objects (pens, pencils, scissors, letter openers) with the point down or in a drawer. Never hand someone a sharp object point first.
20. Never operate equipment with guards removed (ex., paper shredder).
21. Do not attempt to lift heavy objects by yourself. Call for help from a coworker or break the object down into smaller parts.
22. If you have a disabled visitor, please be sure arrangements have been made to facilitate his/her safe evacuation in an emergency.

## School of Science, Engineering and Health Area Safety Rules

Lab area safety rules for **Biological Sciences** and **Chemistry and Biochemistry** can be found in the School's Chemical Hygiene Plan.

Shop safety rules for the Engineering Department can be found on e-CARPS at http://huggs.messiah.edu/ecarps/resources.php.

## Art & Design Department Safety Rules

Studio work involves potential hazards that can be removed by the use of proper procedures and safety equipment. Messiah University is committed to providing a safe environment for all students and employees. These rules have been developed to achieve this goal. They must be followed in all Arts Studios and storerooms.

1. Eye protection must be worn at all times in any laboratory that has a sign indicating this requirement or when specified by the instructor. Goggles are essential if contact lenses are worn in chemical laboratories, when specified by the instructor or where indicated by a sign.
2. The hazards of chemicals used should be known (e.g., corrosiveness, flammability, reactivity, stability and toxicity). This information can be found by reviewing the Safety Data Sheet for the chemicals.
3. Eating and drinking are not allowed in the studios.
4. Unauthorized use of the studios is strictly prohibited.
5. Appropriate clothing and shoes must be worn. When specified by the instructor, gloves, protective apron or lab coat will be required and open-toe shoes and shorts will not be permitted.
6. Power equipment will not be used when a student is alone in a studio unless suitable arrangements have been made with the course instructor.
7. When handling hazardous materials, proper Personal Protective Equipment should be worn and the person or persons handling the material should be sure to wash their hands when leaving the Studio.
8. No chemicals or equipment may be removed from the studios or storerooms without the specific permission and supervision of the instructor or the Art Technician.
9. All accidents and significant near-accidents must be reported to the instructor who will in turn report them to the Office of Human Resources & Compliance. Injuries involving

employees, including student employees, must be reported using the online Incident Report System.

10. All workers and students must know the location and proper use of all safety equipment in the studio. Instructors or the Art Technician will supply this information.
11. If a person sustains an injury which is not incapacitating but causes bleeding, (s)he shall place a sterile bandage over the wound and go to the University nurse for treatment. No other person, unless properly trained in first aid and Bloodborne Pathogens, should be involved in any way that might cause her/him to contact the blood. The instructor will see that the "Studio Accident Procedure" is followed. Campus and Building Services must be contacted to properly clean up and disinfect the area if blood is present.

# Section 2 – GENERAL HOUSEKEEPING AND STORAGE

***Policy***

It is the policy of Messiah University to strive for compliance with all Occupational Safety and Health (OSHA) regulations that pertain to housekeeping, storage practices and fire safety; and with the National Fire Protection Association (NFPA) 101 regulations.

***Procedure***

All employees are responsible for compliance with the requirements outlined in this section. If possible, violations should be corrected immediately; if not, they should be brought to the attention of area leadership for correction. If this fails, the Office of Human Resources & Compliance should be contacted. When necessary, the Office of Human Resources & Compliance will use the following protocol:

- Issue a letter/warning (for the first offense) to the person and Supervisor responsible for the violation.
- Issue a second letter for violation to the person, Supervisor, and Dean/Manager.
- Issue a third letter for violation to the person, Supervisor, Dean/Manager, VP/Provost and VP of HR.
- If the violation is deemed to be a serious safety violation by the Office of Human Resources & Compliance, the letter of violation may go immediately to the person, Supervisor, Dean/Manager, VP/Provost and VP of HR.

NOTE: If the University is fined for code violations during an inspection by the fire marshal, the Department responsible for the violation will be responsible for paying the fine.

Rules specific to areas may be found under Section 1 of this manual, Area Safety Rules, or in area documentation. **The following are general rules for all campus areas**:

1. Stairwells, halls and corridors shall be kept free of storage/obstructions. If such conditions are found, items shall be removed immediately. When this does not occur, Facilities Services will be notified and will remove and dispose of the items within three (3) days of the email notification. If this occurs and is not resolved at Winding Hill, the director(s) shall be notified.
2. Exit doors shall be free of obstructions and remain unlocked from the inside to allow for emergency egress. Nothing shall block the opening of exit doors, inside or outside. Nothing shall be stored within 36 inches of a fire door opening.
3. Fire extinguishers and fire pull alarms shall be kept free of obstructions. A minimum of 36 inches of “no storage” space shall be maintained around these items and a clear line of access to them shall be maintained.
4. Fire extinguishers shall be mounted and identified.
5. A minimum of 3 feet of clearance must be provided in front of electrical panels and breaker panels to allow quick and unobstructed access in an emergency.
6. Sufficient access and working space shall be provided and maintained around all electric equipment to permit ready and safe operation and maintenance of such

equipment. The workspace shall be adequate to permit at least a 90-degree opening of doors or hinged panels. Working space shall not be used for storage. Workspace must be at least 36 inches wide in front of electric equipment or the width of the equipment, whichever is greater. (See 29 CFR 1910.303, 1910.305, and NFPA 70 110.26).

7. In buildings equipped with automatic fire sprinklers, storage must be kept at least 18 inches from the sprinkler heads or the spray pattern issued from the sprinklers may be blocked, thus keeping the water from reaching the fire. [29CFR1910.37(a)(4); 29CFR1910.159(c)(10); NFPA 101, §9.7.1.1, §9.7.1.4, and §9.7.5; NFPA 13, §8.6.6; NFPA 25, §2-2.1.2].
8. In areas without sprinkler systems, there must be 24 inches of clearance that spans across the ceiling in an invisible plane. In this way, the fire department can direct water over the storage to reach the fire, and this will also help to minimize the spread of fire through the building.
9. Areas shall be kept clean and orderly and in a sanitary condition.
10. Floors shall be kept in a clean and, as much as possible, dry condition.
11. Walkways through areas shall be kept free of tripping hazards. No items should protrude into such areas.
12. Cords and cables shall be kept away from traffic areas to prevent trips and falls. When a cord must be run through a walk area, it should be securely taped to the floor and should only be for temporary use.
13. Whenever possible, storage shelves should be marked with weight limits in areas where large/heavy items might be stored.
14. Heavier items should be stored on lower shelves; lighter weight items on higher shelves.
15. Propped items should be secured to prevent them from falling.
16. “Pack rats” shall be discouraged. Items shall not be accumulated and stored in a manner that creates a safety or fire hazard.
17. Food shall not be stored or consumed within five (5) feet of chemicals.
18. Spills shall be cleaned up immediately. When this is not possible, the area should be secured and Campus and Building Services contacted. For chemical spills, refer to Section 8 of the Hazard Communication Program: Chemical Safety manual.
19. For additional information on fire safety and the policies that apply to the campus, refer to the Fire Safety Office webpage on the University’s website (http://www.messiah.edu/info/20572/fire_safety_office).

# Section 3 – HOT WORK: WELDING, CUTTING, BRAZING

***Policy***

It is the policy of Messiah University to comply with OSHA regulations (29 CFR 1910.251, 252, 253, 254, 255) regarding welding, cutting and brazing. Additionally, it is our goal to provide a safe work environment for employees and students while minimizing the potential for fire.

All hot work (welding, cutting and brazing) operations are covered under this permit requirement *except for the following*: Bunsen burners in laboratories, electric soldering irons, and fixed grinding wheels.

***Procedure***

Before any "hot work" can begin, a permit must be completed. See *Attachment 1* – Hot Work Permit for Cutting or Welding.

A "Fire Watch" is an individual assigned to watch for fire in locations where other than a minor fire might develop or if any of the following conditions are met:

- Significant amount of combustibles within 35 feet of operation
- Significant amount of materials easily ignitable by sparks nearby; this may be further than 35 feet but within wall boundaries of operation

The fire watcher must have a fire extinguisher readily available and should be knowledgeable in how to use it.

A fire watch must continue for 30 minutes after the "hot work" is completed, as required on the permit, to detect and extinguish possible smoldering fires.

NOTE: If a fire watch is not required during the actual operation (conditions listed above are not met), then the individual performing the operation may serve as the fire watcher for the 30 minutes after the operation is completed.

If the operation continues into the next shift or next day, a new permit must be completed. The **only exception** is if the work is anticipated to last over several days or weeks with the same individuals involved in the work each day (leadership, fire watcher, individual performing the hot work). The checklist must still be reviewed each shift, but a record can be made on the back with the name and date of the individual completing the checklist; leadership does not need to re-sign each day but must be aware of the activity and the permit must indicate the range of the dates for which it is to be used.

NOTE: **Hot work is NOT permitted**:

- if an entire building fire detection system is shut down
- in presence of explosive atmospheres, where mixtures of flammable gases, vapors, liquids, or dusts may exist
- in tanks, drums, other containers, or equipment that contain or previously contained materials that could create explosive atmospheres.

CONTRACTORS: Contractor compliance while working in any Messiah University owned building or performing work in any Messiah University leased building is required. The project manager is responsible to review this procedure with the contract supervisor/representative who must communicate it to his/her employees.

## Responsibility

1. Leadership of individual performing "Hot Work" or individual responsible for area.
    a. Complete the permit (Attachment A) along with input from individual performing "hot work." The individual performing the hot work may be an employee, student, or contractor. In some instances, the individual performing the work may be the same as the individual responsible for area and will sign in both places.
    b. Ensure someone has been assigned as "fire watcher" if necessary.
    c. If the individual performing the hot work is a contractor, then the onsite contract supervision is the leadership of the individual. If there is no onsite contract supervision, then the project manager is responsible; however, at the discretion of the project manager, the contracted individual performing the work may be delegated authority as the individual responsible for the area and may sign in both places. When this occurs, the project manager will review the policy with the contract worker to ensure understanding.
2. Fire Watch
    a. Watch for possible fires and be prepared to use fire extinguisher. Know the protocol for fire emergencies if the fire becomes unmanageable.

## Additional Safety Information

It has been determined that welding fumes and UV radiation from welding can cause cancer in humans.

# Hot Work Permit for Cutting or Welding

Work Location: _____

Type of Work: _____

Expected Start Time: _____ Expected Stop Time: _____ Date: _____

| CHECKLIST *(Check appropriate response for each line.)* | YES | NO | N/A |
|---|---|---|---|
| Person doing hot work has been trained in safe operation of equipment, and how to work safely. | | | |
| Appropriate PPE (eye protection, helmet, protective clothing, gloves, etc.) available. | | | |
| Where possible, welding booth screens will be used. | | | |
| Fire extinguishers placed for immediate use. | | | |
| Floors swept clean of combustible materials within a radius of 35 feet. | | | |
| Combustible materials and supplies moved at least 35 feet away from hot work location, if possible. If work area does not allow for the 35 feet, then special consideration has been given to the configuration of work area to reduce possibility of fire; combustibles within 35 feet of welding area have been shielded as much as possible. | | | |
| Wall and floor openings within 35 feet of work location have been covered to prevent emission of sparks, etc. into adjacent areas. | | | |
| Equipment not to be used near flammable vapors or liquids, or containers that have contained flammable vapors or liquids. | | | |
| Fire hazards that can't be moved are protected by appropriate guards. | | | |
| Any pipe lines to containers are disconnected and blanked. | | | |
| Equipment to be used is in good condition. | | | |
| If welding a container, container has been thoroughly cleaned and ventilated. | | | |
| Warning sign(s) posted to warn others workers if welding occurs in area not normally designated for this activity and if welding screens cannot be used. | | | |
| Warn others nearby that welding will be occurring; ensure they are adequately protected from hazards. | | | |
| If working in confined space, confined space permit has been issued. | | | |
| Inspect work area after work is done to ensure it is safe. | | | |
| Maintain a fire watch during operations and for 30 minutes after work has been completed. | | | |

_____ _____

*Signature of individual performing hot work* *Date*

_____ _____

*Signature of supervisor or individual responsible for area* *Date*

*For specific requirements, refer to 29 CFR 1910.146, 1910.251, 1910.252, 1910.253, 1910.254 and 1910.255.*

*When work is completed (including 30 minute fire watch), forward permit to the Office of Human Resources & Compliance.*

# Section 4 – NOISE EXPOSURE/HEARING CONSERVATION PROGRAM

***Definitions***

**Action Level**: An 8-hour time weighted average of 85 decibels or a dose of 50%. This is the point at which a Hearing Conservation Program must be implemented by the employer; this must include baseline and annual audiograms, annual training, and the availability of hearing protection. Note: The use of hearing protection is not required until noise levels reach 90 decibels unless the employee has experienced a standard threshold shift, in which case hearing protection is required at 85 dBA.

**Audiogram/Audiometric Testing**: Gauges the effectiveness of the noise exposure policy and used to determine whether the employee has suffered any significant hearing loss. Employees covered by this policy will be provided with baseline audiograms and annual audiograms thereafter. Test results will be made available to the employee.

**dBA**: Decibel A-weighted scale. The unit of measure for noise which most closely mimics the human ear. OSHA Noise Standard uses this unit of measure for determining compliance requirements. The use of hearing protection is required at 90 dBA if exposed to an 8 hour period. 85 dBA over an 8 hour average is the action level where audiograms must be completed, hearing protection must be available, and training is required.

**Standard Threshold Shift (STS)**: A change in the hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, or 4000 Hz in either ear.

**TWA**: Time weighted average.

***Policy***

It is the policy of Messiah University to comply with OSHA 1910.95, the Occupational Noise Exposure Standard, and to protect employees from hearing loss associated with occupational noise exposure. This standard requires noise monitoring and a Hearing Conservation Program for employees exposed to an 8-hour time weighted average (TWA) of 85 dBA or greater (decibels on the A scale, slow response) measured by a sound level meter or an equivalent dose of 50% measured by a dosimeter. Employees exposed to those levels of occupational noise are included in our Hearing Conservation Program which includes audiometric monitoring, training, and the availability of hearing protection devices.

## Procedures and Responsibilities

Under the OSHA Standard, the requirement for hearing protection use is related to the duration of exposure and the level of noise. As the dBA increases, the hours of permissible exposure before hearing protection is required decreases. At 90 dBA, hearing protection is mandatory if exposed for 8 hours; at 92 dBA, hearing protection is mandatory if exposed for 6 hours; at 95 dBA, hearing protection is mandatory if exposed for 4 hours; etc. Because an employee's work exposure can vary

from day to day, **Messiah University will require the use of hearing protection anytime an employee is exposed to 90 dBA or greater, regardless of the length of exposure time**. This will ensure employees are not overexposed and will aid in the enforcement of the use of hearing protection. Hearing protection will be made available to employees exposed to 85 dBA but is not required until noise levels reach 90 dBA. The only exception is if the employee has experienced a standard threshold shift, in which case hearing protection must be used at 85 dBA or if the employee is working more than 8 hours in one shift.

The use of portable and stationary power tools and table saws shall require hearing protection at all times unless measurements prove they operate under load below 90 dBA.

## Noise Measurements

For the purposes of compliance with the OSHA Standard, measurements made with a sound level meter will be taken using the A-scale and the slow response setting. Such noise measurements will be conducted as needed (when new equipment is added to the campus which generates significant noise; if concerns are brought up that noise levels at or near equipment has increased; periodically to ensure no changes have occurred). Noise measurements will be taken and documented with *Attachment 2* – Noise Survey Form. Records will be maintained by the Office of Human Resources & Compliance.

Dosimeter measurements may be contracted out periodically. Dosimeter exposure monitoring of Grounds Department and Facilities Maintenance work areas was conducted in September 2007. If necessary, or if work conditions change, dosimeter exposure monitoring will be conducted in work areas or job tasks that are suspected of exceeding the 85 dBA action level. Employees involved in this monitoring will receive written notification of their exposure monitoring results.

## Hearing Protection

Hearing protection shall have a sufficient Noise Reduction Rating (NRR) value to provide adequate noise reduction. This will be determined by using the manufacturer's NRR value, subtracting 7, then subtracting the remainder from the maximum dBA level measured. The result gives the estimated value heard by the human ear when using the hearing protection properly and should be less than 85. Ear muffs are available for use but disposable ear plugs are the recommended hearing protector as they afford the greatest NRR value among the types of hearing protection offered on campus. Additionally, the use of safety glasses (temple piece) can impact the seal of the ear muff and reduce effectiveness. The seal of the ear muff can also deteriorate over time thus reducing the effectiveness of the unit.

## Training

Annual training is required for all employees exposed to noise levels at or above 85 dBA over an 8 hour period. Training includes:

- The effects of noise on hearing;
- The purpose, advantages, and disadvantages of various types of hearing protectors, including their attenuation levels;
- The selection, fitting, and care of hearing protectors; and

- The purpose of audiometric testing.

Training is provided along with the annual audiograms administered by Worksite Medical. Records are maintained in the HR Employee Health and Wellness Coordinator's office along with other medical records of personnel.

## Audiograms

A baseline audiogram shall be given initially and an annual audiogram thereafter. Results of audiograms will be reviewed by the Facilities Assistant. If a Standard Threshold Shift (STS) occurs, the Coordinator will consult with the employee within 21 days of the STS determination and will notify the employee that hearing protection is required if their noise exposure is 85 dBA or greater (no longer 90 dBA). At that time the Facilities Assistant will also check the individual's hearing protection, demonstrate the proper use and care of the hearing protection, verify proper fit, provide retraining and allow the employee the opportunity to ask questions. The Facilities Assistant will also schedule a retest to occur within 30 days of the STS determination. Should the retest verify the STS, it may become an OSHA recordable illness.

Messiah University employees affected by noise levels at or above 85 dBA and who are part of the Hearing Conservation Program are in Grounds Services, Facilities Maintenance and Messiah Press (press room). Supervision of these areas is responsible to assure that each employee routinely exposed to 85 dBA or higher, for an 8 hour time weighted average, receive an audiometric examination prior to noise exposure (baseline) and ensure the employee receives an annual audiometric examination thereafter. Supervision will be responsible to make arrangements with Worksite Medical to visit campus annually to conduct the audiograms and training. Leadership is also responsible to enforce the use of hearing protection where mandated. Concentra may be used if the use of Worksite Medical is not convenient. However, results should be sent to Worksite Medical for comparison with baselines they have on file.

All audiometric tests and noise measurements are considered part of an employee's medical and exposure records and thus must be maintained for the duration of their employment plus 30 years (OSHA 1910.1020).

## Employee Responsibility

Employees will be responsible to wear hearing protection at all times when required (in areas where the noise is at or above 90 dBA, or in areas at or above 85 dBA if an STS has been incurred). They should also notify their supervisor or the Facilities Assistant of changes in the workplace that could impact noise exposures.

## Areas/Equipment Requiring Hearing Protection

Employees should be alerted to the need for hearing protection by signs posted in areas or on equipment, or by operating procedures, or by area safety rules. Among areas, equipment and/or operations that have measured 90 dBA or greater and thus require the use of hearing protection are the following:

- Near chillers that are operating

- AB Dick Folder in Messiah Press
- Engineering shop:
    - Makita Miter Saw
    - McEnglevan Furnace
    - Delta Table Saw
    - Delta Disc Belt Sander

And the following equipment unless specifically measured below 90 dBA:

- Portable power tools throughout campus
- Shop vacs throughout campus
- Airguns throughout campus
- All powered equipment in facility maintenance shops except the Harris Forklift
- All powered equipment in grounds except tractors with enclosed cabs, inside the cab if operated with the doors closed
- Assume all unmeasured powered equipment throughout campus until tested

NOTE: This list should not be considered complete.

Because we are required to measure the sound level emissions from noise sources to determine if hearing protection is required (or to prove that it is not needed), any time new equipment or processes are added to campus that produces noise at a significant level, the Facilities Assistant should be contacted to conduct a sound level measurement. Even if this equipment is similar to equipment already tested for noise in the past, a sound level check must be taken as noise emissions can vary slightly from one machine to another of the same make and model. Measurements must be made “under load” or normal use of the equipment.

NOTE: As a rule of thumb, a significant noise level is one that makes it difficult to hear someone speaking to you at a normal volume (without raising their voice).

## Earbuds and Headphones

Earbuds and headphones for listening to audio (music, etc.) are not considered to be acceptable hearing protection. In addition to having no NRR, the volume of the audio is not quantified; they could simply be replacing the noise level of the equipment with audio of the same dBA level or greater. They also can interfere with hearing other noises around you, such as alarms.

## When Does an STS Become an OSHA Recordable?

**1904.10(a)**
Basic requirement. If an employee's hearing test (audiogram) reveals that the employee has experienced a work-related Standard Threshold Shift (STS) in hearing in one or both ears, **and** the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (averaged at 2000, 3000, and 4000 Hz) in the same ear(s) as the STS, you must record the case on the OSHA 300 Log.

To further clarify, per OSHA's rule for recording hearing loss on the OSHA 300 log, only cases that meet both criteria must be recorded. First, the employee must have at least an average 10 dB shift over their baseline at 2000, 3000 and 4000 Hz. Second, when the variance from audiometric zero, which refers to "0" on the audiogram for perfect hearing, reaches an average of 25 dB or more at 2000, 3000 and 4000 Hz, the case must be recorded.

The first table below is an illustration of a 25 dB average hearing threshold level (HTL) above audiometric zero, and the second table shows an average 10 dB Standard Threshold Shift (STS) for Employee A:

Table 1: An average hearing threshold level (HTL) at the 2,000, 3,000, and 4,000 Hz frequencies of at least 25 db over audiometric zero:

| Frequency (Hz) | Audiometric Zero (dB) | Audiogram HTL (dB) | Difference in HTL (dB) |
|---|---|---|---|
| 2,000 | 0 | 20 | +20 |
| 3,000 | 0 | 25 | +25 |
| 4,000 | 0 | 30 | +30 |

Average HTL = (20 + 25 + 30)/3 = 75/3 = 25 dB

Table 2: An average Standard Threshold Shift (STS)at the 2,000, 3,000, and 4,000 Hz frequencies of 10 dB or more:

EMPLOYEE A

| Frequency (Hz) | Baseline Audiogram HTL (dB) | Annual Audiogram HTL (dB) | Standard Threshold Shift (dB) |
|---|---|---|---|
| 2,000 | 20 | 25 | +5 |
| 3,000 | 25 | 35 | +10 |
| 4,000 | 30 | 50 | +20 |

Average STS = (5 + 10 + 20)/3 = 35/3 = 11.7 dB

The second table above represents the change in employee A's hearing threshold level relative to the baseline audiogram. The **STS = 11.7 dB and HTL = (25 + 35 + 50)/3 = 36.7 dB.** The STS meets both recording criteria. Therefore, **the STS is a recordable STS and must be recorded on the OSHA 300 Log** under the column for hearing loss.

An employee may experience gradual hearing loss while employed by several employers, but never work for the same employer long enough to allow a recordable STS to be captured until the employee's HTL reaches the at least 25 dB over audiometric zero level. Once an employee's HTL reaches the at least 25 dB over audiometric zero level, an average STS of 10 dB or more will result in a recordable STS.

Here are two examples of annual audiograms that would **not** be considered OSHA recordable shifts:

EMPLOYEE B

| Frequency (Hz) | Baseline Audiogram HTL (dB) | Annual Audiogram HTL (dB) | Standard Threshold Shift (dB) |
|---|---|---|---|
| 2,000 | 20 | 25 | +5 |
| 3,000 | 25 | 30 | +5 |
| 4,000 | 30 | 40 | +10 |

**STS = (5 + 5 + 10)/3 = 6.7 dB and HTL = (25 + 30 + 40)/3 = 31.7 dB**. Since this STS only meets the HTL at least 25 dB over audiometric zero criteria, this STS is not a recordable STS.

EMPLOYEE C

| Frequency (Hz) | Baseline Audiogram HTL (dB) | Annual Audiogram HTL (dB) | Standard Threshold Shift (dB) |
|---|---|---|---|
| 2,000 | 0 | 5 | +5 |
| 3,000 | 5 | 15 | +10 |
| 4,000 | 10 | 30 | +20 |

**STS = 11.7 dB and HTL = (5 + 15 + 30)/3 = 16.7 dB.** Since this STS only meets the STS of 10 dB or more criteria, this STS is not a recordable STS.

***Work-relatedness***

The OSHA rule includes a presumption of work-relatedness when employees are exposed to an 8-hour 85 dBA noise exposure level or a total noise dose of 50 percent. However, it is not necessary for the workplace to be the sole cause, or even the predominant cause, of the hearing loss for it to be work-related. Therefore, work-relatedness should be evaluated on a case-by-case basis. The revised rule allows the employer to seek the guidance of the audiologist or physician reviewing the audiometric record to make the determination.

Work with Worksite Medical and the Workers' Compensation Insurance Representative if assistance is needed in making a determination. The article "An Explanation of Recording Hearing Loss on the OSHA 300 Log" by George Cook, Au.D., CCC-A found at http://www.workplaceintegra.com/hearing-articles/OSHA-300.php is also a good source of information.

# Noise Survey

| Instrument | Mfg/Model | Serial Number |
|---|---|---|
| Sound Level Meter | Extech 407732 | 12119103 |
| Sound Level Mic | Extech | NA |
| Sound Level Calibrator | Extech 407722 | 12120666 |

**Sound Level Meter Calibration Checked:**

*Before Measurements:* _____ *After Measurements:* _____

**Area/Equipment Measured:** _____

**Building/Location:** _____

**Measurements** *(Include diagram, if applicable. All measurements are in dBA unless noted otherwise.)*:

_____ _____

*Signature of Individual Conducting Survey* *Date of Survey*

# Section 5 – LOCKOUT/TAGOUT (LOTO)

***Definitions***

Affected Employee: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout/tagout (LOTO), or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duty includes performing servicing or maintenance covered under CFR 1910.147.

Leadership of the Authorized Employee: Supervisor of the employee within the department's line organization.

***Policy***

It is the policy of Messiah University to comply with regulations established under OSHA Control of Hazardous Energy Standard found at 29 CFR 1910.147. This standard mandates training, audits and record keeping ensuring that workers will not be unintentionally injured by unexpected energization or startup of machines or equipment.

Before any employee performs any servicing or maintenance on machinery or equipment, where the unexpected energizing, start up or release of any type of energy could occur and cause injury, the machinery or equipment will be rendered safe to work on by being locked out and/or tagged out.

If more than one employee is working on a piece of equipment, each employee must have his/her own lock affixed to the equipment (or to a lock box which secures the lock out of the equipment) to ensure the continued safety of each employee in the event that other employees complete their work and remove their locks.

All locks used for lockout purpose should have only one accessible key. Either duplicate keys should be destroyed or duplicates should be maintained under the control of Key Services. When Key Services maintains duplicates, the key request procedure must be followed and the manager's approval is required to obtain the key.

All locks should adhere to the lock standard for size and color. Locks designated for LOTO procedures should not be used for other functions (ex: securing lockers or personal items).

A standard tag shall be used for LOTO and shall include the name of the authorized employee who has applied the LOTO, the date it was applied, and the reason for the application. (See *Attachment 3* for sample of tag.)

All employees shall be instructed in the safety significance of the LOTO procedure. This **general awareness** communication shall be made to employees on an annual basis by the Office of Human Resources & Compliance and shall be communicated to all new employees as part of their orientation.

Employees **authorized** to perform LOTO shall receive training commensurate with their responsibilities and as per the OSHA requirements. Area leadership will be responsible to ensure that authorized employees receive this training prior to using lockout in the course of their job assignment. This training (and retraining as required) is explained in detail later in this program.

***General Rules/Procedures***

1. All equipment and machinery shall be locked out or tagged out to protect against accidental or inadvertent operation during any servicing or maintenance activity.
2. Anyone attempting to service or provide maintenance to equipment without the proper lockout when it is required will be disciplined.
3. Anyone operating or attempting to operate any switch, valve, or other energy isolating device that is locked or tagged out will be disciplined.
4. Lockout is the preferred method of isolating machines or equipment from energy sources and shall be used whenever possible.
5. If tags are used without a lock, additional steps shall be taken as may be necessary to provide the equivalent safety available from the use of a lockout device. (See additional information in the Tag Out section of this document.)
6. Equipment obtained or modified after January 2, 1990, will be equipped with lockout capability.
7. An energy source is any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

***Electrical Cord Provides Sole Source of Power***

LOTO of equipment is not required for equipment in which the sole source of energy is an electrical cord and plug, and exposure to the hazards of unexpected energization of start-up of equipment is controlled by unplugging the equipment from the electrical power source, and the plug is under the exclusive control of the employee performing the service or maintenance.

***LOTO Procedure***

This procedure establishes the minimum requirements for the LOTO of energy isolating devices.

The authorized employee shall utilize the machine specific lockout procedure. If this procedure is not available, s/he shall make a survey using *Attachment 4* as a guideline to locate and identify all isolating devices to be certain which switch(s), valve(s), or other energy isolating devices apply to the equipment to be locked or tagged out. More than one hazardous energy source and/or means of disconnect (electrical, mechanical, or others) may be involved. No work should proceed until the authorized employee has isolated all energy sources. If the employee notices that the written lockout procedure for the equipment is not complete or is no longer accurate, s/he should report this to leadership to have the procedure updated immediately. (See section on "Written Equipment Specific Lockout/Tagout Procedures" for more information.)

The authorized employee shall notify all affected employees that a LOTO system is going to be utilized and the reason. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.

The following are the steps to take in applying a LOTO device:

1. If the machine or equipment is operating, **shut it down by the normal stopping procedure**. This is usually done by depressing a stop button, opening a toggle switch, etc. In addition, ensure that all stored energy is dissipated or properly restrained.
2. **Locks and/or tags shall be affixed to each energy isolating device** only by an authorized employee.
3. **Clear all affected employees from the equipment.** Then verify that all interlocks are closed, emergency stops are reset, etc. **Try to operate the equipment** with the switch, valve, or other energy isolating device(s) to verify that it is truly and appropriately locked out and that the equipment is isolated from its energy source(s).
4. If maintenance work is to be performed on the equipment and the equipment has an electrical power source, a voltmeter should be used to verify de-energization of the equipment in addition to attempting to start up the equipment. Locks and tags shall be singularly identified. Locks shall either be engraved with the name of the owner (authorized employee) or a tag shall accompany the lock and bear the name of the authorized employee who affixed the lock. Locks shall be affixed in a manner that will hold the energy isolating devices in a safe or off position.
5. All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained or otherwise rendered safe. (If there is a possibility of re-accumulation of stored energy to a hazardous level verification of isolation shall continue until the possibility of accumulation no longer exists).
6. CAUTION: RETURN OPERATING CONTROL(S) TO NEUTRAL OR OFF POSITION AFTER THE TEST.

***Tagout Only***

Tagout should only be used without lockout if the equipment is incapable of being locked out! If this occurs, the following limitations should be observed:

- Tags, when used, shall be affixed in a manner that will clearly indicate that the operation or movement of the energy isolating device from the safe or off position is prohibited.
- Tags must be securely attached to the energy isolating device so that they cannot be inadvertently or accidentally detached.
- Tags that cannot be affixed directly to the energy isolating device 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.
- Tags are only warning devices and do NOT provide the physical restraint that is provided by a lock.
- Tags should NEVER be removed without authorization of the person responsible for applying it.
- Tags should NEVER by by-passed, ignored or otherwise defeated.
- Tags must be legible and understandable in order to be effective.

- Tags and their means of attachment must be able to withstand environmental conditions in the workplace.
- Be careful that tags don't create a false sense of security.
- For tag out of electrical equipment, at least one additional measure must supplement the tag out that provides a level of safety equivalent to that obtained by the use of a lock. Ex., removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

## Written Equipment Specific Lockout/Tagout Procedures

Specific LOTO procedures will be written and maintained for equipment. One procedure may be used for similar equipment with the same energy sources, methods of lock out, and verification steps. A standard format will be used for all lockout procedures (*see Attachment 5*) unless they are part of the Facility Maintenance TMA system; however, general structure (what to lock out, how to verify, etc.) will still be followed.

NOTE: An electronic template for this form can be obtained by contacting the Office of Human Resources & Compliance.

Machines and equipment shall be evaluated using *Attachment 4* (The Energy Source Determination Checklist). This information will be used to develop equipment specific LOTO procedures.

These procedures will be maintained by the area which "owns" the equipment unless the equipment is part of the facility/buildings in which case Facilities Services will "own" and maintain the procedures. Procedures should be available to all personnel who would need to lockout the equipment and should be reviewed annually. If changes are made to the equipment which could impact the lockout procedure, it should be updated immediately.

*Exceptions To Written LOTO Procedures*:

A written lockout procedure is not required (but lockout must still be performed) if all of the following conditions are met:

- The equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown. (Consider capacitors, kinetic energy, pipeline flow, etc.)
- The equipment has a single source of energy which can be **readily** identified and isolated.
- The isolation and lockout of the energy source will completely de-energize and deactivate the equipment.
- The equipment is isolated from the energy source and locked out during servicing or maintenance.
- A **single** lockout device will achieve a locked out condition.
- The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.

NOTE: Care should be taken in using this exception. If multiple sources of energy are available, or multiple means of locking out a power source are available, even though only one source or method of lockout is required when performing specific work, a procedure must still be written.

***Testing or Positioning of Machines, Equipment or Components***

In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

1. Clear the machine or equipment of tools and materials.
2. Remove affected employees from the machine or equipment area.
3. Remove the lockout or tagout devices.
4. Energize and proceed with testing or positioning.
5. De-energize all systems and reapply energy control measures in accordance with the requirements set forth in this instruction.

***Restoring Machines or Equipment to Normal Production Operations***

1. After the servicing and/or maintenance are complete, and equipment is ready for normal production operations, check the area around the machines or equipment to ensure that no one is exposed.
2. After all tools have been removed from the machine or equipment, guards have been reinstalled and affected employees are in the clear, the authorized employee will remove all lockout or tagout devices and notify the affected employees of their removal. Operate the energy isolating devices to restore energy to the machine or equipment.

## Procedure Involving More than One Authorized Employee

In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own assigned lockout device and/or tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. Another acceptable method is the use of a single lock to lockout the machine or equipment with the key being placed in a lockout box or cabinet which allows the use of multiple locks to secure it. Each authorized employee will then use his/her own assigned lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the hasp, box or cabinet.

## Removal of LOTO Devices by Other than the Authorized Affected Employee

LOTO devices shall be removed from each energy isolating device by the authorized employee who applied it, EXCEPT:

LOTO devices may be removed by leadership of the authorized employee if the authorized employee who applied it is not available and:

a. It is verified that the authorized affected employee who applied the device is not at the facility; and
b. All reasonable efforts were made to contact the authorized affected employee to inform him/her that his/her LOTO device is being/has been removed; and
**c. It is determined that it is safe to remove the lockout device**
d. The authorized employee has this knowledge before he/she resumes work at that equipment.

If a duplicate key is available from key services, then the key request procedure must be followed and authorization from the area manager must be given before the key can be issued. If there is no duplicate key, then the lock must be removed using bolt cutters available from facilities maintenance.

## Shift or Personnel Changes

In the case of shift or personnel changes, a change-over period will be established so that the authorized employees may exchange their assigned locks/tags. Authorized personnel assuming control of lockout or equipment shall be fully briefed in the scope and stage of the work by those whom are being relieved.

## Periodic Inspections

Periodically (at least annually) the effectiveness of the entire program will be evaluated by area leadership or an authorized employee(s) other than the one(s) utilizing the energy control procedure being inspected. Any deviations or inadequacies shall be documented and corrected. Any issues/concerns noted must be addressed immediately by the responsible employee(s). Documentation of this evaluation along with any concerns noted will be maintained in facilities services along with the employee training records for their area; documentation for other areas and their employee training records should be maintained in area files or may be forwarded to the Office of Human Resources & Compliance for record retention.

## Training

Training shall be given to all authorized, affected and other personnel as required by 29 CFR 1910.147. *Attachment 6* provides Key Points for Lockout/Tag-out Training Program and shall be used as a training outline along with the appropriate sections of this policy. Copies may be made and handed out at the training session or it may be projected to a screen. NOTE: Facilities Maintenance may have some training resource materials which can be used in conjunction with this Attachment.

The area leadership or designee will conduct training and prepare a record and certify that the affected employee training has been accomplished. The certification will be made on *Attachment 7* (Training Record). Records of training will be maintained by leadership in each area or by the Office of Human Resources & Compliance.

The area leadership will conduct retraining whenever:

1. there is a change in job assignments;

2. there is a change in machines, equipment or processes that present a new hazard;
3. there is a change in the energy control procedures; or
4. the periodic inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in employee knowledge or use of the energy control procedures.

*NOTE: Annual retraining is not required by OSHA. However, areas may choose to conduct retraining as a refresher for employees even if none of the above "triggers" occur.*

## Electrical LOTO

Electrical work requires a lock and a tag to be used together. However, a tag can be used by itself only if the electrical disconnecting source does not have lockout capabilities.

Locks can be placed without a tag only under the following conditions:

1. Only one circuit or piece of equipment is de-energized.
2. The lockout period does not extend beyond the work shift.
3. Affected employees exposed to the hazards associated with re-energizing the circuit or equipment are familiar with this procedure.

## Electrical Test Verifications of De-energized Circuits

Authorized employees use test equipment to check the circuit elements and electrical parts of equipment to which affected employees will be exposed and shall verify that the circuit elements and equipment parts are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back-feed even though specific parts of the circuit have been de-energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

## Work on Energized Circuits

Work on energized circuits may only be done by authorized individuals in the facilities maintenance department. Approval must be obtained from the Facility Maintenance Service Manager prior to any work on energized circuits. The Service Technician will verify that by de-energizing circuits, it will create additional or increased hazards or it is infeasible due to equipment design or operational limitations. For more information on working on energized circuits and use of the Energized Work Permit, refer to the Electrical Program in the *Safety Manual*.

## Personal Protective Equipment

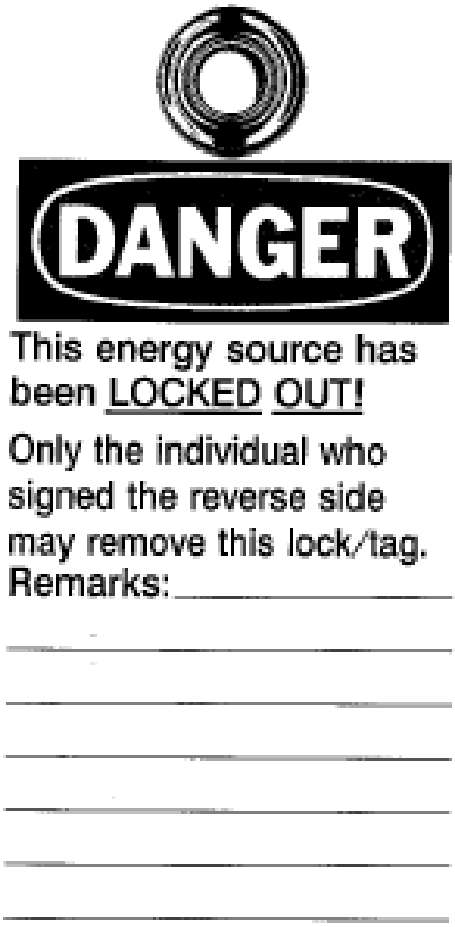
Working on energized parts requires the wearing of appropriate personal protective equipment. Personal protective equipment for electrical hazards shall meet, be used and maintained in

accordance with OSHA Standards. Refer to the Electrical Program in the *Safety Manual* for more information.

## Accidents Concerning LOTO

All LOTO accidents must be fully investigated. Because of their expertise, the Facility Maintenance Service Manager should be involved in all such investigations, regardless of the department/personnel involved. Area leadership will be responsible for reporting the cause of such accidents to the Director of Facility Services and the Office of Human Resources & Compliance.

# Example of Tag Used for LOTO

# Energy Source Determination

In order to determine all energy sources for each piece of equipment, consider the following questions to help in identifying the energy sources; then consider how to properly de-energize and lock out the specific power source. Include in the written lock out procedure for the equipment the specific information for identifying and locking out each power source.

**Does equipment have:**

1. **Electric power (including battery)?**
   If yes, record Motor Control Center (MCC) or power panel and breaker number to be locked out.
   If no numbers are available, where is the location of the MCC, power panel, breaker?
   If the power source is a battery, where is the battery disconnect location?
   Push buttons, selector switches and interlocks may not be used as the sole mean for de-energizing circuits or equipment. Interlocks my not be used in lieu of lockout.
   Stored electrical energy which may endanger personnel must be released (ex, capacitors should be discharged).
2. **Mechanical power?**
   Is it engine driven? If yes, where is the switch or key location? Is a lockout device installed?
   If no, what method can be used to prevent operation?
   Is it spring loaded? If yes, what method can be used to prevent spring activation?
   If no, how can spring tension be safely released or secured?
3. **Chemical system?**
   If yes, where is the location of the main control or shutoff valve? Can the control/shut off valve be locked in the off/closed position? Is the locked/closed position perpendicular to the line?
   If no, where is the location of the closest manual shutoff valve? Does the manual shut off valve have a lockout device?
   If no, what is needed to lock valve closed?
   Is there a bleed or drain valve to safely reduce system pressure and drain system of chemicals?
   If no, how can system be drained and neutralized?
   What personal protective clothing or equipment is needed for this equipment?
4. **Thermal energy?**
   If yes, where is the location of the main control/shut off valve? Can control/shut off valve be locked in off or closed position? What is the locked or closed position – perpendicular to line?
   If no, where is the location of the closest manual shutoff valve? Does the manual shutoff valve have a lockout device?
5. **Kinetic energy?**
   Is there the potential for parts to move or drift after all other sources of power are shut off and locked out? If yes, what needs to be done to prevent or block the movement or drifting?

# Lockout/Tagout Procedure

| | |
|---|---|
| Equipment: | |
| Equipment Tag #: | |
| Building: | |
| Area/Location: | |
| Area of Ownership: | |

*Steps to follow for energy control (include ALL energy sources to be locked out and tagged):*

| |
|---|
| |

*After applying the lock and tag,* ***verify that the equipment is appropriately de-energized and locked out by clearing the equipment/area of all personnel and trying to re-start the equipment using the steps listed below****. This should include verification of all interlocks and emergency stops or other items which could keep the equipment from operating and give a false impression that the lock out was successful.*

| |
|---|
| |

_____ _____

*Signature of procedure's author* *Date*

Dates of procedure review: _____

# Key Points for LOTO Training Program

**General Rules**

- Procedures developed, documented and utilized for control of potentially hazardous energy.
- Staff Member has provided locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware for isolating, securing or blocking machines or equipment.
- LOTO devices singularly identified.
- LOTO devices are used only for controlling energy.
- LOTO devices are not used for other purposes.
- Durable LOTO devices must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
- For tagout devices, standardized print and format.
- Identifiable LOTO devices must indicate the identity of the staff member applying the devices.
- When major modifications are made to machinery electrical systems or when new machinery is installed, the energy source must be designed to accept a lockout device.
- Policy review will be conducted at least annually.
    - ✓ Performed by authorized staff members and management other than those utilizing energy control procedure under inspection.
    - ✓ Designed to correct any deviations or inadequacies observed and policy modification.
    - ✓ Include review of each authorized staff member's responsibilities under the procedure(s). If tagout is used, include review of limitations of tags.

# Training Record/Certification for LOTO

This is to certify that the following individuals received training on Messiah University's energy control program in accordance with 29 CFR 1910.147 and the provisions of the University's lockout/tagout program.

| Name (Print) | Signature | Indicate Type of Training (Authorized, Affected, or Other) |
|---|---|---|
| | | |
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| | | |

*Instructor's Name (Print)*

*Instructor's Signature*

*Instructor's Title*

*Date*

# Section 6 – CONFINED SPACE PROGRAM

***Policy***

It is the policy of Messiah University that employees understand and are aware of confined spaces on University Property. It is the policy of Messiah University that employees are not to perform any confined space entries, perform work in confined spaces, or attempt rescue during a confined space emergency.

This policy will provide a program for

- identifying confined spaces;
- administering an entry permit system;
- safety requirements to be followed by contractors who are entering, exiting, and working in confined spaces at Messiah University.

Outside contractors performing confined space entry on University property are expected to be in compliance with all OSHA 1910.146 Confined Space Standards.

***Definitions***

**Authorized Attendants:** Attendants are individuals stationed outside one or more confined spaces that monitor the authorized entrants.

**Authorized Entrant:** An employee who is authorized to enter a permit required space. Only employees who are trained as an entrant and have obtained a permit signed by the entry supervisor may enter a permit required confined space.

**Confined Space:** A space meets OSHA's definition of a confined space if it meets **ALL** of these factors:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit (e.g., tanks, tankers, silos, storage bins, vaults and pits);
3. Is not designed for continuous employee occupancy.

**NOTE:** If a space fails to meet one or more of these tests, it is not subject to the confined space standard. However, this does not mean that it is necessarily safe.

**Entry:** Entry 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 Supervisor:** Entry supervisors are responsible for determining if acceptable entry conditions are present prior to entry, for authorizing entry and overseeing entry operations, and for terminating the entry. An entry supervisor may also serve as an attendant or authorized entrant if properly equipped and trained.

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

> ***NOTE:*** Non-permit required spaces may become permit confined spaces according to the type of work being performed. Some work (i.e. welding) can create a hazardous atmosphere, thus making it a permit required confined space.

**Permit Required Confined Space:** If a space meets the definition of a confined space (and all three tests as defined above), then it must be determined if it also is a **permit required** confined space. To be a PRCS, it must also have **one or more** of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an entrant;
3. 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 smaller cross-section; or
4. Contains any other recognized serious safety or health hazard.

***Training***

All employees who may enter, attend, or supervise employees entering confined spaces must be trained. New hires that will participate in confined space entry should be trained prior to entering a confined space. Re-training will occur if there is evidence that the need exists (ex. lack of following procedures, change in procedures, etc.).

Persons who are required to work in confined spaces or in support of those working in confined spaces (attendants) shall be trained and received instructions in the following areas:

- Nature of the work to be performed
- Emergency confined space entry and exit procedures
- Use of entry and emergency equipment

## Responsibilities for Confined Space Entry

***The Office of Human Resources & Compliance shall:***

1. Assist departments with identifying, labeling, and documenting confined spaces. A list of confined space locations on Messiah's Campus is found in *Attachment 8*; however, this may change without notice.
2. On an annual basis, review all canceled permits to ensure that the policy remains effective. Take corrective measures if issues are noted that need to be addressed; this can include communications to the Facility Service Manager/Project Manager, initiating changes in the procedures, re-training, etc.

***The Facility Maintenance Service Manager shall:***

1. Recommend personal protective equipment (PPE), if necessary.
2. Contact Eichelberger's to rent multi-gas meter.
3. Schedule hoist/tripod for inspection (only needed if the equipment is used for rescue procedures or if it has been dropped).
4. Review outside contractor's written Confined Space policies, training certificates, and Safety Data Sheet's (SDS's).

***The Entry Supervisor shall:***

(NOTE: Entry supervision can be contracted to Cocciardi and Associates, Inc.)

1. Conduct evaluations of confined spaces and classify as either a Permit Required Confined Space or Non-Permit Required Confined Space. A listing of confined space locations on Messiah Campus is found in *Attachment 8*; however, this may change without notice.
2. Conduct atmospheric testing to verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.
3. Develop, conduct, and document employee confined space training for the work being performed.
4. Maintain and distribute confined space entry equipment including tripod, air monitoring instrumentation, and harnesses, as necessary.
5. Whenever possible, notify the Office of Human Resources & Compliance of upcoming confined space activities at least two (2) days prior to entry.
6. Identify those employees who will be involved with confined space work and ensure that they have received confined space certification training. The Office of Human Resources & Compliance will maintain a list of those employees who have received this training.
7. Generate Confined Space Permit prior to work in a permit-required confined space (see *Attachment 9*).
8. Perform any necessary lockout/tagout procedures needed to ensure safe entry.
9. Ensure the appropriate personal protective equipment (PPE) is available and used, if necessary.
10. Ensure the proper safe lighting equipment is available to enable employees to see well enough to work safely and to exit the space quickly in the event of an emergency.
11. Ensure barriers and shields to protect workers from pedestrian and vehicular traffic are available.
12. Ensure the appropriate ladders needed for safe ingress and egress by authorized entrants are available.
13. Ensure rescue, retrieval, and emergency equipment is available to extract or treat injured personnel.
14. Ensure employees know emergency procedures (i.e. emergency phone numbers, fire extinguisher locations).
15. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

16. Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted, and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
17. Verify that rescue services are available and that the means for summoning them are operable.
18. Ensure removal of unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
19. Determine, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
20. Terminate the entry and cancel the permit as required in accordance with this policy.
21. **Have current CPR and First Aid certification**.

***The Authorized Entrant***

1. Apply his/her lockout to any equipment/pipelines, etc. in order to ensure safe entry and maintain safe occupancy during operation.
2. Know the hazards that may be encountered during entry, including information on the mode, signs or symptoms, and consequences of the exposure. Must be given the opportunity, if she/he so desires, to observe atmospheric measurements (oxygen, combustible gases, hazardous air contaminants).
3. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by this section.
4. Know how to properly use personnel protective equipment (PPE) and retrieval equipment provided.
5. Alert the attendant whenever:
    a. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
    b. The entrant detects a prohibited condition.
6. Exit from the permit space as quickly as possible whenever:
    a. An order to evacuate is given by the attendant or the entry supervisor.
    b. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
    c. The entrant detects a prohibited condition.

***The Authorized Attendants shall:***

1. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
2. Be aware of possible behavioral effects (i.e. disorientation, faulty judgment) of hazardous exposure in authorized entrants.

3. Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.
4. Remain in a designated location outside the permit space during entry operations until relieved by another attendant.
5. Assist the occupants entering the confined space, but shall not, at any point, enter the confined space.
6. Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
7. Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
    a. If the attendant detects a prohibited condition.
    b. If the attendant detects the behavioral effects of hazard exposure in an entrant.
    c. If the attendant detects a situation outside the space that could endanger the entrants.
    d. If the attendant cannot effectively and safely perform all the duties stated in this section.
8. Summon rescue and other emergency services (911), and safety dispatch x6005, as soon as the attendant determines that entrants may need assistance to escape from permit space hazards. Safety dispatch will notify 911, if necessary and if contact has not yet been made.
9. Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
    a. Warn the unauthorized persons that they must stay away from the permit space.
    b. Advise the unauthorized persons that they must exit immediately if they have entered the permit space.
    c. Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
    d. Perform no duties that might interfere with the attendant's primary duty to monitor and protect the entrants.
10. Perform non-entry rescues; must know how to use non-entry retrieval equipment.
11. **Have current CPR and First Aid certification.**

## Confined Space Entry Permit Requirements

A confined space entry permit is required to authorize entry into a confined space. See *Attachment 9*.

1. A confined space entry permit/checklist must be filled out by the Entry Supervisor.
2. Only those who have been trained in the areas described in this policy shall sign the confined space entry permit.

3. A thorough review of the checklist must be completed at the confined space location by the Entry Supervisor. The signed permit, along with special precautions to be followed, must be handed to and discussed with those persons who will enter the confined space.
4. It shall be specifically stipulated on the permit exactly when it will begin and expire.

**NOTE:** For NO reason will the permit extend into the following shift or day without being reissued and approved.

5. The approved permit shall be posted in close proximity to the confined space entrance. Also, a sign stating that a "Confined Space Entry is in Progress" shall be posted in close proximity to the confined space.
6. **The canceled permit shall be forwarded to the Office of Human Resources & Compliance** who shall retain each cancelled entry permit for at least one (1) year. These permits shall be reviewed annually as required by OSHA and a record of the review shall be kept.

## Preparation for Confined Space Prior to Entry

***Removal of Residual Materials:***

Residual materials in the confined space shall be removed before work is started. Sludge or encrustation shall be removed to as large an extent as possible before entry.

**Exceptions** can be made only if low levels of hazardous materials are involved and the employee is totally isolated from exposure to the residual material and/or the hazards created by it (i.e. suffocation hazard of partially filled tanks, crush hazards of materials caked on top/sides of the space). Exceptions are to be considered on a case-by-case basis.

Prior to any entry, monitoring/testing must be conducted and the result must be within the parameters outlined under Atmospheric Testing in this section.

Consideration should also be given to by-products and secondary hazards of contents/residual materials. For example: Is dust present that could create an explosion hazard? Are biologicals present which could decay, resulting in "pockets" of hazardous gases?

***Purging:***

The confined space must be purged to ensure fresh air prior to entries using a mechanical air blower or exhauster that is safe for service in the specific environment.

1. Thorough purging is best accomplished by carefully choosing the best location of the suction and discharge of the exhaust blower/exhauster. Locate the blower suction and discharge at the opposite ends of the confined space or attach a flexible duct to the exhauster suction and extend it to a remote part of the space when only a single opening is available.

**Exceptions** to step 1 can occur in cases where it is not practical to ventilate the area because the residual materials cannot be removed. In such cases, SCBA or continuous airline respirators must be worn and work will be outsourced to an outside company. (This exception does not apply when residual material is flammable).

2. The rate and volume of fresh air purging is to be determined by the nature and quantity of the residual material and the size and configuration of the confined space.
3. The discharge of the purged air must be located where it will not present a flammability/toxicity hazard.

***Isolation:***

All pipelines, which are intended to discharge a hazardous material into the confined space, must be isolated from the confined space as follows:

1. Where practical, each pipeline shall be physically disconnected from the space or unit, and blind flanges installed and tagged on the live end of the pipe. All blind flanges are to be of materials that are corrosion resistant and must be rated for the line pressure, per ASME specifications.
2. If the requirements of (1) are not practical, acceptable isolation may be achieved by installing slip blanks between flanges in the pipeline upstream of the line's entry into the unit, but as close as possible to the piping entrance.
3. If (1) and (2) are not possible or practical, and the materials are NOT hazardous, isolation may be achieved by locking and tagging tow valve in series in the closed position and providing an open bleed line between the valves with a visible discharge (DOUBLE BLOCK AND BLEED).
4. If (1, 2, 3) are all totally impractical, the pipelines should be re-engineered to permit compliance or an alternate plan for safe isolation should be developed and approved by the person responsible for signing off on the confined space entry permit.

***Lockout:***

All electrically controlled movable equipment (agitators, storage tank pumps, elevator motor, fans and other energized equipment) that could cause injury if energized, shall be deactivated and locked and tagged in the OFF position, in accordance with Messiah's LOCKOUT/TAGOUT procedures (also see 3 above for lockout of pipelines).

***Moveable Equipment Drives:***

In addition to LOCKOUT and where practical, it is recommended that any movable equipment drives have the drive belt physically disconnected or the electric motor leads be disconnected.

***Atmospheric Testing:***

The atmospheric testing described below shall be performed on all confined spaces before entry.

Atmospheric testing is required for two distinct purposes:

1. Evaluation of hazards of the permit space.
2. Verification that acceptable conditions exist for entry into that space.

**Evaluation Testing:** The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to 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 be done by, or reviewed by, a technically qualified professional (e.g. OSHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional) based on evaluation of all serious hazards.

**Verification Testing:** The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all containments identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. **Testing order should be oxygen, flammables, and then toxics.** Results of testing (i.e. actual concentration) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

**Duration of Testing:** Measurement of values for each atmospheric parameter will be monitored continuously.

**Testing stratified atmospheres:** When monitoring for entries involving descent into atmospheres which may be stratified, the atmospheric envelope should be tested a distance of approximately four (4) feet (1.22 meters) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

**Retest:** Periodically retest to verify that the atmosphere remains within acceptable entry conditions.

Testing must occur in the order listed below. (For example, insufficient oxygen could result in an erroneous combustible gas test.)

1. <u>Oxygen</u>:
   An oxygen test for deficiency and enrichment shall be performed using an appropriate meter before entering **ALL** confined spaces. The sample shall be taken at representative points with the unit. The oxygen concentration must be in the range of 19.5% to 23.5% before entry is permitted.

2. <u>Flammable/combustible gases, vapors or mists</u>:
   A flammable gas test shall be performed using an appropriate meter calibrated as per the manufacturer's recommendations and qualitatively tested before each use. Concentrations of gases, vapors, or mists will not exceed ten percent of its lower explosive level (LEL).

3. <u>Additional Contaminants</u>:
   When the confined space has contained material which is toxic by inhalation, the confined space must be tested by analyzing a grab sample taken at a representative point. This testing shall be performed using direct-reading instruments (i.e. Draeger tubes, etc.).

Results shall be such that persons will not be exposed to concentrations above those specified by industry standards. (Ex. ACGIH TLVs.) Whenever possible, exposure should not exceed 50% of the limit. Note: **Employees should never be permitted to enter a space that measures the ceiling limit or the IDLH.**

4. Ambient Temperature:
   Consideration shall be given to providing a confined space that is neither excessively hot nor cold. Engineering controls, administrative controls or personal protective equipment controls shall be implemented to counteract the hazard (decreasing order of preference).

***Respiratory Protection Requirements:***

1. If the atmosphere in a confined space is a potential health hazard and/or toxic, personnel entering the confined space must wear an open circuit, positive pressure, full-face piece airline respirator or a full-face piece Self Contained Breathing Apparatus (SCBA). **This work will be contracted out to an outside vendor.**
2. If the atmosphere in a confined space is below the Immediately Dangerous to Life and Health (IDLH) level, personnel entering a confined space must wear, as a minimum requirement, PAPR (Positive Air Purified Respirator) and check all O2 levels.
3. Negative pressure air purifying respirators SHALL NOT be worn for confined space entry if the atmosphere is hazardous.
4. For welding or gas cutting operations in a confined space, personnel shall wear the same respiratory protection as in (1).
5. Airline respiratory protection may be deleted in areas that are open top with adequate general ventilation and if the confined space does not contain any materials hazardous to health.
6. In areas with limited access, respirators may be deleted, providing all three of the following conditions exists:
   - The vessel is free of any potentially hazardous materials
   - Welding or gas cutting is not being performed.
   - Mechanical ventilation is provided.
   - All atmospheric testing is within compliance.
7. All respiratory protection equipment must be NIOSH/OSHA approved for the service for which it is being used.

***Electrical Appliance:***

1. Lighting equipment for confined space entry shall be powered by a 12-volt electrical system. If a 110-volt system is preferred, a ground fault interrupter must be connected to the electrical system outside of the confined space.
2. All electrical systems must be an approved type for the location and hazards.
3. If powered electrical tools are used in a confined space, a ground fault interrupter must be connected to the electrical system outside of the confined space.

***Emergency Response Equipment:***

1. A full-body harness and D-ring shall be properly fitted to each person entering an enclosed confined space. A lifeline shall be attached to the body harness extending out to the primary exit to the attendant and shall be located as to permit safe removal of the individual.
2. Where rescue is to be accomplished by lifting the person vertically, mechanical hoisting equipment shall be provided directly above the entry opening (for purposes of hoisting the person by the lifeline), mounting either on overhead structures (capable of supporting the weight of the person) or on a detachable pulley support frame. The equipment shall be such that a rescue team can readily lift the person.
3. A continuous supplied air respirator shall be located near the attendant ready for immediate use. This would be coordinated by using Cocciardi and Associates at 717-766-4500. **Messiah University employees cannot use air supplied respirators.**

***Exit Capabilities:***

Before entry, the means of exiting shall be determined. Any special precautions for entry or exit must be taken and clearly specified on the permit checklist. Each case must be evaluated separately.

***Attendants and Rescue Teams:***

1. All confined space operations shall require an Authorized Attendant for personnel in the unit. The Attendant's primary function is to assure continued safe work in the confined space throughout the duration of the job and to call for rescue aid if assistance is required.
2. An Authorized Attendant may pass tools but shall have no other job that will take his/her attention away from the person(s) in the confined space (i.e. Attendant must not walk to a vehicle parked away from the personnel in the confined space to get tools, etc.).
3. An Authorized Attendant must be trained in the duties assigned to confined space entry and rescue. Training records should be kept on file and updated as re-training occurs.
4. An Authorized Attendant shall maintain either constant observation of person(s) in confined space, maintain constant radio, or voice contact with the employee in the confined space.
5. An Authorized Attendant shall provide constant surveillance of the work and protective equipment associated with the confined space entry.
6. An Authorized Attendant shall visually observe the continuous gas and oxygen monitor. If an alarm is activated, the Authorized Attendant shall notify the individual in the confined space to abort the entry.
7. Whenever an emergency condition requires the immediate removal of a person, the Authorized Attendant shall:
    - Summon aid immediately by activating a previously agreed to alarm/notification plan.
    - Perform rescue work from OUTSIDE the confined space.

**AT NO TIME SHALL AN INDIVIDUAL ENTER**

**THE CONFINED SPACE**

**UNTIL ADDITIONAL ASSISTANCE**

**ARRIVES AT THE SCENE!**

For every location involved in confined space entry, a rescue team shall be assigned and trained annually to provide quick and effective first aid, CPR and rescue. This would be coordinated by using Cocciardi and Associates, Inc. at 717-766-4500. Training in First Aid and CPR is available through the Messiah University Safety Department. Messiah University does not have their own rescue team but contracts this service (ex., Cocciardi and Associates, Inc.).

***Burning Inside Confined Spaces:***

1. All the standard procedures required for burning or hot work as per Messiah University policy shall be followed.
2. Air monitoring will be conducted on a continuous basis. If the monitor indicates flammability concentrations in the confined space other than zero, welding or other burning will be stopped immediately and will resume only after an investigation shows that it is safe to do so.
3. Where welding or burning will take place inside a unit, NIOSH/OSHA approved continuous airline respirators or positive pressure self-contained breathing apparatus shall be required for all persons inside the unit, and such work will be conducted by an outside contractor.
4. Welding or burning shall not be done if flammable dusts are present in the confined space or in the air around the confined space.

***Other Hazardous Work in Confined Spaces:***

If it is necessary to perform other hazardous work inside the confined space, the nature of the job, the hazards and the necessary safety precautions shall be thoroughly evaluated on a case-by-case basis. The Entry Supervisor shall clearly describe the precautions effectively to all those who will do the work.

***Equipment and Tools:***

1. Tools shall be in good condition and proper for the use intended.
2. For entry into metal confined spaces, all portable electric equipment must have ground fault circuit interrupters installed at the electrical outlet or the supply voltage shall be 12-volt or less.
3. When there is the possibility of flammable liquids or gases being present, any electrical tools or equipment must be explosion proof or intrinsically safe.

4. If there is a possibility of flammable liquids or gases being present, spark-generating operations (grinding, drilling, scraping, hammering with spark generating tools, etc.) shall not be permitted.
5. Good illumination within the confined space shall be provided.
6. Cylinders of compressed gases must not be taken into a confined space. Exempt from the rule are cylinders that are part of a self-contained breathing apparatus or resuscitation equipment.

***Personal Protective Equipment (PPE)***

1. Normal requirements for proper PPE apply for confined space entry.
2. All PPE requirements must be designated on the permit form, and fully explained to the persons involved in the confined space entry.

## Completion of Work

1. When work has been completed in a confined space, the Entry Supervisor shall verify the following:
   - All personnel, equipment and materials have been removed from the confined space.
   - Locks and tags have been removed from all valves and piping and disconnected lines secured.
   - Personnel working in the confined space have removed all electrical equipment locks and tags.
   - All openings have been secured for normal operations.
   - Housekeeping has been completed.
   - The cancelled entry permit shall be sent to the Office of Human Resources & Compliance who shall retain for at least one (1) year and conduct an annual review of the canceled permits to determine if there are any deficiencies in the confined space program.

   Any problem encountered during an entry operation shall be noted on the pertinent permit so that appropriate revision to the permit program can be made.
2. After all items have been completed, the Entry Supervisor can remove his/her lock from the main deactivation point and make the equipment ready for service.
3. Emergency stand-by equipment shall be replaced and made ready for service.

## Confined Space Contractor Information

| **Company** | **Phone Number** |
|---|---|
| Cocciardi & Associates, Inc | 717-766-4500 |
| Eichelbergers, Inc | 717-766-4800 |
| Sponaugle | 717-703-3245 or 717-564-1515 |

# Confined Space Locations
# at Messiah University

| Sollenberger Sports Center: | Number of spaces | Location | Description of location | Permit Required? | Contracted out for entry? |
|---|---|---|---|---|---|
| Water Storage Tanks | 1 | Mechanical Room | Under Pool, 1,000 gallon tanks | Yes | Yes |
| Pool Surge Pits | 1 | Pool Area | Under manhole at south end of lane pool | Yes | Yes |
| Pool Filter Tanks | 2 | Mechanical Room | Under Pool, 1,000 gallon tanks | No | Yes |

| Eisenhower Campus Center: | Number of Spaces | Location | Description | Permit Required? | Contracted out for entry? |
|---|---|---|---|---|---|
| Boiler Tank | 1 | Rm 113 Mechanical Room | 3,000 gallon tank | No | Yes |
| Grease Tank | 1 | Outside Lottie door towards Central Campus | 1,000 gallon tank | Yes | Yes |

| Building | Number of Spaces | Location | Description | Permit Required? | Contracted out for entry? |
|---|---|---|---|---|---|
| Smith Residence | 1 | Rm C4 Mechanical Room | 1,000 gallon tank, boiler tank | No | Yes |
| Naugle Residence | 1 | Rm B13 Mechanical Room | 1,000 gallon tank, boiler tank | No | Yes |
| Miller/Hess Residence | 1 | Outside, in front of Hess | 93,000 gallon tank, boiler holding tank | Yes | Yes |
| Kelly Residence | 2 | Rm C6A | 500 gallon tanks | No | Yes |
| South Complex | 1 | Outside, northside of building | 85,000 gallon tank | Yes | Yes |
| Bertram House | 1 | Outside, towards Starry Field | 500 gallon tank, grinder pump tank | No, if LOTO | No |
| Larsen Student Union | 1 | Grease trap, delivery entrance | 300 gallon | No | Yes |
| Boyer Hall | 1 | B001 | Crawl Space | No | No |

*****All sewer/water/communication manholes located on campus*****

# Messiah University

## Confined Space Entry Permit

1. **Purpose:** *(Check One)*
   - ☐ Permit Required Confined Space Entry
   - ☐ Permit Required Confined Space **Declassification** and Entry
   - ☐ Other: _____

2. **Project Information:**

Location of confined space: _____

**DURATION OF PERMIT:** *(Not to exceed 24 hours, or task listed below)*

Entry Date: _____ Start Time: _____ Stop Time: _____

Description of work to be performed/purpose of entry:

| |
|---|
| |

3. **Employee Assignments:**

| | | | |
|---|---|---|---|
| Supervisor*: | | Trained in Confined Space: | |
| Attendant(s)*: | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| Entrant(s): | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |
| | | Trained in Confined Space: | |

**These individuals must also have current certification in First Aid/CPR.*

**4. Rescue Services***

Participant(s): _____ Trained in Confined Space: _____

_____ Trained in Confined Space: _____

_____ Trained in Confined Space: _____

_____ Trained in Confined Space: _____

Confirmed (date/time): _____ Emergency Contact # _____

**Required for Permit Required Confined Space Entry*

**5. Safety Procedures:**

Energy Lockout:

Double Blinds/Blanks (isolation):

Ventilation Requirements:

Signs:

Barricades:

Trenching Requirements:

Briefing (Emergency Action Plan):

Employee Alarm System/Communication:

Continuous Air Monitoring Requirements (for/by):

**6. Confined Space Atmospheric Measurements**

*Measurements must be taken in the order listed below.*

| | **Acceptable Limits** | **Measurement** | **Initials** | **Date/Time** |
|---|---|---|---|---|
| Oxygen by volume | >19.5%, <24% | | | |
| *Flammable or Explosive Gases, LEL* | No indication on equipment | | | |
| ***List Contaminants:*** *Ex. Hydrogen Sulfide*<br><br>*Carbon Monoxide* | **TLV-TWA/PEL*:**<br>TLV = 10 ppm<br>(50% = 5 ppm)<br>TLV = 25 ppm<br>(50% = 12.5 ppm) | | | |
| | | | | |
| | | | | |

***NOTE:** *Air contaminants should be tested. If the level exceeds 50% of the TLV or PEL, entry should require an air purifying respirator. If it reaches the TLV-STEL, the TLV-Ceiling or IDLH, SCBA is required and contractors should be performing the work.*

7. **Equipment and PPE Used During Entry:** *(Check all that apply)*

| | | |
|---|---|---|
| ☐ Tripod w/mechanical wench | ☐ General/local exhaust ventilation | ☐ Gloves |
| ☐ Rescue tripod w/lifeline | ☐ Air purifying respirator | ☐ Chemical resistant clothing |
| ☐ Harness | ☐ Self-contained breathing apparatus (SCBA) | ☐ Hearing protection |
| ☐ Two-way communication | ☐ Hard hat | ☐ Safety glasses/ goggles/face shield |

☐ Other: _____

8. **Other Permits in Space (e.g. hot work):**

9. **Other Contractors in Space:**

10. **Comments:**

11. **Permit Posted at:**

12. **PRIOR TO ENTRY: I certify that all procedures required by this permit and the OSHA Standard 29 CFR 1910.146 will be enforced.**

| _____ | _____ | _____ |
|---|---|---|
| *Supervisor Signature* | *Date* | *Time* |

13. **CLOSURE OF PERMIT: I certify that all procedures required by this permit and the OSHA Standard 29 CFR 1910.146 were followed; all personnel and tools removed from the confined space; the permit removed and voided; and the confined space locked/closed.**

| _____ | _____ | _____ |
|---|---|---|
| *Supervisor Signature* | *Date* | *Time* |

Equipment problems incurred during activities:

Incidents/Accidents incurred during activities:

Comments:

**14. Certification: RECLASSIFYING OF CONFINED SPACE, IF APPLICABLE:**

*This section should only be completed and signed if the permit-required confined space is being reclassified as a non-permit required confined space.*

Testing/inspection have demonstrated that the hazards within the permit space have been eliminated; the permit space is reclassified as a non-permit confined space for as long as the hazards remain eliminated.

| *Supervisor Signature* | *Date* | *Time* |
|---|---|---|

---

## After this permit is closed, forward a copy to the Office of Human Resources & Compliance for record keeping.

# Section 7 – BIOTERRORISM READINESS PLAN

***Policy***

It is the policy of Messiah University to provide a readiness plan for educational purposes if a bioterrorist act should occur on campus. This document is not intended to provide an exhaustive reference on the topic of bioterrorism; rather it is intended to serve as a tool to provide the necessary first response for Messiah University employees.

All employees are reminded that open and accurate communications are very important during events that might have an adverse impact on the students or operation of the University. Under no circumstances should any employee provide any information, interviews or statements to the media. All questions, inquiries and concerns should be directed to the Office of Marketing and Communications, extension 6027, or Vice President for Operations, extension 6003.

**The following is guidance for emergency response to a bioterrorism incident:**

## Contacts

Internal Contacts

- Dispatch: Emergency, ext. 6565; non-emergency, ext. 6005
- Engle Center, ext. 6035
- Vice President for Operations, ext.6003

Internal Contacts After Hours

Dispatch will be responsible for contacting the individuals listed below:

- K. Shafer, Vice President for Operations
- B. Miller, Director of Facility Services
- B. Neuenschwander, Director of Safety

Winding Hill Facility Contacts

- Vice President for Operations
- Please have the staff at Winding hill email Danielle Rutherford at drutherford@cra-architects.com with any building concerns. Her cell is 717-756-3022 for urgent emergencies.

External Contacts

- CDC, Center for Disease Control (404) 639-2888
- CDC Emergency Response Office 24 Hour Hotline, Bioterrorism Emergency Number (770) 488-7100
- CDC Healthcare Infections Program (404) 639-6413
- CDC General Information 1-800-CDC-INFO (1-800-232-4636)
- Cumberland County Control, Call 911
- Federal Bureau of Investigation (FBI) Local Field Office:

228 Walnut Street

Harrisburg Pa, 17101

717-232-8686

- Pennsylvania Department of Health; Secretary of Health, Phone No. 1-877-724-3258 (1-877-PA-HEALTH)
- Pennsylvania Emergency Management (717) 588-6900 (State), (717) 766-0756 (Local)
- Postal Inspection Service, 1-888-876-2455
- Regional Poison Control Center 1-800-222-1222
- Upper Allen Township
  Emergency Management
  100 Gettysburg Pike
  Mechanicsburg, PA 17055

## How to Identify Suspicious Packages and Letters

Some characteristics of suspicious packages and letters include the following:

- Marked with threatening message
- Excessive postage
- Handwritten or poorly typed addresses
- Incorrect titles
- Title, but no name
- Misspellings of common words
- Oily stains, discolorations or odor
- Powdery substance on item
- Strange odors
- No return address
- Shows a city or state in the postmark that does not match the return address
- Excessive weight
- Excessive security material such as masking tape, string, etc.
- Lopsided or uneven envelope
- Marked with restrictive endorsements, such as “Personal” or “Confidential” or “Do Not X-Ray”
- Visual distractions
- Protruding wires or aluminum foil
- Ticking sound

## What to Do If You Receive a Suspicious Letter or Package

If the situation is not an emergency but something appears questionable, notify the senior-most supervisor present immediately. If a senior supervisor is not available to make a determination, contact dispatch.

1. Do not shake, empty, try to open, or move any suspicious envelope or package.
2. Do not pass on to others to look at.
3. Leave the letter or package where it is or gently place it on the nearest flat surface.
4. If possible, gently cover the envelope or package with anything (e.g., clothing, paper, trash can, etc.) and do not remove this cover. NOTE: If package is suspected to contain a bomb, do not cover.
5. **Call Messiah University Dispatch x6565 to report the incident.** Dispatch will contact a Safety Officer who will respond to the scene. The Officer will then determine if other outside agencies should be notified and will make the necessary contacts.
   **At Winding Hill, contact the VP of Operations** who will make a decision regarding the need for an outside agency.

   **Please have the staff at Winding Hill email Danielle Rutherford at drutherford@cra-architects.com with any building concerns. Her cell is 717-756-3022 for urgent emergencies.**
6. Secure the room by closing the door, or section off the area to prevent others from entering.
7. **If a bomb is suspected**, refer to the following section on *How to Handle a Suspected Bomb*.
8. **If a suspicious powder is present or a biological agent is suspected**, refer to the following section on *How to Handle Suspicious Powder/Biological Agent Threats*.

## How to Handle a Suspected Bomb

1. **TURN OFF CELL PHONES AND RADIOS** as they may trigger detonation.
2. Do not touch or handle package.
3. Evacuate the area, if possible.
4. Stay calm and contact Dispatch. At Winding Hill, call 911.
5. Alert supervision if they have not already been contacted.
6. If, in addition to a suspicious package, an actual bomb threat was received (by phone, email or written note), complete the Bomb Threat Call Procedure & Checklist (*Attachment 10*), also found in Section 14 in this manual.

## How to Handle Suspicious Powder/Biological Agent Threats

**RELAX AND REMAIN CALM; DO NOT PANIC** – Although any threatened use of biological agents must be treated as though it is real, experience has demonstrated that these are likely to be a HOAX.

1. If powder spills out onto a surface, do not try to clean up the powder. Cover the spilled contents immediately with anything (e.g., clothing, paper trash can, etc.) and do not remove this cover.

**NOTE:** If the suspected biological agent is reported as Anthrax, be assured that it is NOT contagious, and that treatment is readily available if administered before the onset of symptoms. Anthrax organisms can cause infection in the skin, gastrointestinal system, or the lungs. To do so, the organism must be rubbed into skin, swallowed, or inhaled as a fine, aerosolized mist. Disease can be prevented after exposure to the anthrax spores by early treatment with the appropriate antibiotics. Anthrax is not spread from one person to another person. For anthrax to be effective as a covert agent, it must be aerosolized into very small particles. This is difficult to do and requires a great deal of technical skill and special equipment. If these small particles are inhaled, life-threatening lung infection can occur, but prompt recognition and treatment are effective.

2. Secure the room by closing the door, or section off the area to prevent others from entering. If you have touched the article in question, you could possibly be contaminated. DO NOT leave the area as you could potentially contaminate others. Remain in the area for further instructions by the Safety Officer. At Winding Hill, staff should email Danielle Rutherford at drutherford@cra-architects.com with any building concerns. Her cell is 717-756-3022 for urgent emergencies. Then contact the Vice President for Operations.
3. **At all locations**, if a bomb is not suspected and a cell phone is available, take photos of the package/letter to send to leadership, Department of Safety and/or other emergency responders. The Department of Safety should be included in the pictures for Winding Hill location for this type of emergency.
4. Alert supervision.
5. **Call Messiah University Dispatch x6565 to report the incident.** Dispatch will contact a Safety Officer who will respond to the scene. The Officer will then determine if other outside agencies should be notified and will make the necessary contacts. **Safety Officer should not enter space.**
   **At Winding Hill, report the incident to 911.**
6. Avoid contact with others when possible. List all people who were in the room or area when this suspicious letter or package was recognized. Give this information to the Safety Officer who responds to the scene. At Winding Hill, this information should be given to police who respond to the 911 call.

If individuals must remove contaminated clothing prior to receiving instructions from the responding official, avoid agitation and excessive handling of clothing. Place in labeled plastic bags or some other container that can be sealed. This clothing bag/container should be given to the emergency responders for proper handling.

## Room Contamination by Aerosolization (i.e., via HVAC)

For example: if the air handling system is contaminated or a biological agent is released in a public space.

**NOTE: At Winding Hill**, staff must call the Landlord to handle this type of emergency as they have control of the HVAC system. Contact Danielle Rutherford; her cell is 717-756-3022 for urgent emergencies. She can also be reached at drutherford@cra-architects.com.

For Messiah University main campus and Bowmansdale facility, use the following procedure:

1. Turn off local fans or ventilation units in the area, if possible.
2. Secure the room by closing the door, or section off the area to prevent others from entering. If you were in the area in question, you could possibly be contaminated. DO NOT leave the general vicinity as you could potentially contaminate others. Remain in the area for further instructions by the Safety Officer.
3. **Call Messiah University Dispatch x6565 to report the incident.** Dispatch will contact a Safety Officer who will respond to the scene. The Officer will then determine if other outside agencies should be notified and will make the necessary contacts. The Safety Officer should not enter the space.
4. **Contact Facility Services to shut down air handling system in the building.**
5. Avoid contact with others when possible. List all people who were in the room or area when the agent was released. Give this information to the Safety Officer who responds to the scene.

## Evacuation Due to Bioterrorism Threat

**If the threat is believed to be immediate to the area**, the employee is authorized to alert individuals in the area to evacuate. The Safety Officer will secure the area when s/he arrives on the scene. At Winding Hill, evacuate the areas and call 911/Upper Allen Police.

**If the threat is believed to be immediate to the building**, the employee is authorized to activate a fire pull alarm to evacuate the building. S/he should advise Dispatch/Safety Officer of the reason immediately after exiting the building. At Winding Hill, activate a fire alarm, call 911 and contact Danielle Rutherford at 717-756-3022 (building landlord representative).

**If there is no recognized immediate danger or if the employee is uncertain if an evacuation is necessary,** supervision and/or the Department of Safety will determine if the area/building should be evacuated and will take the proper steps to begin the evacuation process. For Winding Hill, supervision and/or the landlord's representative (Danielle Rutherford) will make the determination. Contact Ms. Rutherford at 717-756-3022.

## Department of Safety Protocol During Bioterrorism Threat

*This section only applies to the main campus of Messiah University and the Bowmansdale Facility. The Department of Safety would not be involved in bioterrorism threats at Winding Hill.*

### Dispatch Responsibilities

1. When an incident is reported to Dispatch of a suspected Bioterrorism act (e.g. suspicious or hazardous mail, anthrax scare, etc.), the dispatcher shall contact the officer on duty for him/her to respond to the scene.
2. If the area is equipped with surveillance cameras, the dispatcher shall monitor the area on camera to observe any changes in the package and to ensure no unauthorized individuals enter the area.

3. Once the Safety Officer has arrived on the scene and has verified an actual bioterrorism incident has occurred, the Safety Officer will notify the dispatcher. The dispatcher will immediately contact the following:
    - Vice President for Operations
    - Director of Safety
    - Director of Facility Services

### Safety Officer Responsibilities

**OFFICER SAFETY IS CRITICAL; DO NOT BECOME A VICTIM YOURSELF. Do not enter the area/room if you are uncertain of what you might be exposed to or what dangers might be present.**

1. The Safety Officer will secure the area, not allowing access to anyone except proper authorities responsible for the incident investigation and/or decontamination. The Officer should not enter the area but secure it from the outside.
2. The Safety Officer will have Dispatch contact Cumberland County Communications, 911, to have the local police authorities respond.
3. The Safety Officer will ensure that all exposed victims are in a separate, secure and private area. The officer will inform exposed victims that they are not to call or talk to anyone regarding the situation until accurate information is gathered; this includes friends and family. Keeping the possibly exposed victims together in a private area reduces the chance of further exposure to the campus community and will help keep all those involved calm and safe.
4. The Safety Officer will ensure that Dispatch has made the appropriate contacts to those listed above under Dispatch responsibilities.
5. If building ventilation system needs to be shut down, the Safety Officer will ensure that Facility Services has been contacted.
6. The Safety Officer will await the arrival of local authorities and direct them to the scene.
7. **Complete an incident report and involve input from all employees that participated in the activities.**

## Decontamination of Individuals in Bioterrorism Incident

1. The decontamination process will be supervised by the government agencies responding to the incident.
2. If individuals must remove contaminated clothing prior to receiving instructions from the responding official, avoid agitation and excessive handling of clothing. Place in labeled plastic bags and seal.
3. Contact Public Health officials for further instructions on decontamination and contact **the Center for Disease Control (404) 639-2888 for treatment, vaccine and prophylaxis information specific to the exposure.**

## Communication to the University Community

Any communication will be made with the involvement of the Vice President for Operations and the Vice President for Human Resources and Compliance. In the event of an incident or outbreak which would cause the University to close down or to isolate an area of campus, one or more of the following procedures will be followed to inform all students and employees:

- A mass email will be sent out explaining the incident and the procedures that will need to be followed.
- A message will be left on the Messiah emergency phone number (717-691-6084).
- A text message will be sent to all students and employees who are signed up to receive the alerts.
- A message will be posted on the Messiah webpage.

## Post Bioterrorism Incident De-Briefing

After any type of a Bioterrorism incident has occurred, a debriefing will be scheduled; this meeting will be conducted as soon as possible and will include all individuals involved in the incident as well as the Vice President for Operations, the Director of Facility Services, the Director of Safety, and the Vice President for Human Resources and Compliance. If the campus Post Office was involved, the Director of Printing and Mailing Services should also be involved in this debriefing. This debriefing will cover any feedback from those involved, a detailed summary of the investigation, what improvements could be added to enhance the policy, and what education may be necessary for employees in the future.

At Winding Hill, this meeting would include all individuals involved in the incident, the Vice President for Operations, the Vice President for Human Resources and Compliance, and a representative of the building landlord. Contact Danielle Rutherford at drutherford@cra-architects.com to arrange for a representative.

# Bomb Threat Call Procedure & Checklist

## BOMB THREAT CALL PROCEDURES

Most bomb threats are received by phone. Bomb threats are serious until proven otherwise. Act quickly, but remain calm and obtain information with the checklist on the reverse of this card.

**If a bomb threat is received by phone:**

1. Remain calm. Keep the caller on the line for as long as possible. DO NOT HANG UP, even if the caller does.
2. Listen carefully. Be polite and show interest.
3. Try to keep the caller talking to learn more information.
4. If possible, write a note to a colleague to call the authorities or, as soon as the caller hangs up, immediately notify them yourself.
5. If your phone has a display, copy the number and/or letters on the window display.
6. Complete the Bomb Threat Checklist (reverse side) immediately. Write down as much detail as you can remember. Try to get exact words.
7. Immediately upon termination of the call, do not hang up, but from a different phone, contact FPS immediately with information and await instructions.

**If a bomb threat is received by handwritten note:**

- Call _____
- Handle note as minimally as possible.

**If a bomb threat is received by email:**

- Call _____
- Do not delete the message.

**Signs of a suspicious package:**

- No return address
- Excessive postage
- Stains
- Strange odor
- Strange sounds
- Unexpected delivery
- Poorly handwritten
- Misspelled words
- Incorrect titles
- Foreign postage
- Restrictive notes

**DO NOT:**

- Use two-way radios or cellular phone; radio signals have the potential to detonate a bomb.
- Evacuate the building until police arrive and evaluate the threat.
- Activate the fire alarm.
- Touch or move a suspicious package.

### WHO TO CONTACT (select one)

- **Follow your local guidelines**
- **Federal Protective Service (FPS) Police 1-877-4-FPS-411 (1-877-437-7411)**
- **911**

## BOMB THREAT CHECKLIST

**Date:** _____ **Time:** _____

**Time Caller Hung Up:** _____ **Phone Number Where Call Received:** _____

### Ask Caller:

- Where is the bomb located? (Building, Floor, Room, etc.)
- When will it go off?
- What does it look like?
- What kind of bomb is it?
- What will make it explode?
- Did you place the bomb? Yes No
- Why?
- What is your name?

### Exact Words of Threat:

_____

_____

_____

_____

### Information About Caller:

- Where is the caller located? (Background and level of noise)
- Estimated age:
- Is voice familiar? If so, who does it sound like?
- Other points:

**Caller's Voice**

- ❑ Accent
- ❑ Angry
- ❑ Calm
- ❑ Clearing throat
- ❑ Coughing
- ❑ Cracking voice
- ❑ Crying
- ❑ Deep
- ❑ Deep breathing
- ❑ Disguised
- ❑ Distinct
- ❑ Excited
- ❑ **Female**
- ❑ Laughter
- ❑ Lisp
- ❑ Loud
- ❑ **Male**
- ❑ Nasal
- ❑ Normal
- ❑ Ragged
- ❑ Rapid
- ❑ Raspy
- ❑ Slow
- ❑ Slurred
- ❑ Soft
- ❑ Stutter

**Background Sounds:**

- ❑ Animal Noises
- ❑ House Noises
- ❑ Kitchen Noises
- ❑ Street Noises
- ❑ Booth
- ❑ PA system
- ❑ Conversation
- ❑ Music
- ❑ Motor
- ❑ Clear
- ❑ Static
- ❑ Office machinery
- ❑ Factory machinery
- ❑ Local
- ❑ Long distance

**Other Information:**

_____

_____

**Threat Language:**

- ❑ Incoherent
- ❑ Message read
- ❑ Taped
- ❑ Irrational
- ❑ Profane
- ❑ Well-spoken

_____

_____

_____

Homeland Security

# Section 8 – RESPIRATOR PROGRAM

***Policy***

The purpose of the Messiah University Respiratory Protection Program is to ensure that all employees who may be required to wear any type of NIOSH approved respirator, as part of their job assignment, completely understand their proper use and selection. Respirators will be used to control occupational diseases caused by breathing air contaminated with harmful dust, fogs, fumes, mists, gases, smokes, sprays, or vapors. Any change or modification to this program must be approved by the Office of Human Resources & Compliance.

The Office of Human Resources & Compliance will be responsible for administration and supervision of the respiratory protection program. The guidelines in the Messiah University Program will be based on the Occupational Safety and Health Administration's (OSHA) Standard 29 CFR 1910.134.

## Where to Use Respirators

Employees in the following areas may be required to wear respirators due to the nature of their operations:

1. Campus and Building Services – Employees assigned to use the Clorox 360 Disinfectant System. Any employee performing this task will be fitted with a NIOSH N95 respirator (dust mask).
2. Engle Center – Employees providing health care where the use of a NIOSH N95 respirator is required to protect them from airborne contaminants which could cause significant adverse health effects to the provider.

***NOTE: There are no other areas on campus where the use of respirators is presently required!***

Employees performing duties in these areas will be trained and educated in accordance with the procedures outlined in the training section of this program. Supervisors will be responsible for notifying the Office of Human Resources & Compliance concerning any change of an employee's health status that may disqualify him/her from using a respirator, or any new or transferred employee who will need to be trained. Most work that requires respirator use is contracted out (ex., asbestos abatement, lead program compliance). **UNDER NO CIRCUMSTANCES WILL MESSIAH UNIVERSITY EMPLOYEES BE REQUIRED TO WEAR SELF-CONTAINED BREATHING APPARATUS (SCBA); THIS WORK WOULD BE PERFORMED BY A CONTRACTOR.**

**NOTE:** In the past, a maintenance employee has been certified/licensed to provide asbestos abatement and as such was fitted with a full-face APR. However, the decision was made to have all asbestos abatement work conducted by outside contractors and therefore no maintenance employees are currently approved to wear a respirator. Although the only respirators in current use by employees on campus are the N95 units, this written program includes elements that would be necessary should additional types of respirators be necessary for employee use in the future.

## Selection of Respirators

When choosing a respirator, a number of factors have to be taken into consideration. Employees will be made aware that respirators do have their limitations and will not eliminate all hazards. Employees will also be made aware that if the equipment is not properly fitted, maintained and kept in serviceable condition, a respirator may fail and over-exposure could occur.

Messiah University will use the following criteria to select respirators for its employees:

1. Chemical and physical properties of the contaminant.
2. Characteristics of the hazards present in each operation performed.
3. Toxicity and concentration of the hazardous material.
4. Period of time respiratory protection may be needed.
5. Amount of oxygen present.
6. Nature and extent of work to be performed.
7. Respirator/protection factors and respirator fit. Consideration should be given to the employee's need for corrective lenses and respirator fit if such lenses must be worn.
8. Work rate and mobility required.
9. Location of hazardous material with respect to a safe area having breathable air.
10. Emergency or routine use.

If an employee, after having received a respirator, determines that there is a problem(s) with it, the Office of Human Resources & Compliance should be notified immediately. A respiratory protection program can only be effective if all employees communicate to make it so.

## Respirators Are Divided into Two Major Classifications:

### *Air Purifying Respirators (APRs)*

APRs remove contaminants by passing breathing air through a purifying element (cartridge). Many cartridges are available to protect against specific contaminants, but they all fall into two subclasses:

a. Particulate purifying elements which employ a mechanical filter element.
b. Gas and vapor cartridges or purifying elements that utilize chemical sorbents contained in a cartridge or canister (used for emergency ACM removal).

Limitations to the applications of APR's are that they are specific for certain types of contaminants, so the identity of the hazardous agent must be known. There are maximum concentration limits for exposure to many hazardous substances; this requires knowledge of the ambient concentration of the contaminant, as well as the maximum use limit (MUL) of the respirator/purifying element. Since APR's only clean the air, ambient concentration of oxygen must be sufficient (>19.5%) for the user.

### *Air Supplying Respirators (ASRs)*

ASRs provide a substitute source of clean breathing air. The respirable air is supplied to the worker from either a stationary source through a long hose or from a portable container. The first type is called supplied air respirators (SAR's) and the latter are known as self-contained breathing apparatus (SCBA's). These devices can be used regardless of the type of airborne contaminant or

oxygen concentration. However, the contaminant concentration limits vary for the different types of SAR's, and the wearer must be aware of the limitations of his/her respirator.

## Characteristics and Factors Used for Respirator Selection

| HAZARD | RESPIRATOR TYPE |
|---|---|
| 1. **Oxygen Deficiency**. Immediately Dangerous to Life and Health (IDLH). | Any positive pressure SCBA. |
| Not IDLH. | Any positive pressure SCBA or supplied air respirator. |
| 2. **Gas and vapor contaminants**. IDLH | Positive pressure SCBA;<br>Combination positive pressure SAR with auxiliary self-contained air supply. |
| Not IDLH | Any positive pressure SAR, gas mask or chemical cartridge respirator. |
| 3. **Particulate contaminants** | Any positive pressure SAR including abrasive blasting respirator, powered APR equipped with high efficiency filters, an air purifying respirator with a specific particulate filter. |
| 4. **Gaseous and particulate contaminants**. IDLH | Positive pressure SCBA;<br>Combining positive pressure SAR with auxiliary self-contained air supply. |
| Not IDLH | Any positive pressure SAR, gas mask, chemical cartridge respirator. |
| 5. **Escape** from contaminated atmosphere | Any positive pressure SCBA, gas mask, combination positive pressure SAR with escape SCBA. |
| 6. **Fire fighting** | Any positive pressure SCBA. |

*Note: IDLH – "Immediately dangerous to life and health" is any condition that poses either an immediate threat to life or health or an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse delayed effects on health.

## Requirements for Medical Approval, Fit Testing and Training

| Respirator Type | Use | Requirements | | | |
|---|---|---|---|---|---|
| | | Appendix D | Medical Approval | Fit Testing | Training |
| Dust Mask | Voluntary | X | | | |
| Dust Mask* | Required | | | X | X |
| Half-Face APR* | Voluntary | X | X | | X |
| Half-Face APR* | Required | | X | X | X |
| Full-Face APR* | Voluntary | X | X | | X |
| Full-Face APR* | Required | | X | X | X |
| Air Supplying (SAR/SCBA)* | All uses | | X | X | X |

* Use of these will not be permitted by employees on campus without approval by the Office of Human Resources & Compliance. Employees may not supply their own respirators for voluntary use.

***Training and Education***

Training will be given in the proper use of the respirator being used to all employees as noted in the table above. If respirator use is required, training will be provided prior to the employee's initial use of the respirator and annually thereafter. As part of their training, employees will be given an opportunity to handle a respirator, wear it in normal air for a period of time to become familiar with it and practice adjusting it. **Employees will not be permitted to use respiratory protection equipment in atmospheres immediately dangerous to life or health (IDLH).** Outside emergency responders will be called for rescue situations and a contract company will be used for hazardous spill cleanup. It is important for users to know that improper respirator use, poor maintenance, or an improper fit, can cause acute or chronic diseases and possibly death from over-exposure to contaminants present in the air.

The respiratory protection training and education program will focus on explanation of the following:

1. Nature of respiratory hazards and what may happen if the respirator is not used properly.
2. Engineering and administrative controls being used and the need for the respirator as added protection.
3. Reason(s) for selection of a particular type of respirator.
4. Limitations of the selected respirator.
5. Methods of donning and removing the respirator and checking its fit and operation.
6. Proper use of the respirator.

7. The need to leave a respirator use area if any of the following occurs:
    a. The need to wash faces or respirator face pieces to prevent eye or skin irritation.
    b. The detection of vapor or gas breakthrough, change in breathing resistance (including what might feel like an increase in the temperature of the air into the lungs), or leakage of the face piece.
    c. The need to replace the respirator, filter, cartridge or canister elements.
8. Respirator cleaning, maintenance and storage.
9. Proper methods for handling emergency situations.

***Fit Testing***

Fit testing will be conducted per the table above. Since no one respirator fits everyone, it will be necessary to fit-test each employee required to use one. The employee will be fitted with the respirator/respirator type assigned to them. All employees will receive fitting instructions, including demonstrations and practice with how to wear the respirator, how to adjust it and how to determine if it fits properly for the type(s) each is required to use. Qualitative fit testing will be used to check for leaks in the face piece for full-face air purifying respirators and SARs. Either qualitative or quantitative may be used for half-face air purifying respirators. To ensure proper protection, the face piece shall be checked for leaks by the wearer <u>each time</u> s/he puts on the respirator.

Respirator protection depends on the equipment being used. When a good face seal is not achieved, a respirator shall not be worn. Conditions that could prevent a good face seal are:

1. Growth of beard or sideburns.
2. A skull-cap that projects under the face piece.
3. Absence of one or both dentures.
4. Temple pieces of glasses.
5. Significant weight gain or loss.

***Respirators and Auxiliary Components***

Presently, no employees are authorized to wear air-purifying respirators at Messiah University other than N95 units. Should a need arise in the asbestos abatement program or the lead program, outside contractors will be involved and not Messiah employees. If, in the future, the need occurs to have an employee fitted for an air-purifying respirator other than a N95, only full-face, air-purifying respirators will be used.

NIOSH N95 respirators (dust masks) are used in conjunction with the Clorox 360 System (as noted on the SDS for this product). NIOSH N95 respirators are also used in the Engle Center by health care providers.

NOTE: Filtering facepieces (dust masks) are available in some areas for **voluntary** use.

APR filters will be designated with an “N” (respirators/filters not resistant to oil), “R” (resistant to oil), or “P” (oil-proof). The number following the letter indicates the % efficiency of the filter. Selection should be made as follows:

- Series N, P, or R: if no oil particles are present in the workplace, use a filter of any series
- Series P or R: if oil particles are present, use an R- or P- series. R-series may be used for only one shift if oil aerosols are present. N-series cannot be used if oil particles are present.
- Series P only: if oil particles are present and the filter is to be used for more than one workshift, only P-series may be used.

Presently, the following canisters/purifying elements are used at Messiah University:

| **Canister/Purifying Element & P/N** | **Use** | **MUC*** |
|---|---|---|
| NA | NA | NA |

* MUC – maximum use concentration

***Maintenance and Care***

Only **disposable** NIOSH N95 respirators are presently required for use on campus. However, if other APR are used in the future, they must be properly maintained to retain the original effectiveness; this would linclude:

Inspection for defects (including a leak check)--All respirators must be inspected routinely before and after each use. The inspection check will cover tightness of connections, condition of the face pieces, headbands, valves, connecting tubes and canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration. These parts can be kept pliable and flexible and prevent the rubber or plastic from forming into an abnormal shape by stretching and manipulating these parts with a massaging action. These inspections will be conducted by the wearer; however, any problems found will be reported to the Office of Human Resources & Compliance immediately and the unit must be removed from use.

Cleaning and disinfecting--Respirators will be cleaned and disinfected before they are issued and after each use. Respirators can be cleaned in a mild detergent solution and disinfected by immersion in a sanitizing solution specially provided for that purpose. Strong cleaning and sanitizing agents, along with many solvents can damage rubber or elastomer respirator parts.

Repairs--All repairs will be made by experienced and trained personnel, with parts designed for each particular respirator OR the respirator will be replaced. No attempt will be made to repair or replace components or make adjustments beyond the manufacturer's recommendations. Reducing or admission valves or regulators will be returned to the manufacturer or to a trained technician for adjustments or repairs.

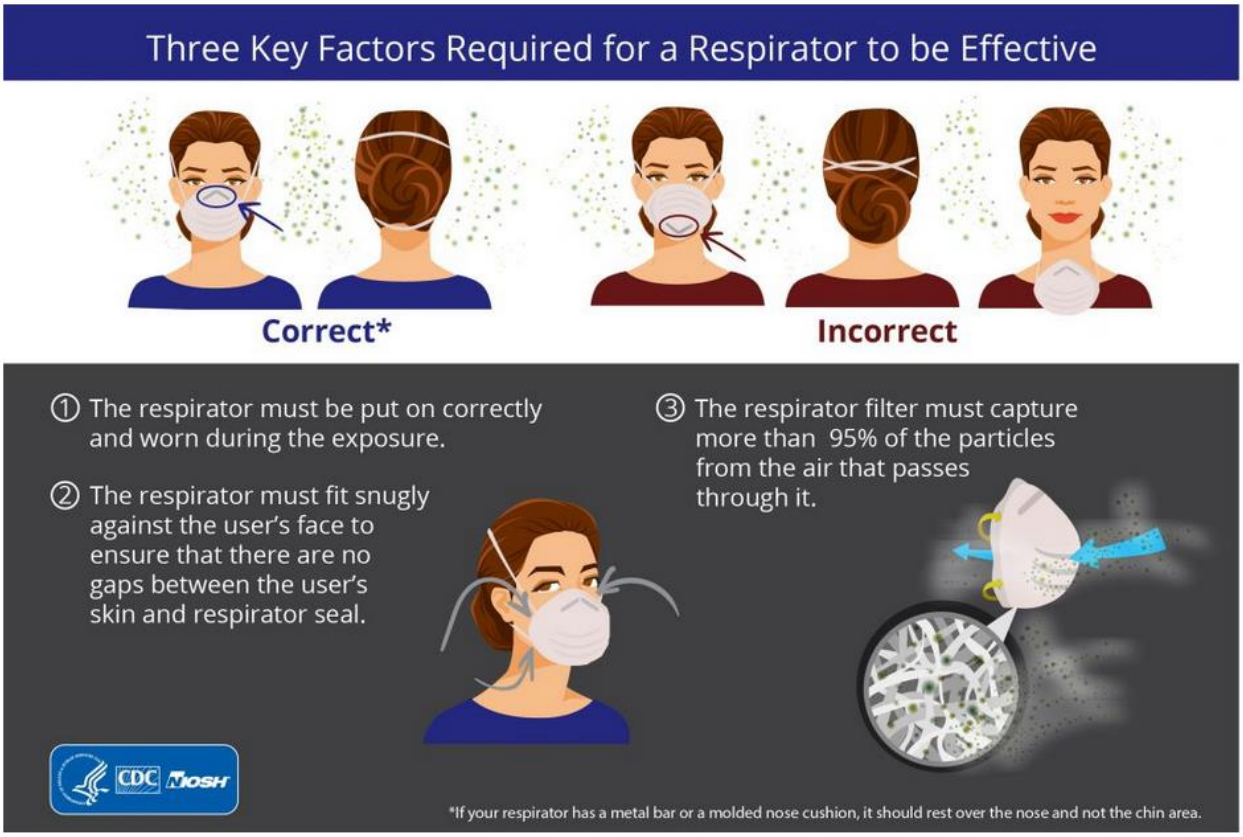
Storage--Respirators will be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture or damaging chemicals. Respirators placed at stations and work areas for emergency use will be quickly accessable at all times. Storage will be in such a way that the face piece and exhalation valve will rest in a normal position and function will not be impaired. There are presently no respirators for emergency use maintained at the University.

**NOTE: NIOSH N-95 respirators are NOT reusable. They are intended for a single shift of use and must then be discarded.**

## Dust Masks

Dust masks (ex., N-95) are available for **voluntary** use by employees. Where the use of a dust mask is required, compliance with OSHA's Respirator Standard including fit testing and training will be conducted for the users. Appendix D of the Respirator Standard *(Attachment 11)* will be made available to all employees who voluntarily elect to use a dust mask.

The following infographic was taken from the NIOSH blog and demonstrates the correct use of a dust mask:




The following chart explains the differences in the types of dust masks:

| Filter Class | | Resistance to Oil | Minimum Percentage of Airborne Particles Filtered |
|---|---|---|---|
| **N** | 95<br>99<br>100 | Not Resistant | 95%<br>99%<br>99.97% |
| **R** | 95<br>99<br>100 | Resistant | 95%<br>99%<br>99.97% |
| **P** | 95<br>99<br>100 | Oil Proof | 95%<br>99%<br>99.97% |

## Medical Status

No employees will be permitted to use a respirator (except for the **optional** use of dust masks) unless it has been determined by a doctor that they are physically able to perform the assigned work while using the assigned respirator. The employee will provide the examining doctor with pertinent data and guideline's regarding the requirements of each employee's working environment in order to get a proper determination regarding the individual's physical ability to wear a respirator in normal performance of their duties. Employees will have their medical status reviewed anytime there is a change in work or medical conditions.

## Record Keeping

All records required by this OSHA standard will be maintained by Human Resources and/or Facility Services (asbestos abatement licensing records). Records pertaining to the medical portion will be maintained by HR&C Office (Employee Health and Wellness Coordinator) along with all other employee medical records.

## Program Evaluation

An evaluation of the respirator program will be conducted annually by the Office of Human Resources & Compliance. This will include completion of the "Annual Respirator User Review" form by each respirator user (*Attachment 12*). Completed forms will be submitted to the Office of Human Resources & Compliance for review. S/he will take any necessary action required as a result of the information provided on the form and will retain the completed forms for proof of the evaluation.

# Appendix D to Sec. 1910.134 (Respirator Standard)

(Mandatory)

**Information for Employees Using Respirators When Not Required Under the Standard**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator’s limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

# Annual Respirator User Review

Employee Name: _____ Date: _____
*(Print)*

**Type of respirator you use (check all that apply):**

☐ Full Face ☐ Half Face ☐ Air Purifying* ☐ SAR

Manufacturer: _____

** NIOSH N95 respirators are half-face, air-purifying respirators.*

**Since your last fit test, have any of the following occurred:**

| | YES | NO |
|---|---|---|
| 1. Have you experienced any symptoms that are related to your ability to use a respirator? (Ex., shortness of breath, heart issues, seizures, diabetes, etc.) | | |
| 2. Have you experienced changes in your physical condition that could impact the fit of your respirator? (Ex., facial scarring, dental changes, cosmetic surgery, body weight, etc.) | | |
| 3. If you wear prescription eye glasses and have the eyepiece insert for your respirator, has your prescription changed since you received the eyepiece? | | |

**If you receive your fit testing & training as part of asbestos abatement licensing/certification:**

| | YES | NO |
|---|---|---|
| 1. Have you been fit tested in the past year and are records available as proof of this fit testing? | | |
| 2. Have you received respirator training in the past year and are records available as proof of this training? | | |

Do you have any suggestions for improvement of Messiah University's respirator program? Have you incurred any problems with any aspect of the respirator program?

_____

*Employee's Signature and Date*

**The following questions should be completed by the reviewer:**

| | YES | NO |
|---|---|---|
| Does the employee need to have another medical evaluation? *(Question 1 above)* | | |
| Does the employee need to be fit-tested again? *(Question 2 above)* | | |
| Does the employee need to have their eyepiece prescription updates? *(Question 3 above)* | | |
| Do any changes need to be made to the respirator program based on feedback from the employee? | | |

For any questions answered "yes" in this section, it is the responsibility of the reviewer to ensure that the appropriate corrective action is taken.

_____

*Reviewer's Signature and Date*

# Section 9 – INJURIES AND ILLNESSES

***Policy***

It is the policy of Messiah University to eliminate or minimize incidents which might lead to employee injuries or illnesses on the job. However, if they do occur, Messiah University will comply with all regulations regarding reporting and recordkeeping and will act to prevent reoccurrence. This policy applies to ALL locations and facilities of Messiah University.

## OSHA Recordkeeping and Reporting

Recordkeeping - Injury and Illness Log

Per OSHA 1904.2, NAICS Code 6113, Colleges, Universities, and Professional Schools (and 6117, Educational Support Services) are exempt from the requirements for recordkeeping and annual reporting of workplace injuries and illnesses. However, per 1904.41, OSHA may request in writing the completion and submission of their annual survey form and, per 1904.42, the Bureau of Labor Statistics may request in writing the completion and submission of their Survey of Occupational Injuries and Illnesses Form. In either case, Messiah University will comply with such requests.

NOTE: All needlestick and sharps injuries will be documented as required by the Needlestick Safety & Prevention Act and OSHA's Bloodborne Pathogen Standard, 1910.1030. In addition, because needle stick injuries and cuts from sharp objects contaminated from another person's blood or body fluids and a Standard Threshold Shift hearing loss are reportable on the OSHA 300 Log, if these occur during the year that a request for submission has been made by OSHA or the Bureau of Labor Statistics, they must be included in the report(s).

Reporting Fatalities, Hospitalizations, Amputations and Loss of an Eye

OSHA 1910.39 - Despite the exemption noted above, all employers must report the following to OSHA:

1. Any employee fatality as a result of a work-related incident must be reported within 8 hours.
2. Any in-patient hospitalization of one or more employees as a result of a work-related incident must be reported within 24 hours.
3. Any employee amputation as a result of a work-related incident must be reported within 24 hours.
4. Any employee loss of an eye as a result of a work-related incident must be reported within 24 hours.

**NOTE:** OSHA interprets the term "work-related" very loosely. If the incident occurred at work, it may need to be reported; OSHA will then make a determination if it is truly work related (ex., heart attack that occurs at work). Please contact the Office of Human Resources & Compliance if uncertain.

*Additional clarification on reporting requirements:*

- Only fatalities occurring within 30 days of the work-related incident must be reported to OSHA.

- In-patient hospitalization, amputation or loss of an eye must be reported to OSHA only if they occur within 24 hours of the work-related incident.
- OSHA defines in-patient hospitalization as a formal admission to the in-patient service of a hospital or clinic for care or treatment. Employers do not have to report an in-patient hospitalization that involves only observation or diagnostic testing. You must only report each in-patient hospitalization that involves care or treatment.
- An amputation is the traumatic loss of a limb or other external body part. Amputations include a part, such as a limb or appendage, that has been severed, cut off, amputated (either completely or partially); fingertip amputations with or without bone loss; medical amputations resulting from irreparable damage; amputations of body parts that have since been reattached. Amputations do not include avulsions (tissue torn away from the body), enucleations (removal of the eyeball), deglovings (skin torn away from the underlying tissue), scalpings (removal of the scalp), severed ears, or broken or chipped teeth.
- If the incident was caused as a result of a motor vehicle accident that occurred in a construction work zone, then employers must report the fatality, in-patient hospitalization, amputation, or loss of an eye to OSHA. If the motor vehicle accident occurred on a public street or highway, but not in a construction work zone, then employers do not have to report the fatality, in-patient hospitalization, amputation, or loss of an eye to OSHA. However, it must be recorded on the OSHA injury and illness records, if required to keep OSHA injury and illness records*.
- Employers do not have to report the fatality, in-patient hospitalization, amputation, or loss of an eye to OSHA if it occurred on a commercial or public transportation system (e.g., airplane, train, subway, or bus). However, it must be recorded on the OSHA injury and illness records, if required to keep OSHA injury and illness records*.
- If the fatality or in-patient hospitalization is the result of a heart attack it must be reported. The local OSHA Area Office director will decide whether or not to investigate the incident.
- Also, for further guidance, please see OSHA's clarification on the determination of work-relatedness found at OSHA 1904.5 or online at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9636.

How to Report to OSHA

Messiah University has three options for reporting the event:

1. By telephone to the OSHA Area Office nearest to the site of the work-related incident. Messiah University is located in OSHA Region 3 (Philadelphia); the phone number is (215) 861-4900.
2. By telephone to the 24-hour OSHA hotline (1-800-321-OSHA or 1-800-321-6742).
3. Electronically, using the Serious Event Reporting Online Form on OSHA's public website (https://www.osha.gov/) or at https://www.osha.gov/pls/ser/serform.html .

**If the need for such a report should occur, the Vice President for Human Resources and Compliance and the Vice President/Provost of the area in which the employee was injured must be involved and the University President must be notified immediately. The Vice President(s) will make the report; however, accurate information to report must be provided to them immediately after the incident so that additional information can be obtained, if necessary, and the report completed within the time constraints. If the incident occurs during off-shift hours or during a weekend, contact the Dispatch Office for a list of phone numbers for the Vice President(s). Although unlikely, if the incident occurred at Winding Hill during off-shift hours or during a weekend, contact the Dispatch Office at the main campus for the list of phone numbers (717-691-6005).**

What to Report

Employers must give OSHA the following information for each fatality, in-patient hospitalization, amputation, or loss of an eye:

1. The establishment name;
2. The location of the work-related incident;
3. The time of the work-related incident;
4. The type of reportable event (i.e., fatality, in-patient hospitalization, amputation, or loss of an eye);
5. The number of employees who suffered a fatality, in-patient hospitalization, amputation, or loss of an eye;
6. The names of the employees who suffered a fatality, in-patient hospitalization, amputation, or loss of an eye;
7. Your contact person and his or her phone number; and
8. A brief description of the work-related incident.

## Reporting a Serious Injury or Death to the U.S. Chemical Safety and Hazard Investigation Board (CSB)

The U.S. Chemical Safety and Hazard Investigation Board (CSB) has chemical accident reporting requirements (OE-3 2020-02). The CSB requires reporting of **any accidental release of certain chemicals into the ambient air that results in a fatality, serious injury, or substantial property damage**. Serious injury includes in-patient hospitalization; substantial property damage is damage estimate of at least $1,000,000. Reporting is not based on the quantity of chemical released or the airborne concentration of the release. This reporting requirement applies to extremely hazardous substances (any substance which may cause death, serious injury, or substantial property damage, including any amount of any regulated substance) or regulated substances (those listed pursuant to the authority of 42 U.S.C.7412(r)(3) and listed by the U.S. Environmental Protection Agency (EPA) in 40CFR§68.130 Tables 1 through 4). For more information, refer to https://www.csb.gov/assets/1/6/csb_guidance_on_accidental_release_reporting.pdf.

## Injury and Illness Reporting for Employees and Student Employees

All injuries of employees must be reported to a University designee as soon as possible (but within 24 hours of the event). Supervision is required to submit the report in conjunction with the employee via the online "Incident Report" form. This form is available on FalconLink. In the "search anything…" window, type "Incident Report" and click the search icon (magnifying glass); then click on the link that appears. This report must be completed in as much detail as possible. When finished, clicking on submit will automatically send a copy to the Employee Health & Wellness Coordinator and VP for HR&C.

The Employee Health & Wellness Coordinator (or designee if the Employee Health & Wellness Coordinator is not available) will report the incident to the Workers Compensation carrier within three (3) business days of receiving the report.

If the employee requires treatment, s/he must go to one of the medical providers listed on the Physician Panel provided by our Workers Compensation insurance carrier. This list is available on FalconLink (search for "Workers' Comp – Panel of Physicians"), at various locations throughout campus and from the Human Resources Department. The supervisor is required to provide the employee with a copy of the Panel of Physicians at the time of the incident/injury regardless of whether the employee requires treatment or not.

**Please note:** Student employees must use this same physician panel; they cannot use the Engle Center for a work-related injury.

The Employee Health & Wellness Coordinator will send to the injured employee (and copy the supervisor) several forms in the Encova Insurance Company's "Injury Kit" that must be completed and returned promptly. The employee should make copies for his/her records:

- INCIDENT REPORT – This is used to outline your injury.
- MEDICAL RECORDS RELEASE – This allows the insurance company to obtain medical records related to your work injury and will limit the potential for providers to inadvertently bill you for treatment related to your work injury.
- Sign and date the EMPLOYEE'S RIGHTS & DUTIES UNDER SECTION 306(f.1) OF THE PENNSYLVANIA WORKERS' COMPENSATION. This serves as your acknowledgement that you have been provided with the Panel of Physicians and you understand your rights and duties. When seeking medical treatment within the first 90 days of your injury, you are required to use a provider on the Panel of Physicians.
- Sign and date the NOTICE: MEDICAL TREATMENT FOR YOUR WORK INJURY OR OCCUPATIONAL ILLNESS.
- If you seek medical treatment, please give the provider the PHYSICIAN STATEMENT OF PHYSICAL CAPABILITIES to complete.
- If you need to fill a prescription as a result of your injury, please take the FIRST FILL INFORMATION form to one of the pharmacies listed on the last page of the Injury Kit.

At each monthly meeting of the Workplace Safety Committee, the Employee Health & Wellness Coordinator (chair of Committee) will review the previous month's reported incidents. Any

suggestions made by committee members to prevent reoccurrence of the incident will be followed up by the Committee chair.

Temporary Agency Employees

Temporary agency employees must immediately report an on the job injury/incident to the Messiah employee who is supervising their work on campus along with reporting injuries to their temporary employment agency. While workers' compensation is paid through their agency, Messiah University needs to know about such incidents to correct any safety concerns which could lead to others receiving similar injuries. The same incident reporting form used for other employees should be used for temporary agency employees (under type of employee, the option for agency employees should be select).

## Employee's Right to Report Injuries and Illnesses

Under federal law, every worker has the right to report work-related injuries and illnesses without fear of retaliation. If you believe that you are in any manner being discriminated against because of reporting a work-related injury or illness, you may contact OSHA at:

OSHA Region III Office.....215-861-4900

OSHA Harrisburg.....717-782-3902

# Section 10 – ENVIRONMENTAL, HEALTH AND SAFETY AUDIT PROGRAM

***Policy***

It is the policy of Messiah University to maintain a safe and healthy environment for employees and students; to protect the environment; to comply with federal, state and local regulations; and to audit our campus and programs to identify areas for improvement.

As part of this policy, an Environmental, Health and Safety (EHS) audit will be conducted by the Office of Human Resources & Compliance and CMI (Compliance Management International), a third party compliance management company. Areas will be inspected either semi-annually or annually depending on the potential hazards which exist in the area, the number of EHS regulations that impact the area, and the issues noted on previous audits of the area. Inspections will occur during fall and spring semesters. (See *Attachment 13* for a list of areas and frequency of inspections. These may change based on the criteria mentioned and changes in the areas.)

The audit will include observation and review of compliance with EHS regulations; University EHS policies and programs; unsafe conditions of walking/working surfaces, equipment, and other physical aspects of the area; and unsafe acts of employees including unsafe work practices.

**NOTE:** Inspection of Walking/Working Surfaces (WWS) for buildings not covered in the EHS audits (ex., residence halls) will be included in the summer "blitz" conducted by Facility Maintenance. In addition, the Office of Human Resources & Compliance will send an annual mass email as a reminder to all employees requesting that everyone pay close attention to the walking/working surfaces that they use including parking areas and outside walkways, as well as halls, offices, stairs, etc. and to report any concerns of tripping/slipping/fall hazards immediately to Facility Maintenance.

## Procedure

1. The Office of Human Resources & Compliance will contact area leadership to schedule a date/time for the audit.
2. In addition to the Office of Human Resources & Compliance and CMI, the area leadership or designee will participate in the audit. Because this is to serve as a learning experience for participants, affording them the opportunity to ask questions and to gain a better understanding of the regulations that impact their area, leadership is encouraged to include other employees in these audits.
3. The Office of Human Resources & Compliance and CMI will take notes during the audit and will generate a report within ten (10) working days of the audit. The report will be sent to the participants, area leadership, the area's VP/School Dean, the Vice President for Human Resources & Compliance, and the co-chair of the Workplace Safety Committee.
4. Items which were noted on previous audits and are repeated or re-occurring will be indicated as such in the report. (See section on Audit Score for more information on repeat observances.)

5. Areas should attempt to address issues in a timely fashion. Prioritization may be necessary:
   a. Issues that offer the greatest potential hazards to employees and students.
   b. Programs that can be implemented with little effort or cost.
   c. Issues that present fewer hazards.
   d. Programs that may incur significant resources (time and cost).

   Area leadership (including VP) may need to be involved in the decisions/prioritizations.

## Audit Score

1. The audit will be written up using the audit form, *Attachment 14*. This will indicate if the observation is a repeat/uncorrected observation from a previous audit.
2. Points for audits are accumulated by the number of observances made. Observances may include unsafe conditions, unsafe acts, and non-compliance issues.
3. If the observation is new for the area (not noted previously), it will be given a value of one (1) point.
4. If the observation is a repeat from the previous audit and was uncorrected, it will be given a greater point value (3 points).
5. Multiple observations of the same issue will only receive one combined point **unless** it was an uncorrected observation from the previous audit – then each observation that is an uncorrected issue will be counted. (*See Example 1 below*.)
6. **Rationale** – the intent of the audit is not to do a 100% review but rather to make areas aware of EHS issues or concerns observed so that they can self-audit and address any similar issues throughout the area. Therefore, once a concern is noted, the auditor may or may not look for similar concerns during the remainder of the walk-through but will expect the area to look for all similar concerns when corrective action is being taken.
7. The impact of the size of the area on the final score is somewhat neutralized by factoring in the time allotted to complete the audit when calculating the final score. The equation for the final score = 60 minutes/hr x 1/total minutes for audit x total points of audit = points/hour

   (*See Example 2 for impact of this equation*.)
8. In general, **the lower the score, the better the audit**; the higher the score, the worse the audit.
9. Areas are encouraged to strive to lower their audit score with each consecutive audit. This can be done by correcting any issues/concerns noted on audits, by educating their area employees on the issues, and by continuing to police for issues/concerns to prevent reoccurrence.
10.

*Example 1:*

Blocked fire extinguisher at X044 and X066 were noted on previous audit. One point was assigned at that time even though there were two observations noted as neither were repeat offenses. Blocked fire extinguisher is present at X044, X032 and X015 for this audit. They will be rated as follows:

- Blocked extinguisher at X044 is an uncorrected, repeat observation (3 pts)
- Blocked extinguishers at X015 and X032 are new observations and will only be assigned one point even though they were two new observations

*Example 2:*

Area A received 15 points and took 75 minutes to complete. The final score was 12.

Area B received 15 points but took only 35 minutes to complete as it is significantly smaller in size. The final score was 26.

# List of Audit Areas and Frequency

| Area | Frequency |
|---|---|
| Athletics and Training Rooms | Annual |
| Biological Sciences Labs | Semi-Annual |
| Campus and Building Services, Bowmansdale Storage & Laundry | Annual |
| Chemistry & Biochemistry Labs | Semi-Annual |
| Conference Services | Annual |
| Dining Services: all kitchen and prep areas, eating areas, clean-up areas and storage areas of Falcon, Lottie Nelson, Larsen, and Café Diem | Annual |
| Engineering Labs, large project room in Frey and any other areas in use by Engineering or the Collaboratory for project development | Semi-Annual |
| Facility Maintenance | Semi-Annual |
| Fitness Center | Annual |
| Greenbriar, Campus Substation, Dispatch | Annual |
| Grounds including garage and storage areas; pump house; municipal waste; and cardboard and metal recycling areas | Annual |
| Health Services, Engle Center | As Needed |
| Information Technology | Annual |
| Messiah Press | Annual |
| Murray Library | Annual |
| Nursing Labs | Annual |
| Nutrition and Dietetics Labs | Annual |
| Oakes Museum | Annual |
| Physics Labs | Semi-Annual |
| Pool Maintenance Area and CHP Physical Plant | Annual |
| Post Office/Postal Services | Annual |
| Theatre & Dance (all shops, stages, storage areas, etc.) | Semi-Annual |
| Art & Design Areas (all studios, storage, shops, etc. in Climenhaga, Frey and Mill House) | Semi-Annual |
| Waste Storage (including pertinent records – ex., manifests, inspection records, etc.) | Semi-Annual |
| Winding Hill, OT Labs/Storage | Annual |
| Winding Hill, PT Cadaver Lab/Storage/Waste Records | Semi-Annual |

**NOTE:** Areas listed above may request more frequent auditing; areas not listed above may request an audit.

# Section 11 – SAFETY SUGGESTION SYSTEM

***Policy***

It is the policy of Messiah University to encourage employees to make suggestions for improvement of our environmental, health and safety programs; our workplace (grounds, buildings, and equipment); and to report unsafe acts or conditions.

Anonymous Safety Committee Suggestion Form

This form is available on FalconLink:

- Check the box next to "Environmental, Health and Safety" under FILTER BY TOPIC. Then from the list of links that appears, click on "Anonymous Safety Suggestion Form."
  ***OR***
- Search for "Safety Suggestion" and a link will appear to the "Anonymous Safety Suggestion Form."

After completing the form, simply click the submit button and it will be sent via email to the co-chairs of the Workplace Safety Committee. **Use of this form**, because the sender remains anonymous, **cannot result in a response to the employee or requests for clarification**. However, submissions will be reviewed at the Workplace Safety Committee meeting and follow-up action, if needed, will occur.

Safety Suggestions, Safety Concerns

If the employee is not concerned about maintaining his/her anonymity, suggestions, concerns, and reports of unsafe acts or unsafe conditions may be made directly to area leadership, line organization leadership, the Office of Human Resources & Compliance, any member of the Workplace Safety Committee, or a member of the Human Resources & Compliance Department. Additionally, any employee may submit a maintenance work order if repair/maintenance is needed to correct an unsafe condition (ex., repair an unlit EXIT sign). The maintenance work order form is available on FalconLink under "Submit a Maintenance Work Order."

# Section 12 – EYEWASH STATIONS AND SAFETY SHOWERS

The American National Standards Institute (ANSI) Z358.1 standard offers requirements that all portable and plumbed emergency eye, eye/face wash and emergency shower equipment should meet. This includes construction, testing, location, water pressure, flow requirements, operation and maintenance. As much as possible and feasible, the University will try to meet the requirements of this standard.

ANSI Z358.1-2004, states that "emergency eyewash and shower equipment shall be located on the same level as the hazard, have un-obstructed access, and require not more than 10 seconds to reach." **A clear and unobstructed path to the emergency shower or eyewash station should be maintained at all times.** Whenever feasible, the University will strive to meet this standard.

## Proper Use

Employees working with chemicals shall be trained in the location and proper use of eyewash stations and safety showers. **It is recommended that the affected body part be flushed immediately and thoroughly for at least 15 minutes.** Water does not neutralize contaminants – it only dilutes and washes them away. Time can be modified based on the chemical contaminant involved. Some general guidelines:

- Minimum 5-minute flushing time is recommended for mildly irritating chemicals
- 15-20 minutes for moderate to severe irritants
- At least 20 minutes for non-penetrating corrosives
- At least 60 minutes for penetrating corrosives

If the individual is wearing contact lenses, they can add an additional hazard: chemicals can become trapped under the lens. Any delays in removing the contact lenses in order to properly rinse the eyes can cause increased injury. Prompt removal of contact lenses is a necessity for proper flushing of the eyes to occur.

## Inspections by Areas

Emergency eyewash stations and safety showers are typically not used often, so it is important to make sure that they are working properly for those few emergency situations. Additionally, stagnant water in the plumbing lines to these units can breed bacteria which can add to medical issues should they be used in an emergency situation.

**Eyewash stations shall be inspected at least weekly by the area and a record of the inspections maintained.** Eyewash stations where the water used for flushing is provided by the building's water supply via plumbed lines shall be activated and inspected for proper flow and function. Eyewash stations where there is a limited (contained) reservoir of flushing fluid shall not be activated but all inspections possible without activation should be completed. Inspection cards are available (but not required) from Messiah  Press for recording of inspections; other methods of recording may be used. Inspections shall include the following:

- There shall be nothing blocking the access to the eyewash station.
- For all new installations, units shall be equipped with one-hand activation and shall remain activated hands-free.
- Where present, the nozzle dust covers shall be in place and activation of the unit shall cause the covers to be removed.
- The two flushing streams shall meet in the middle to ensure that both eyes can be flushed simultaneously.
- The water or flushing fluid shall be clear and free of sediment and odors.
- The unit shall be free of obvious contamination (dirt, chemicals, etc.).
- If water filtration screens are present, they shall be free of sediment.
- If a contained eyewash station is used (not hard plumbed to a water supply), the solution shall be within the usage date and the solution reservoir shall be full. When this type of equipment is used, actual weekly activation of the unit is not required.
- Bottles of flushing solution are not acceptable in lieu of an eyewash station unless installation of an eyewash station is not feasible.

**Safety showers shall be inspected at least monthly by the area** for proper flow and function and a record of the inspections maintained. Inspections shall include the following:

- There shall be nothing blocking the access to the safety shower.
- For all new installations, the unit shall be equipped with one-hand activation and shall remain activated hands-free.
- The shower stream shall be unobstructed, flowing freely from all openings of the shower head.
- The water shall be clear and free of sediment and odors.
- The unit shall be free of obvious contamination (dirt, chemicals, etc.).

**Exception:** For academic areas and areas where floor drains are not available for the showers, inspection and flushing of safety showers shall occur quarterly (ex., May, August, December and March). However, should any problems be observed during these inspections (ex., discoloration of water, odors), then the monthly inspections will be reinstituted.

## Annual Inspections by Maintenance

Facilities maintenance shall conduct and record an annual inspection of eye wash stations and safety showers at Bowmansdale and the main campus. At Winding Hill, arrangements for completion of this annual inspection is the responsibility of the Cadaver Lab Coordinator. This annual inspection shall include checking the actual flow rate of each for compliance with the ANSI standard and the manufacturer's recommendations.

# Section 13 – PORTABLE LADDERS

***Policy***

Because ladders are used by various departments across campus, this procedure establishes consistent safety practices for their use and compliance with OSHA 1910.23. This section covers portable ladders including step stools. It does not cover fixed ladders that are designed to be an integral or permanent part of a structure, building or equipment.

***General Safety Guidelines***

1. Ladders used on Messiah University property shall meet OSHA requirements.
2. The use of wood and aluminum ladders is discouraged. If replacement ladders are purchased, they should be of fiberglass construction.
3. Ladders must be maintained in a good, useable condition at all times.
4. Ladders shall be kept clean and free of slippery substances such as oil and grease. Ladders soiled with such substances shall be cleaned immediately or before use.
5. Ladders must not be coated with any material that may obscure structural defects.
6. Prior to each use, the user should inspect the ladder for the following:
    a. Free of cracks, splits, corrosion, and protruding nails, screws and splinters or other puncture or laceration hazards
    b. Steps/rungs free of oil/grease
    c. Step/rungs firmly attached to side rails
    d. Safety feet/base and other hardware in good condition
    e. Moveable parts operate smoothly without binding or excessive play
    f. Ropes in good condition (for extension ladders)

   Ladders shall be inspected on a routine basis, in addition to the pre-use inspection. This routine inspection shall be documented following University standards for record retention.

7. If a ladder is found defective, it should be tagged “Danger, Do Not Use” or similar language and taken out of service **immediately** until repaired or disposed of properly. If the ladder *can* be repaired, it should be moved to the Lenhert building for the repairs. If it *cannot* be repaired, it should be dismantled so it cannot be used after disposal. If the defect appears to be a manufacturer’s flaw, other ladders of similar manufacture should be inspected and taken out of service, if needed; the manufacturer should be contacted.
8. If a ladder tips over, it should be inspected immediately for side rail dents or bends, or excessively dented rungs; check all rung-to-side-rail connections; check hardware connections; check rivets for shear.
9. If feeling tired or dizzy, or prone to losing your balance, stay off the ladder.
10. Climb slowly and deliberately. Never jump or slide down from a ladder or climb more than one rung/step at a time.
11. When ascending or descending, the climber must face the ladder. Use three points of body contact with the ladder at all times (e.g., one foot, two hands; two feet, one hand or hips or chest). One hand must grasp the ladder at all times when ascending or descending!

12. Ensure shoe soles are clean of slippery materials (ex., grease, mud, etc.).
13. Smooth rungs should not be used where there is ice, rain, snow or other wet conditions.
14. Do not hand-carry tools/materials; carry items on tool belt or raise/lower items by hand lines or have another employee convey the items to you.
15. Only one person at a time is permitted on a ladder unless it is specifically designed for more than one climber (such as a trestle ladder).
16. Ladders must not be tied or fastened together to provide longer sections.
17. The length of the ladder must be sufficient so that the climber does not have to stand on the top rung or step. (Stepping on the top two steps of a step ladder greater than 3 feet in height is prohibited. For single/extension ladders, do not stand/work on the top three rungs.)
18. Portable ladders used to gain access to an upper landing must extend at least 3 feet above the landing surface with their side rails.
19. Ladders should not be used for any use except for which it was intended.
20. If performing work on a ladder where either the employee or ladder could contact exposed energized parts, the ladder must have non-conductive (fiberglass) side rails. Metal ladders should never be used around electrical equipment (panels, transformers, power lines, etc.).
21. Keep ladders and tools at least ten (10) feet away from overhead electrical lines.
22. Manufacturer labels should not be removed from ladders. The user should be familiar with all safety precautions noted on these labels. Manufacturer labels must be legible.
23. The ANSI Duty Rating labeled on the ladder indicates the maximum safe load capacity of the ladder (person & tools). This must not be exceeded. The maximum load includes the total load (weight and force) of the employee and all tools, equipment, and materials being carried.
    - Type I (Industrial) rated for 225-300 pounds
    - Type II (Commercial) rated for 200-225 pounds
24. Whenever possible, set up ladders away from areas where they can be accidentally struck or displaced.
    a. When using a ladder in an area where other people may be present, the area should be barricaded or a second employee should maintain a watch to keep a safe work environment.
    b. Ladders shall not be placed in front of doors unless the door is locked, blocked open or guarded. (Locking of exit doors is not permissible.)
25. Avoid working on ladders in high winds or storms.
26. Set up ladders for use on firm level ground. If surface is not level, ladder must be secured or stabilized to prevent accidental displacement. Ladders should not be set on boxes, barrels or other unstable bases.
27. Ladders may never be moved, shifted or extended while an employee is on it.
28. Stepladders: Must be equipped with a spreader or locking device that securely holds the front and back sections open when in use. Always open stepladder fully and ensure spreader bars are locked. Do not use as a straight ladder.

29. Single/Extension Ladders:
    a. For proper ladder angle, set ladder base one (1) foot away from the wall for every four (4) feet of ladder height.
    b. Straight or extension ladders must extend at least 5 rungs above the platform, roof or other area of dismounting.
    c. Secure the ladder at the top to prevent it from slipping sideways or at its base from slipping outwards. When not possible to tie off at the top or secure at the base, have a person brace the ladder at ground level.
    d. Be sure all locks are properly engaged.
30. If stored upright, secure ladders to prevent them from falling.

# Section 14 – EMERGENCY ACTION PLAN

For emergency situations, the University utilizes a text alert messaging system. All students and employees are required to sign up to receive these text alerts.

The University has a Crisis Management Team which is responsible for the University's Crisis Management Plan. Crisis drills are held annually.

## Emergencies Requiring Evacuation of a Single Building

This section addresses the emergency evacuation of a **single, non-residence** campus building.

**NOTES:**

The Office of Student Affairs is responsible for the evacuation procedure for residence halls and the procedure for conducting a headcount of students during the emergency evacuations of these buildings.

In the event that the entire campus must be evacuated, the Crisis Management Team will enact and communicate protocol to be followed.

Preparations must be made in advance for emergency situations so that, should an emergency occur, employees know what to do and can handle the situation efficiently and effectively. Below are outlined the measures the University has initiated to prepare for an evacuation of a single building.

### Emergency Alarms and Exits

- Fire alarms are used for audible (horn) and visual (strobe) signaling of an emergency evacuation in most Messiah University buildings. In most buildings, alarm pull stations are located near exit doors to activate these alarms. Single-family residential buildings are also used throughout campus for student housing, employee offices, and even workspaces for projects/processes. These buildings are furnished with battery operated smoke detectors for local evacuation alerts during a fire emergency.
- Exit doors are labeled with exit signs that should be lit at all times or should be illuminated in the dark. If an employee notices a sign that is unlit, a work order should be submitted immediately to facility maintenance. All employees should become familiar with all exit routes from their work areas. NOTE: At Winding Hill, an email should be sent to Danielle Rutherford (drutherford@cra-architects.com) to notify her of the unlit sign.
- Exit doors, stairwells and paths of egress, and fire pull alarms should never be blocked.

### Prior to an Emergency Evacuation, Plan for the Needs of Individuals Requiring Special Assistance

*Faculty Responsibilities*

**Faculty are responsible** for ensuring the evacuation of any students requiring special assistance in an emergency. Whether the need for special assistance is temporary (e.g. student with a broken-leg and on crutches) or permanent, faculty should be in contact with Disability Services regarding the best way to accommodate specific needs and assign responsibilities for assisting in an evacuation.

*Leadership of Employees Responsibilities*

**Leadership of employees** (including student employees) who may need assistance in evacuating **are responsible** to plan for such needs in advance. Leadership should discuss with the employee the best way to accommodate their specific needs and assign responsibilities to others, if required, who can provide the assistance.

## During an Emergency Evacuation

- Elevators should never be used in an emergency evacuation.
- **All individuals are responsible** for immediately evacuating a building whenever an alarm sounds. In addition, faculty are responsible for making sure all students evacuate classroom buildings, and supervisors of student employees are responsible for making sure all student employees evacuate the building in the event of an alarm/emergency.
- Individuals should not deviate from the most direct and shortest route out of the building in order to collect personal belongings, etc.

## Evacuation Signage/Meeting Locations for Accountability

- In many classrooms, studios, and labs an evacuation plan has been posted near exit doors. This post includes the location for occupants of the room to congregate outside for accountability, the primary exit route, and emergency phone numbers. At the beginning of each semester, **faculty are responsible** to point this out to their students. **If no evacuation plan is posted** in the room, faculty are responsible for designating a meeting location in the event of a building evacuation to aid in accounting for individuals and communicate this location to all students in the class.
- **Each work group** should designate a meeting location in the event of a building evacuation to aid in accounting for individuals and communicate this location to all employees in the group. This should be out of the path of emergency vehicles.
- Most conference rooms have an evacuation plan posted near exit doors. This post includes the location for occupants of the room to congregate outside for accountability, the primary exit route, and emergency phone numbers. If an emergency evacuation occurs, **all meeting participants are responsible** to report to the checkpoint noted on the posted plan even if their primary work area/office is located in the same building and their normal evacuation checkpoint is a different location. **If a plan does not exist**, the chair of the meeting should designate an outside area for accountability.

## Accountability During an Emergency

- **Faculty are responsible** to document student headcount. They should keep their class roster readily available to aid in this endeavor (i.e., iPad, hard copy, etc.) and take a role call to ensure all students have safely evacuated during an emergency.
- **Department or unit leadership (or designee) are responsible** to account for student employees and colleagues. In the event that an individual's office/work area is physically located in another building from his/her department or work unit, arrangements should be made for the individual

to be accounted for by a group also housed in the same building. It is the responsibility of the department or unit leadership and the employee to work together to ensure this happens. **NOTE:** Department or unit leadership may find it useful to assign specific individuals the responsibility of accounting for personnel during an evacuation. Due to the nature of campus activity (individuals moving from building to building throughout the day), such responsibility should be assigned to individuals whose job is stationary or who are most often in the area/building. Whoever is responsible for conducting the headcount should keep the employee/student employee list readily available to aid in this endeavor (i.e., iPad, hard copy, etc.). The Office of Human Resources & Compliance can help in creating the respective lists.

- If an emergency evacuation occurs during a meeting, **the individual in charge of the meeting is responsible** to account for the safe evacuation of meeting participants.
- After a headcount is completed, the class professor, area leadership or the chair of the meeting should report the names and last known locations of missing individuals to emergency responders.

## Visitors on Campus During Emergency Evacuations

**Employees who are hosting visitors are responsible** to inform the visitors of emergency protocols including the location of exits and what to do should an alarm sound; and to direct them during an emergency.

## After the Emergency is Over

When an evacuation occurs for any reason, no one should re-enter the building until an "all clear" is given by individuals in charge.

For more detailed instructions in dealing with specific types of emergencies, refer to the appropriate section below.

# Campus Emergency Contact Numbers

For additional information, directions during an emergency situation, or further explanation of responsibilities in an emergency, the Messiah University employees listed below should be contacted. However, if emergency responders (e.g., local fire department, police, etc.) are on campus, they will assume responsibility for the safety of personnel and have the authority to make decisions regarding actions necessary to protect life and property.

| Name | Title | Using campus phone | Using cell phone or outside line |
|---|---|---|---|
| **FOR MAIN CAMPUS AND BOWMANSDALE:** | | | |
| Miller, Brian | Dir., Facility Services | Ext. 7151 | 717-796-1800, x7151 |
| TBD | Dir., Dept. of Safety | Ext. | 717-691-6005 |
| Shafer, Kathie | VP, Operations | Ext. 6003 | 717-691-6003 |
| | Dispatch Office | Ext. 6005 | 717-691-6005 |
| | Department of Safety | Ext. 6565 | 717-691-6005 |
| **FOR WINDING HILL:** | | | |

| | | | |
|---|---|---|---|
| Rutherford, Danielle | Rep. for Landlord | 9-756-3022 or email drutherford@cra-architects.com | 717-756-3022 or email drutherford@cra-architects.com |
| Fisler, Jennifer | Dean of the School of Graduate Studies | Ext. 6715 | 717-796-1800, x6715 |
| TBD | Dir., Dept. of Safety | Ext. | 717-691-6005 |
| Shafer, Kathie | VP, Operations | Ext. 6003 | 717-691-6003 |
| | Dispatch Office | Ext. 6005 | 717-691-6005 |
| | Department of Safety | Ext. 6565 | 717-691-6005 |

For guidance on specific situations or types of emergencies, refer to the alphabetical listing following the emergency phone numbers.

## Agency Phone Numbers

For all medical and fire emergencies, call 911. (Dial 9-911 when using a campus phone.)

The following are phone numbers which may be useful for portions of this Emergency Action Plan:

Carroll Township Police, Emergency..... 911
Carroll Township Police, Non-emergency ..... 717-432-3317
Community Right to Know ..... 1-800-535-0202
Cumberland County Department of Public Safety .....717-218-2900 or 717-240-6400
Department of Environmental Protection, South Central Region .....717-705-4700
Department of Environmental Protection, South Central, environmental emergency1-866-825-0208
Department of Environmental Protection, Regional Office for Spills/Emergencies .1-800-541-2050
National Weather Service .....814-231-2408
Norfolk Southern Emergencies ..... 1-800-946-4744
Norfolk Southern Regular Business Work Number .....717-541-2100
OSHA Region III Office.....215-861-4900
OSHA Harrisburg.....717-782-3902
Pennsylvania Emergency Management Agency (PEMA)..... 717-651-7060 or 1-800-272-7362
Poison Control .....1-800-222-1222
PPL Electrical Services..... 1-888-220-9991
SDS & Chemical Spill Response Information, 3E Company .....1-800-451-8346
Suez (previously United Water) Emergency 24 hour .....717-564-3662 or 717-232-5093
Upper Allen Police, Emergency ..... 911
Upper Allen Police, Non-emergency..... 717-238-9676
Upper Allen Township.....717-766-0756

***If a phone number is missing from the list above, contact dispatch. They have a more extensive list of numbers and there are some phone contacts that should be made by either dispatch or facility services.***

## Active Shooter Response

Quickly determine the BEST WAY TO SAVE YOUR OWN LIFE


## Bomb Threat

Turn off cell phones and radios as they may trigger detonation.

Stay calm.

Contact the Department of Safety at ext. 6565 (campus phone) or 717-691-6005 immediately. At Winding Hill, call 911.

Evacuate the area, if possible.

If a suspicious object/package is observed, DO NOT touch or handle it.

**Telephone threat:**

- Remain calm and try to keep the caller on the line as long as possible.
- If the phone has caller ID, note the number immediately.
- Find out as much information as possible including the time of the call, what the bomb looks like, what time it will go off, if the caller is male or female, and if the caller is a student, parent, staff member, or member of the public. Use the "Bomb Threat Call Procedure" as a guideline. *(Attachment 10, found in section 7)*

- Try to notice any background noise that may indicate the caller's location (i.e., traffic noise, music etc.)
- Notify the Department of Safety at ext. 6565 immediately. At Winding Hill, call 911.

**Email/written threat:**

- Threats received via email should be saved and sent to safetydepartment@messiah.edu and dispatch@messiah.edu for investigation.
- If the threat is imminent call 911 and notify the Department of Safety at ext. 6565 immediately.
- If you receive a written threat, save all items including the letter, envelope, and any packaging.
- Notice whether the address was typed or handwritten, whether the package makes any noise, and to whom the letter is addressed.
- All written threats should be reported to the Department of Safety at ext. 6565 immediately.

## Death on Campus

- Notify the Department of Safety immediately at ext. 6565.
- If the death is of an employee, the Office of Human Resources & Compliance must be notified at ext. 5300.
- The death of an employee must be reported to the OSHA Region III Office within eight hours of the incident regardless of cause. Refer to Section 9 of this manual for more information on OSHA reporting.
- If the death of a student occurs, the Department of Safety should be notified at ext. 6565 immediately.
    - For undergraduate students, the Department of Safety will contact the Residence Life Staff who have specific protocols to follow if this occurs.
    - If the student is also a student employee and dies during their work hours, the Human Resources & Compliance Office must also be notified as OSHA reporting will be required.

## Building Evacuation

- In the event of a building evacuation, employees should calmly lead students to the designated assembly area outside of the building.
- It is important to take head counts of the students or staff who you know are within your group. In the event of a missing student or employee, call the Department of Safety at ext. 6565 and report the missing individual immediately. At Winding Hill, report any missing students or employees immediately to the Dean of the School of Graduate Studies or the individual in charge of the emergency responders if they are already on site.
- Be sure to designate assistance to any students with special needs and staff or visitors who may require assistance during an evacuation.
- Do not stop to take personal belongings with you; do not use elevators or restrooms.
- Stay with the staff and students in your area.
- Remain calm and wait for further directions from a Crisis Team Member or Safety personnel. Refer to the Messiah University Crisis Plan for additional information.
- Do not return to the building until instructed to do so by University officials.

- The Crisis Management Team will oversee and provide direction if a campus evacuation is necessary.

## Explosion

Explosive devices are often used to disperse other hazardous materials, and can be mechanical, chemical, nuclear, or radiological.

- Remain calm and explain to students and others in the area that there might be another explosion and to use caution.
- Evacuate the building or area immediately. Remain with the students or other persons who have evacuated the building.
- If there are known missing persons, notify the Department of Safety at ext. 6565 **AND** the emergency officials that have arrived on site.
- Only return to the area after an "all clear" is announced.

## Fire

If the fire alarm sounds:

- Remain calm and evacuate students and employees via the nearest exit to the outside of the building.
- Provide assistance for any students, employees or visitors with special needs.
- Do your best to take head counts of those persons in your area and report any missing persons to the Department of Safety at ext. 6565 **AND** the fire officials that have arrived on site.
- An "all clear" will be announced when it is safe to re-enter the building.
- If you see smoke or fire in an area, evacuate all persons immediately and activate the fire alarm system by pulling the "pull station" that is located next to every exit door.
- If you are the individual who sounds the alarm, once outside the building, immediately report to the Department of Safety the details of the fire (location, size, fuel source, etc.). At Winding Hill, immediately report the details to Danielle Rutherford (landlord's contact) at 717-756-3022; to the Dean of the School of Graduate Studies; and to the person in charge of emergency responders if they are already on site.
- If you are trapped in an area of the building, use wet towels or other wet items, if available, under the door to keep smoke out. If possible, call Dispatch to inform them of your situation and location **AND** call 911.

## Fire Extinguisher Usage

Only employees/students who have been trained in the proper use of fire extinguishers within the past 12 months should attempt to fight a fire and only if the following conditions apply:

- Evacuation of the building has begun; the fire alarm has been initiated.
- The fire is small (no larger than a waste can).
- There is nothing between you and the emergency exit; you have a means of escape.
- Smoke is limited; exits are still clearly visible and you are still able to breath easily.
- You feel comfortable fighting the fire.

Some things to consider:

- As a general rule, fires double in size every 60 seconds.
- Most fire extinguishers only last 10-20 seconds.
- Always use the right type of extinguisher for the fire.
- Follow the PASS system (**P**ull the pin; **A**im the extinguisher at the base of the flames; **S**queeze the trigger; **S**weep the base of the fire from side to side with the extinguisher.)

## Gas Leak

*The following applies to Messiah University main campus and Bowmansdale:*

Both natural gas and propane are odorless and colorless in their natural forms so a distinctive odorant called mercaptan is added to help you detect a gas leak. Mercaptan makes the gas smell like sulfur or "rotten eggs." Whether the leaking gas is natural gas or propane, the safety precautions listed below will apply. However, **it is important to note that natural gas is lighter than air and will rise to the ceiling; propane is heavier than air and will sink to the floor.** It is also important to note that any fossil fuel, if it doesn't burn properly, can produce carbon monoxide. Carbon monoxide is colorless, odorless, tasteless and can be deadly. Carbon monoxide does not have the mercaptan odor!

**If you detect or suspect a gas leak INSIDE, you should:**

- If possible, quickly extinguish any flames.
- Evacuate the building immediately using the closest exit. Do not use elevator.
- Activate the fire alarm pull station that is located next to the exit door. (Note: The odor will be sensed long before a high concentration is achieved. Pulling a fire alarm will not add to the fire risk already present by static electricity and electrical or mechanical equipment that may be in the building and **will ensure the occupants are notified and evacuate immediately**. However, if the building has been unoccupied and the gas has had the time to build up, do not activate the fire pull alarm.)
- Proceed to your area's check-in point outside to be accounted for; if you can still smell the gas at this location, proceed to a safe location where you can no longer smell the odor.
- Call 911 from the nearest phone in a safe area.
- Call the Department of Safety at ext. 6565 to report the safety concern. They will make additional required on-campus contacts and will notify our gas provider.
- If propane is leaking, Facility Services will close the main gas valve upon arrival.
- Spark-producing equipment, radios, and cell phones are to be turned off.

**Do NOT:**

- Use telephones, cell phones, computers, appliances, or elevators.
- Touch electrical outlets, switches.
- Use a lighter, match or other open flame.
- Position or operate vehicles or powered equipment where leaking gas may be present.
- Re-enter the building to open doors and windows. Do not re-enter the building until it has been deemed safe and the individuals in charge give the all clear.

**If you detect or suspect a gas leak OUTSIDE, you should:**

- Evacuate. Keep unauthorized people from getting near the site.
- Call 911 from a safe location where you can no longer smell the odor.
- Call Dispatch from a safe location.
- Abandon your car, backhoe, or other equipment until the scene is deemed safe by the authorities.

**Do NOT:**

- Use anything that could generate a spark or flame.
- Start up or shut down motor vehicles or electrical equipment.
- Use a telephone or cell phone in or near the area where the signs of a leak were observed.

In addition to the smell of rotten eggs (mercaptan), other signs of an underground gas leak may include bubbling water; dirt blowing into the air from a hole in the ground; a hissing, whistling or roaring sound; dead or dying vegetation.

**NOTE:** For more detailed information on handling natural gas leaks on campus, refer to Facility Services "Natural Gas Emergency and Accident Prevention Policy" located online under their list of Policies and Procedures (http://www.messiah.edu/info/20084/about_facility_services/135/policies_and_procedures).

## Hostage Crisis

In the event of a hostage situation:

- If it is safe to do so, call 911 immediately, and then notify the Department of Safety at ext. 6565.
- Move yourself and others away from the hostage/captor as quickly and quietly as possible.
- Listen for possible instructions from outside help, for lockdown initiation, or instructions from the captor.
- Take note of any details including a physical description of both the hostage/captor, possible weapons, and any communication from the hostage/captor and try to determine if there is a connection between the hostage/captor that may provide responding emergency personnel additional information.

## Intruder

If there is an unauthorized person in your building or area:

- Notify the Department of Safety immediately at ext. 6565. At Winding Hill, call 911.
- When calling, be prepared to give a description of the person to include physical attributes, clothing, any weapons, last known location, and advise them of any unusual circumstance or situation that may have arisen.
- Be prepared to initiate a lockdown procedure, if necessary, to protect students and others in the area.

## Lockdown/Shelter in Place

A lockdown occurs when there is a threat that requires remaining in one's current location (building/room) until told otherwise. The lockdown is usually under the direction of the Campus Safety Department or Crisis Management Team (or at Winding Hill, CRA – the building owners – may oversee this action).

- Remain calm and stay together with the students and/or other staff in the area.
- Upon notification of a lockdown, begin by locking all interior and exterior doors.
- Barricade the exit doors for extra protection and when doors cannot be locked.
- Cancel all outside activities until further notification.
- Close and lock all windows.
- Maintain a calm atmosphere and keep others away from windows and doors-DO NOT leave students unattended at any time.
- Be sure to take frequent head counts of staff and students and report any missing persons to the Department of Safety at ext. 6565. At Winding Hill, report the information to the Dean of Graduate Studies.
- If you hear a gunshot or explosion, direct others in the area to get down on the floor.
- Do not unlock windows or doors, and do not permit anyone to leave until an "all clear" is announced by a member of the Safety Department, Law Enforcement, or Crisis Team Member.

## Media Policy

- The Office of Marketing and Communications is responsible for dealing with the media.
- During business hours (M-F, 8 a.m. – 5 p.m.), in the event that you are approached by the media, direct them to the Office of Marketing and Communications on the third floor of Old Main or call 717-691-6027. Outside of business hours, contact Dispatch at ext. 6565 and they will contact the appropriate member of the Marketing and Communications team to respond to the situation.
- If you observe media personnel or vehicles on campus, notify the Department of Safety at ext. 6005 immediately. At Winding Hill, if you observe media personnel in the Messiah University leased portion of the building, contact the Dean of the School of Graduate Studies or the Marketing & Communications Office at ext. 6027 (717-691-6027).

## Medical Emergency

- Remain calm.
- Notify the Department of Safety at ext. 6565 or press the emergency call button at the nearest emergency call station. Safety Officers have been trained and certified in First Aid, CPR and how to operate an AED. (At Winding Hill, call 911.)
- If the medical emergency is life threatening, dial 911 (or 9-911 from a campus phone).
- Do not move the injured person unless the scene is unsafe.
- Keep the victim calm and comfortable. Reassure them that help is on the way.
- Always use personal protective gear (i.e., gloves, masks, etc.) when there is danger of coming into contact with bodily fluids (see *Messiah University Exposure Control Policy* for full details).
- Unless certified, do not attempt to administer first aid before trained personnel arrive.

- Automated external defibrillators (AEDs) are available in the safety officers' vehicles and at various locations throughout campus:

| Building | Location |
|---|---|
| **Admissions and Welcome Center** | Near room 110 |
| **Bowmansdale** | Main office area |
| **Boyer Hall** | Main entrance on left in corner |
| **Eisenhower Campus Center** | • Lower Level outside weight room<br>• Lower Level in the Athletic Training Room<br>• First floor at Dispatch Services<br>• Second Floor Outside entrance C Lottie |
| **Engle Center** | Back exam rooms |
| **Frey Academic** | Main entrance beside fire panel |
| **Kelly Residence** | C section by fire panel |
| **High Center** | Lower level in vending machine room |
| **Hostetter Chapel** | Between restrooms in main lobby |
| **Kline/Jordan** | By trash cans in center near elephant |
| **Larsen Student Union** | 1st floor near pulse door |
| **Lenhert** | Hallway off front offices by room 110 |
| **Murray Library** | Beside elevator on main floor |
| **Naugle** | 1st floor lounge near TV |
| **North Complex** | Main lobby/Fishbowl beside TV |
| **Old Main** | Rear entrance under steps in center stairwell |
| **Safety Office Vehicles** | • Escape<br>• Focus<br>• Pick-up |
| **Sollenberger Sports Center** | • Fitness Center wall just inside door<br>• Indoor Track on Pool Side<br>• Side entrance to Hitchcock |
| **South Complex** | Mt. View lobby inside door |
| **Witmer/Mellinger** | First floor lobby |
| **Winding Hill** | Second floor, rear hallway |

## Alcohol Intoxication/Drug Overdose/Poisoning

Alcohol poisoning can be fatal. Do not allow someone who drank too much alcohol to "sleep it off."

- Remain calm.
- If life threatening situation, call 911 immediately.
- Stay with the person and call the Department of Safety at ext. 6565 immediately.

## Mental Health Emergency

- Contact Dispatch at ext. 6005 (717-691-6005)
- Remain with the person until someone arrives to take command of the situation.

- If you think someone is at immediate risk for suicide, contact Dispatch at ext. 6005 (717-691-6005). See section below on "Suicide Attempt" for more information.

### Seizure

- At main campus and Bowmansdale building, notify the Department of Safety at ext. 6565. At Winding Hill, a call to 911 may be warranted.
- Do not attempt to restrain the person any more than necessary to prevent injury.
- Try to keep the person away from radiators, other hot objects, or sharp instruments.
- Do not force the person's mouth open or force anything between the teeth.
- Remain calm and assure others that there is no danger and that the seizure will pass in a few minutes.
- When the seizure stops, let the person rest in a quiet place.
- Be certain to take note of the length of the seizure.
- At the main campus and Bowmansdale building, try to be as accurate as possible when describing the seizure to the Safety Officer. At Winding Hill, if off-site emergency responders are present, try to be as accurate as possible when describing the seizure.

## Missing Student

- Notify the Department of Safety at ext. 6565 immediately.
- Ask persons in the area if they have seen the missing individual and search the surrounding area.
- Provide a detailed description to the Department of Safety.
- Advise of any medical conditions and inquire as to whether there has been anything unusual going on with the missing person.
- The Department of Safety officers will be responsible to contact the local authorities.

## Physical Altercation

- In any type of altercation remain calm and try to diffuse the situation without putting yourself in danger.
- At the main campus and the Bowmansdale building, call the Department of Safety at ext. 6565 for assistance.
- Assess the situation as best you can and be aware of your surroundings.
- If the altercation becomes aggressive or violent call 911 immediately.

## Potable Water Emergency

If an authority from the water company notifies the University of a domestic water contamination that mandates restriction in the use of potable water, action needs to be taken immediately to provide bottled water and to notify the occupants of the campus of the restriction. Messiah University has a detailed policy that is to be followed if this occurs.

At main campus and the Bowmansdale building:

- The Department of Safety is to be notified at ext. 6565. The Department of Safety will then notify the Director of Facility Services and the Vice President of Operations.

- Signs to notify building occupants need to be posted at each building entrance and on all water fountains.
- Notification needs to be communicated to Dining Services immediately.
- The detailed policy is to be followed as soon as possible after notification from the Water Authority. This policy is available in the Department of Facility Services and online at http://www.messiah.edu/info/20084/about_facility_services/135/policies_and_procedures

At Winding Hill facility:

- The Dean's Office will ensure signs are posted on all water fountains and Dining Services personnel who operate the Café are notified immediately.

## Power Failure

Main campus and Bowmansdale building:

- Remain calm and notify the Department of Safety at ext. 6565 immediately.
- If deemed necessary, evacuate using caution to avoid hazards.
- The buildings on campus have either emergency generators or emergency light packs that will provide egress lighting for a minimum of 90 minutes. In order to maximize the emergency generator run time and efficiency, turn off power to non-essential areas and equipment.
- No building shall be occupied if egress lights run out of capacity after the initial 90-minute period.
- Only return to an evacuated building after an "all clear" is announced.
- If you are in a lab area, close fume hood sashes.
- Stop any operation that requires an exhaust, even if the process itself will operate without power.
- Eisenhower Campus Center receives electrical power from the on campus CHP and will not be impacted by a campus wide power loss.
- The Messiah University detailed Campus Power Outage Policy is to be followed as soon as possible upon the loss of power. The policy can be found on the Facility Services Policies and Procedures website by clicking on the appropriate link. The Department of Safety typically initiates this process.

Winding Hill:

- Contact CRA (Danielle Rutherford, 717-756-3022).

## Spills (Hazardous Material/Chemical)

*NOTE: No large quantities of hazardous materials are present at the Winding Hill facility. If a spill of cadaver fluid occurs, the Cadaver Lab Coordinator should be contacted immediately.*

- Notify the Department of Safety at ext. 6565 immediately.
- If the spill is life threatening, call 911 first.
- Evacuate students and others to the outside of the building.
- Take notice of students or others who demonstrate difficulty breathing, fainting, or other adverse medical symptoms.
- If it is known what was involved in the spill, communicate that to the Department of Safety and responding emergency personnel.

- Safety Data Sheets can be obtained by accessing the 3E/Verisk Online system; there is a link to this online system on FalconLink. Check the box next to “Environmental, Health and Safety” under FILTER BY TOPIC. Then click on the link for “Safety Data Sheet (M)SDS Online System” that appears in the list. You can also obtain a SDS by calling 1-800-451-8346; this number is answered 24/7 and you can request the SDS be emailed or faxed to you.
- Remain outside of the building or affected area until an "all clear" is given.
- For more information on chemical spills, refer to Section 8, Spill Procedure, of the *Hazard Communication Program: Chemicals Manual*.

## Suicide Attempt

- In the event that a student or employee expresses suicidal thoughts, or there is an attempted suicide, do not leave the person alone.
- Call the Department of Safety at ext. 6565. At Winding Hill, call 911.
- Do not try to handle the situation alone.
- If weapons were used in an attempted suicide, do not attempt to secure them if it puts you in danger.
- Stay with the person/student and be attentive to them until help arrives.
- Remain calm and show support, trying not to be judgmental.
- Be sure to report any suicidal statements immediately, as all threats should be handled by a professional.
- Reassure others that help is on the way.
- Off campus help:
    - Holy Spirit Hospital Crisis Intervention Services 717-763-2222 or 1-866-350-4357.
    - CONTACT HELPLINE 717-652-4400 or Toll-free 1-800-932-4616
    - Crisis Text Line: text HELP to 741-741
    - The National Suicide Prevention Lifeline: 1-800-273-TALK (8255).

## Suspected Abduction

If you suspect that there has been an abduction of a student or other person:

- Notify the Department of Safety immediately at ext. 6565. At Winding Hill, call 911.
- Give a detailed description of the abducted person including age, height, weight, hair and eye color, any distinguishing characteristics, and what clothing they were wearing.
- While waiting for responders to assist, inquire as to when the person was last seen, if they were with anyone, if there has been a situation with a roommate or dating partner, or if the person has been acting out of character.
- Upon investigation, outside authorities will be notified.

## Suspicious Package

- Remain calm and do not touch the package.
- Ensure the safety of students and others that are in the area by clearing them away from the immediate area.
- Move calmly and quietly; running or sudden movement may trigger a detonation.
- Notify the Department of Safety at ext. 6565 immediately, **remembering not to use cell phones or radios that may trigger a detonation**. At Winding Hill, call 911 immediately.

- Do not attempt to move the package, or allow anyone near the package.
- Do not use light switches as this may trigger a detonation -- leave the lights as you found them.
- Reference the Messiah University Bioterrorism Plan for detailed instruction, Section 7 of this manual.

## Weapons on Campus

- Call the Department of Safety at ext. 6565 IMMEDIATELY. At Winding Hill, call 911.
- Be prepared to share as much information as possible including your name, your location, the name or description of the individual with the weapon, and any additional information regarding the type and location of the weapon.
- If a weapon is seen on the campus grounds, do not touch it.
- Secure the area by moving students and others to a safe location away from the weapon.
- If necessary, follow lockdown procedures until the appropriate personnel arrive to remove the weapon.
- If the weapon is seen on an individual, use extreme caution and do not attempt to confront or disarm the individual.
- Ensure the safety of others in the area by moving them away from the individual.
- Remain calm until help arrives.

## Weather Event

- In the event of severe weather, the National Weather Service will issue a **warning** or advisory. A warning means that the dangerous weather is threatening the area; the event is occurring; you should take action. (A **watch** means conditions are right for dangerous weather. Watch out and be ready to react.)
- Be vigilant for text alerts that give instructions from the Crisis Team.
- If possible, move to a sheltered area and stay away from windows, mirrors, skylights, and other areas with glass.
- Be aware of unsecured objects (i.e., filing cabinets, desks, etc.)
- Assess any damage to the area, personal injuries, and be aware of any additional risk caused by exposed electrical wiring, falling debris, or other hazards.
- Wait for emergency crews to facilitate evacuation once the emergency has passed.
- Try to calm students and others that are in the area.
- At the main campus and Bowmansdale building, notify the Department of Safety at ext. 6565 of any injuries of persons within your immediate area.

### Earthquake

Drop, cover and hold on. Minimize your movements to a few steps (to a nearby safe place). If indoors, stay there until the shaking has stopped and you are sure exiting is safe.

If Indoors:

- Drop to the ground; take cover by getting under a sturdy table or other piece of furniture; hold on until shaking stops. If there isn't a table or desk near you, cover your face and head with your arms and crouch in the inside corner of the building.

- Stay away from glass, windows, outside doors and anything that could fall such as lighting fixtures, bookcases, etc.
- Do not use a doorway unless you know it is strongly supported, load bearing and it is close to you.
- Do NOT use elevators.
- Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.

If Outdoors:

- Stay there.
- Move away from buildings, streetlights, and utility wires.

If in a Moving Vehicle:

- Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, bridges, overpasses and utility wires.
- Proceed cautiously once the earthquake has stopped. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.

If Trapped Under Debris:

- Do not light a match or flame.
- Do not move about or kick up dust.
- Cover your mouth with a handkerchief or clothing.
- Tap on a pipe or wall so rescuers can locate you. Avoid shouting, if possible, to minimize the amount of dust you breathe.

## Floods

*NOTE: This is not anticipated for the Winding Hill facility.*

If flooding is forecast (flood warnings or flash flood warnings), it means you can expect flooding of low-lying land and roads. At this time, you may be asked to move vehicles from certain parking areas. In addition, facility services may turn off gas, electricity and/or water supplies.

- If flooding occurs, go to higher ground and avoid areas subject to flooding (ex., Yellow Breeches Creek).
- Do not attempt to walk across flowing streams or drive through flooded roadways.
- Do not enter areas that are closed off with traffic cones or safety tape.
- If water rises in your building before you can evacuate, go to the top floor, attic or roof and call the Department of Safety at ext. 6565 immediately. Be prepared to give your exact location, how many individuals are with you, and if there are any injuries.
- Beware of sharp objects and pollution in floodwaters.
- If you come in contact with flood waters, wash your hands with soap and disinfected water.
- If footwear is contaminated with floodwaters, decontaminate by washing and treating with mild disinfectant. Wash all clothing contaminated with floodwater.
- Contact Facility Services if there is floodwater in the building that needs pumped out, if any electrical wiring has come into contact with floodwater, or if there is any damage to building or grounds from flooding. If after hours or if you cannot make contact with Facility Services, contact the Department of Safety at ext. 6565.

## Hurricane

- Stay indoors and away from windows and glass doors.
- Close all interior doors – secure and brace external doors.
- Keep curtains and blinds closed. Do not be misguided if there is a lull; it could be the eye of the storm – winds may pick up again.
- Take refuge in an interior room, closet or hallway on the lowest level.
- Lie on the floor under a table or another sturdy object.
- Avoid elevators.

## Tornado

If Inside:

- Go to the lowest level of the building. If there is no basement, go to the center of an interior room on the lowest level (closet, interior hallway) away from corners, windows, doors and outside walls.
- Stay away from large open rooms such as gymnasiums.
- Get under a sturdy table and use your arms to protect your head and neck. Crouch with your face down. If there are mattresses, sleeping bags, blankets or similar items available, cover with them. Likewise, if head protection is available (ex., bike helmet), use it.
- Do not use elevators; you could become trapped if the power is lost.

If Outside:

- Immediately get into a vehicle, buckle your seat belt and try to drive to the closest sturdy shelter.
- If your vehicle is hit by flying debris while you are driving, pull over and park.
- Stay in the car with the seat belt on. Put your head down below the windows; cover your head with your hands and a blanket, coat or other cushion if possible.
- If you can safely get noticeably lower than the level of the roadway, leave your car and lie in that area, covering your head with your hands.
- Do not get under an overpass or bridge. You are safer in a low, flat location.
- Stay away from trees, vehicles and other objects which could be blown onto you in a tornado.
- Never try to outrun a tornado in urban or congested areas in a car or truck. Instead, leave the vehicle immediately for safe shelter.
- Watch out for flying debris. Flying debris from tornadoes causes most fatalities and injuries.

# Section 15 – EMPLOYEE TRAINING AND NEW EMPLOYEE ORIENTATION

## General Area Orientation for New Employees Provided by Supervisor

Area supervision is responsible for ensuring that **all** new employees (full-time, part-time, and student employees) receive safety and environmental training specific to their work area and their job responsibilities. This information may include, but is not limited to:

- Location of fire pull alarms, emergency exit routes, and location for personnel to gather and be accounted for during an evacuation of the building
- Location of eye wash stations and safety showers
- How to report an emergency
- Area safety rules
- Location of rest rooms and break rooms
- Location of closest Federal/State workplace regulations poster or how to access online
- Personal Protective Equipment (PPE) required for job duties
- Specific chemicals present in the workplace and how to safely handle them safely
- Lock Out/Tag Out procedures for area equipment
- Reporting an injury
- Reporting off policy and contact phone numbers
- Equipment safety features including guards, exhaust systems, etc. that employee might operate
- Housekeeping policies, storage policies
- Etc.

Documentation requirements for this general area training may be met by using *Attachment 14*.

## Specialized Orientation for New Employees

OSHA, EPA and other regulatory agencies require employee training for specific job assignments or workplace exposures. Much of this training is required at the start of the employee's job assignment. To ensure compliance, a document has been prepared to help identify and provide the necessary training for each new employee (*see Attachment 15*).

This form will be given to all new employees at the start of their employment. Human Resources & Compliance will provide it to full-time and part-time employees; the Student Employment Coordinator will provide it to student employees.

Graduate Program Faculty: The only exception will be the graduate program faculty. All graduate program faculty working at the Grantham campus or Winding Hill facility will be given this at the start of employment by HR&C. Graduate program faculty not located at the Grantham campus or Winding Hill but **who will be teaching on-campus intensive courses** will be given it prior to their first intensive; the graduate programs coordinator will provide this list of faculty to the Office of

Human Resources & Compliance. All other graduate program faculty who only teach on-line will not be given this form.

The new employee's immediate supervisor is responsible to review the list with the new employee and identify the training pertinent to his/her position. (The supervisor should indicate the required training by initialing in the last column of the applicable row.) The supervisor is also responsible for ensuring that the employee is given sufficient release time from his/her job during the first week of employment to complete the training. Supervision must sign the form to indicate that s/he has fulfilled all responsibilities.

The new employee is responsible for completing all training identified by supervision as applicable to his/her job assignment. This training should be completed during the first week of employment, if possible. When all training is completed, the new employee should then forward a copy of the signed form to the Office of Human Resources & Compliance as noted at the bottom of the last page of the form.

**NOTE: As a minimum, all full time and part time staff, administrative and faculty personnel must complete EHS Orientation.** Links to this training appear in the first table on the form; links to specialized training applicable to specific job functions appear in the second table. For Graduate Program Faculty, only those located at the Grantham campus, Winding Hill or teaching intensives on campus will need to complete this orientation.

## Human Resources and Compliance Orientation

The Department of Human Resources and Compliance sends a new employee training email with links to the required EHS training, Employee Reporting and Responding Obligations (Harassment/Title IX/etc.), Active Shooter training, and Cybersecurity training. HR&C also conducts an in-person orientation meeting bi-monthly. Notices of the meeting will be sent to these employees and their supervisors. All new full-time and part-time employees are expected to make every effort to attend; supervision should make whatever arrangements are necessary to accommodate this meeting. This meeting includes, but is not limited to:

- History of Messiah University
- Messiah University Distinctives
- Review of Employee Reporting and Responding Obligations
- Environmental, Health and Safety Information Review

## Documentation for All Training

**All safety, health and environmental training**, including orientation, **must be documented**. Many elements of orientation and training programs are mandated by federal and state regulations and documentation is a requirement. It is also a good practice to document communications made to employees as reminders of policies or procedures. Documentation should include, as a minimum:

- Name of employee being trained and job position/title, if appropriate
- Name of trainer
- Date of training
- Topic(s) covered during training

*Attachment 14* is an example of a form which can be used by the areas for new employee orientation. This form is not required, but does include all elements that are required in proper documentation. Copies of this form and other documentation used for new employee training should be forwarded to the Department of Human Resources and Compliance for inclusion in the employee's file.

*Attachment 15* is a checklist of specialized training which may be required for specific job assignments and workplace exposures. The actual training documentation for each of the specific elements of this checklist are detailed in the document. However, a copy of *Attachment 15* with the signatures of both the new employee and his/her immediate supervisor should be submitted to the Office of Human Resources & Compliance as a record that this information was reviewed and both individuals are aware of these additional training requirements. (The checklist is NOT documentation for the specific training elements.) This form will be emailed by the Office of Human Resources & Compliance to the new employee and the employee's supervisor at the beginning of his/her employment.

Training records required by law may be maintained in several locations:

- In files maintained by area supervision
- In files maintained by the Office of Human Resources & Compliance
- Included in the employee's file located in Human Resources
- In the EGaD System (Employee Growth and Development) – a tracking program for employee training

These files may be electronic records.

Record retention (including location of records and length of time records must be maintained) for documentation of training and re-training required to meet specific program needs (ex., Lock-Out/Tag Out, Confined Space, etc.) will be outlined in the program's policy/procedure. If this isn't the case or for any reason you are unsure of the retention procedure for the specific training, please contact the Office of Human Resources & Compliance.

***NOTE:*** Many training records that are required by federal or state regulations have specific minimum retention times under law. Do not discard any of these training records unless you are certain they are no longer needed or you check with the Office of Human Resources & Compliance before discarding.

**Re-training can also occur because area leadership feels there is value in re-communicating information to employees.** When re-training is not required by law but has occurred at leadership's discretion, the training records should be maintained in the area's personnel files and may be discarded at the supervisor's discretion.

# New Employee Area Safety Orientation

**Area:** _____

**Job Title:** _____

| TOPIC REVIEWED | Initials of Trainee | NA |
|---|---|---|
| *EMERGENCIES:* | | |
| Emergency evacuation; location of emergency exits; location of fire pull-alarms; where to report once outside building; when to run/hide/fight. (*Safety Manual Section 14 – Emergency Action Plan*) | | |
| How to report an emergency situation (call 9-1-1; call Dispatch; dialing 9 for campus phones); first aid available from Safety Officers by calling Dispatch. | | |
| Campus emergency text alert system (sign up on FalconLink). | | |
| Emergency systems in work area (ex., gas detection) | | |
| *HOUSEKEEPING:* | | |
| General storage: not in stairwells, not blocking exits, not blocking fire extinguishers or fire pull alarms, not blocking electrical panels, 18" from sprinkler heads. | | |
| Proper area housekeeping; keeping work area uncluttered; specific area and breakroom rules. (*Safety Manual Section 1*) | | |
| Proper use of surge protector strips – no "daisy chains"; no extension cords. | | |
| *AREA SEPCIFIC POLICIES:* | | |
| Lone Worker Policy for department/area. (*Safety Manual Section 26*) | | |
| Specific area rules/guidelines for maintaining safety in area (ex., no lone workers in shop areas; hair pulled back and up when operating equipment; etc.). | | |
| Food and beverage policy for area (minimum campus policy: not within 5 ft. of chemicals). | | |
| Chemicals present in workplace; potential hazards of chemicals used in area operations; storage areas for chemicals; emergency procedures for chemical exposure; proper waste disposal for chemicals; etc. | | |
| Personal Protective Equipment (PPE) required for job; how and when to use it; how to care for it; how to inspect reusable PPE for damage. | | |
| Location of safety showers/eye wash stations & how to use them. | | |
| Lock Out/Tag Out procedures for area equipment. | | |
| Use of equipment guarding. | | |
| Use of exhaust systems and/or lab hoods for area operations (ex., shop equipment, lab equipment). | | |
| *OTHER:* | | |
| Location of closest Federal/State workplace regulations posters (e-copy on FalconLink; hardcopy locations across campus). | | |
| Report an injury immediately - no matter how minor - to supervision; Incident Report. (*Safety Manual Section 9*) | | |
| Other (list): | | |

| Employee Name *(Print)* | Signature | Date |
|---|---|---|
| Trainer/Supervisor Name *(Print)* | Signature | Date |

*Send copy of signed form to Human Resources for inclusion in employee's personnel file.*

# Specialized New Employee Training

You can find the most up-to-date version of this document by using this link, https://www.messiah.edu/download/downloads/id/8505/, or searching “EHS Training List for New Employees” on FalconLink.

# Section 16 – PROJECT/ACTIVITY APPROVAL PROCEDURE

***Policy***

**Project/Activity** – for purposes of this procedure and completion of the checklist, a project or activity is defined as

a. Any new project/activity occurring under the auspices of the educational area(s), and
b. That occurs *outside* or *inside* the lab, studio or classroom and would generate a "YES" on the checklist for items 1-11.

**NOTE: Projects that involve only the research of literature are exempt from this policy.**

In addition to a project/activity that meets the definition above, the following also require review of the checklist (and would require signatures and submission if any question in items 1-11 is answered "YES"):

a. Any project/activity involving grants and/or outside funding
b. Any repeat of previous projects/activities which have undergone changes that could impact the compliance status of any of the areas on the checklist.

NOTE: Course field trips are not considered activities which require completion of the checklist. If they are part of a larger project, the project may require completion of the checklist if it meets the definition given above. However, all course field trips must be in compliance with section 8.13 of the *COE Handbook*.

For items 12-15 on the checklist

a. "Yes" response for item 12 alone does not require submission of the checklist but will require compliance with the University's Hot Work Permit (see section 3 of this manual). This question is present to bring awareness to the University's compliance program for hot work (welding, cutting, and brazing operations).
b. "Yes" response for item 13 alone (IRB implications) does not require submission of the checklist but will require compliance with the University's IRB approval process. This question is present to bring awareness to the compliance requirements for human subjects research and the University's compliance program. (See Institutional Review Board on FalconLink.)
c. "Yes" response for item 14 alone (research involving animals) does not require submission of the checklist but will require submission of the research protocol to the Institutional Animal Care and Use Committee for approval prior to beginning the research. This question is present to bring awareness of the compliance requirements for animal use in research and the University's compliance program. (Contact the chair of the IACU Committee for more information.)
d. "Yes" response for item 15 alone (student involvement) does not necessitate completion and submission of the checklist. Student involvement is noted to ensure that if the project/activity meets the other definitions, then any student involvement must be in compliance with regulatory requirements.

e. "Yes" response for any combination of items 12, 13, 14, and/or 15 together, but for no other items on the checklist, do not necessitate completion and submission of the checklist.

All new projects/activities which meet the definition above must be reviewed using the "Project/Activity Checklist" to ensure that environmental, health and safety issues have been considered *(see Attachment 16)*. Projects/activities that have undergone this review previously do not need to be reviewed again unless there are significant changes which could impact the responses on the checklist or impact regulatory compliance. (Example, the size of the oil container has increased from 15 gallons to 55 gallons thus impacting the SPCC Plan for the University.)

If, during the review of the checklist, any question in #1-11 is answered with a "YES," then the checklist must also be signed and submitted. In addition, questions with a "YES" response may require contacting resources to discuss compliance requirements. If this is required, the question will include instructions on who to contact. The individual completing the form (professor, advisor, technician, etc.) must then record the date the contact was made. A list of contact information (names, extensions, email addresses) is included at the end of this procedure. **If all questions #1-11 are answered "NO," signatures are not required and the checklist does not need to be submitted.**

A more detailed description of regulatory compliance requirements can be found in *Attachment 17, "Regulatory Impact on Projects/Activities."* This includes specific training resources that meet the applicable training requirements. The "contacts" listed on the checklist may use this attachment when reviewing/discussing with faculty/advisors specific regulations impacting the project. Line items in this resource are numbered to reflect the numbered items on the checklist which they may impact. This should be used as a tool to guide conversations.

***Responsibilities***

Faculty/Advisor – If you are the faculty member, advisor, researcher, paraprofessional or other individual accountable for overseeing a project/activity (as defined above), you are responsible to:

a. **Review the checklist.** If all questions in 1-11 are answered "no," the checklist does not need to be signed and submitted.
b. **Complete the checklist if any question in 1-11 results in a "yes" response.** Contact all individuals noted on the checklist in each question with a "yes" response to discuss and ensure regulatory compliance with your project. Record the date you first contacted these individuals where indicated on the form. When uncertain if an item on the checklist applies to your project, contact the Office of Human Resources & Compliance for further clarification.
c. **Inform all students involved in the project of regulatory implications** and their responsibilities for compliance. Ensure that all students have received any required training.
d. If any of the asterisked topics (items 8-11) on the checklist are applicable, you must submit the completed checklist to the dean for final approval.
**e. If a "yes" response is given for any item in 1-11, sign the checklist and forward a copy of the form to the Office of Human Resources & Compliance.** Do NOT sign the checklist

and forward until ALL contacts (see 'b' above) have been made. If the dean's signature is required, forward a copy *after* it is signed by the dean.

Dean/Director – If asterisked items (8-11 on the checklist) are applicable, the Dean of the School is responsible for reviewing the form and ensuring that s/he is satisfied with responses. His/her signature will grant final approval for the project.

Office of Human Resources & Compliance – The Office of HR&C will be responsible for:

a. Maintaining a log of all projects/activities requiring completion of the form.
b. Reviewing all submitted forms for final check of regulatory compliance.

***Contacts***

| Title | Name | Extension | Email |
|---|---|---|---|
| Chemical Hygiene Officer/Radiation Safety Officer | Lauri Norbeck | 2165 | lnorbeck@messiah.edu |
| Director of Facility Services | Brian Miller | 7151 | bemiller@messiah.edu |
| Facility Services Project Manager | Russ Ehrich | 3550 | rehrich@messiah.edu |
| Institutional Animal Care & Use Committee, Chair | John Harms | 3528 | jharms@messiah.edu |
| Institutional Review Board, Chair | Jennifer Thomson | 2016 | jthomson@messiah.edu |
| Laser Safety Officer | Abaz Kryemadhi | 2384 | akryemadhi@messiah.edu |

Return signed checklist to the Office of Human Resources & Compliance

# Project/Activity Checklist

**Name of Project/Activity:** _____

**Brief Description:** _____

**Researcher/Advisor:** _____ **Department:** _____

**Proposed Start Date:** _____ **Proposed Completion Date:** _____

| Does your project/activity include: | YES | NO |
|---|---|---|
| **1. The use or generation of a chemical not previously used/generated in department?** (Consider SDSs, inventory lists, PPE, storage, gas cylinders, flammable substances, transportation, etc.) If YES, in the natural sciences departments contact the Chemical Hygiene Officer; all other depts/schools contact the Office of Human Resources & Compliance (HR&C); date of contact: _____ | | |
| **2. The generation of waste not previously generated in the department?** (Consider disposal, costs, inspections, storage time, containers, etc.) If YES, contact HR&C; date of contact: _____ | | |
| **3. A new exhaust system or new chemical to an existing exhaust system?** Contact director of facility services and/or HR&C; date of contact: _____ | | |
| **4. Oil (fuel, vegetable, hydraulic, mineral, etc.) in containers with capacity of 55 gallons or more? Introduction of any "project/process" at single-family residence whether or not oil is part of the project?** (Consider SPCC Plan implications.) Contact HR&C; date of contact: _____ | | |
| **5. Exposure to human blood or other infectious materials?** (Consider Bloodborne Pathogens Standard Training, Hepatitis B Vaccination Waiver, disposal of infectious wastes, etc.) Contact HR&C; date of contact: _____ | | |
| **6. Confined Spaces? (**See Section 6 of Safety Manual for definition of confined space. Messiah University does not allow employees or students to enter a permit required confined space.) Contact HR&C; date of contact: _____ | | |
| **7. Powered Industrial Trucks?** (Cannot be operated by other than trained and certified employee.) Contact HR&C; date of contact: _____ | | |
| **If an asterisked (*) item is checked YES, dean's signature is required.** | | |
| *** 8. Newly obtained or modified machine/equipment (not including office equipment)? Building of a machine/equipment?** (Consider noise; radiation; lasers; guarding – pinch points, blades, hazard zones; Lock Out/Tag Out; PPE; etc.) Contact HR&C; date of contact: _____ | | |
| *** 9. Changes (alterations, modifications, demolition) to infrastructure of a campus facility?** ("Bricks and mortar") Contact director of facilities services or project manager in facilities services; date of contact: _____ | | |
| *** 10. Changes (alterations) to grounds/groundwater/streams/habitats/vegetation/environment?** (Consider PA DEP, EPA, PA-1 Call, etc.) Contact director of facility services and/or HR&C; date of contact: _____ | | |
| *** 11. International shipments?** Contact Office of Human Resources & Compliance; Date of contact: _____ | | |
| **If only item(s) below are checked YES, form does not need to be submitted.** | | |
| **12. Hot work: welding, cutting, brazing?** Compliance with the University's Hot Work Permit is required. See Section 3 of Safety Manual. | | |
| **13. Surveys/research involving human subjects?** (Consider IRB implications.) If "YES," go to FalconLink for the link to the Institutional Review Board and review the information on compliance requirements. | | |
| **14. Research involving animals?** If "YES," contact the chair of the Institutional Animal Care & Use Committee; Date of contact: _____ | | |
| **15. Student involvement?** (Consider training requirements; remember that students who are receiving payment for their work are considered employees by OSHA. Faculty/Advisors are responsible to inform students of all regulatory compliance needs.) Contact HR&C if an item in #1-11 is also checked YES; date of contact: _____ | | |

Signature of Faculty or Advisor indicates that all contacts identified above have been made and project/activity is in compliance with regulations and University policies that were discussed with these contacts:

_____ _____

*Faculty/Advisor's Signature* *Date*

All questions must be answered and faculty/advisor's signature must be on form before submission to Dean for final approval. Dean's signature indicates his/her approval of project/activity and is required for items asterisked (*):

_____ _____

*Dean's/Director's Signature* *Date*

# Regulatory Impact on Projects/Activities

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| **1. Chemicals** – Will you be using chemicals? Will you be ordering chemicals not previously used in your area? Will you be manufacturing chemicals not previously manufactured in your area including intermediary chemicals? | OSHA – Hazard Communication Standard, 1910.1200<br><br>For labs in SEH – OSHA 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories | A chemical is anything that during use may give off dusts, mists, gases, vapors or particulate.<br>Hazard Communication:<br>• Chemical Safety Data Sheets – must be obtained for all new chemicals<br>• GHS labels/secondary container labels – must be on all containers and process tanks<br>• Inventory – new chemicals must be included on area inventory<br>• If we are the "manufacturer" of the chemical, we must write the SDS for it<br>NOTE: In addition, specific standards may apply depending on the chemical. (Ex. Lead Std., Silica Std., Methylene Chloride Std., etc.)<br>Resources: *Hazard Communication Program: Chemical Safety Manual* and for SEH *Chemical Hygiene Plan* | Training in the Hazard Communication Program requirements and Messiah University's programs for compliance; for link to this online training, see Attachment B of Section 15 of this manual. |
| | US DOT | All chemicals must be shipped in compliance with US DOT regulations; this may mean proper shipping papers, packaging, labeling, using an approved shipper, etc. and includes shipment of test samples.<br>HazMat training required for individuals involved in packaging and preparing shipping papers for chemical shipments; for individuals ordering and receiving chemical shipments. | Contact Human Resources & Compliance, ext. 5300, to determine if US DOT Hazardous Materials training is required. |
| | TSCA | Chemicals must be included in federal Toxic Substance Control Act list or a PMN may be required; this includes chemicals from process reactions, if segregated. | |
| | OSHA, EPA, DEP | **Spill Clean-up** – are supplies available in the event of a minor spill? Are you familiar with the Spill Procedure in the event of a major spill? Do you know how to handle disposal of items from a spill clean-up? Do you understand reporting implications of certain spills to federal and state agencies? | Review the Messiah University Spill Procedure, Section 8, *Hazard Communication Program: Chemical Safety Manual* |
| **1. Gas Cylinders** | OSHA | Training in how to properly secure and transport them; the safety cap and how to NOT remove it; shutting them off when not in use; storage areas; etc. | For link to this online training, see *Attachment 15* of this manual. |

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| **1. Flammable Substances** | OSHA | Are fire extinguishers available? Flammable cans? Flammable storage cabinets? Proper grounding? | |
| **1 and 8.**<br>**Personal Protective Equipment** | OSHA – Personal Protective Equipment, Subpart I | Is there the chance of flying particles, dusts, etc. entering your eyes or hitting your face? Safety glasses/face shield should be worn.<br>Chemical splashes or sprays? Chemical splash goggles and chemical gloves should be used.<br>Cuts, lacerations, punctures to the hands? Material handling gloves should be used.<br>High noise exposure? Hearing protection should be worn.<br>Objects fall in on the head? Hard hats required.<br>Welding? Welding face shields, aprons, etc. may be required.<br>Exposure to hazardous airborne chemicals? Respirators may be required but are not permitted on campus to be worn by employees or students – we do not have the required programs in place to support their use. Contact Office of Human Resources & Compliance!<br>Other hazards? Contact Office of Human Resources & Compliance. | Training in the proper use and care of the personal protective equipment may be required. Contact Office of Human Resources & Compliance.<br>Completion of PPE Assessment form may be required. Contact Office of Human Resources & Compliance. |
| **2. Waste** – will the project generate any type of waste including, but not limited to, chemical waste? Scrap equipment? Scrap parts? | EPA, DEP (ex., RCRA, CDRA, etc.) and Upper Allen Sewer Authority | There are several "categories" of wastes, each regulated to include inspections, labeling, storage and accumulation limits (including length of time waste may be kept), training, etc. These categories include Hazardous Waste, Residual Waste, Municipal Waste, Universal Waste, Infectious/Biohazard Waste, Recyclables and Consumer Devices.<br>ALL wastes must be disposed of properly in compliance with federal, state and local regulations.<br>For information on how to handle waste generated from your project, contact Office of Human Resources & Compliance or Wes Bower. | For link to online waste training, see *Attachment 15* of this manual.<br><br>Resource: *Waste Manual* http://www.messiah.edu/download/downloads/id/1252/waste_manual.pdf |

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| | US DOT | Shipping must be in compliance with US DOT regulations; in proper shipping containers; with proper labeling and shipping papers; and by approved/authorized transporter. Likewise, shipments of hazardous materials must be received by trained and authorized personnel. | |
| **3. Exhaust Systems** | OSHA | Exhaust systems must meet ventilation requirements; these may be general requirements or specific to the airborne substance being exhausted. Systems, once installed and operational, must be routinely inspected. | Contact Human Resources & Compliance, ext. 5300, with questions. |
| **4. Oils** (vegetable, mineral, hydraulic, diesel, gasoline, etc.) in containers ≥ 55 gallons?<br>**OR**<br>Have you introduced a project/process at a "single-family" residence that was previously used ONLY for housing of students? It does not matter if the project actually involves oil. | US EPA – SPCC Plan | Monthly inspection of containers, containment, piping, pumps and valves.<br>Adequate supply of absorbents.<br>Training of individuals involved in handling of oil.<br>Updates to the current Messiah University SPCC Plan required if containers are added, eliminated or moved.<br>For more information, contact Office of Human Resources & Compliance at ext. 5038. | For link to SPCC online training, see *Attachment 15* of this manual. |
| **5. Exposure to Blood or Other Infectious Materials** | OSHA – Bloodborne Pathogens, 1910.1030 | Proper containers for waste and proper disposal.<br>Bloodborne Pathogen Training of individuals with potential exposure. Hep B vaccination or waiver form.<br>Safety practices and procedures must be in place. | For link to online Bloodborne Pathogen training, see *Attachment 15* of this manual.<br><br>Completion of Hepatitis B vaccination waiver.<br><br>Resource: *Exposure Control Plan*<br>http://www.messiah.edu/download/downloads/id/1250/exposure_control_plan.pdf |

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| **6. Confined Spaces** - A confined space is a space large enough and so configured that an employee can enter and perform assigned work; and has limited or restricted means for entry or exit (i.e. tanks, vessels, storage bins, vaults, elevator pits, sewers, and pits); and is not designed for continuous occupancy. | OSHA – Permit Required Confined Space, 1910.146 | Persons who are required to work in confined spaces or in support of those working in confined spaces (attendants) shall be trained and received instructions in the following areas:<br>• Nature of the work to be performed<br>• Emergency confined space entry and exit procedures<br>• Use of entry and emergency equipment<br>It is Messiah University's policy to contract such entries (due to the detail of training and the safety equipment required) to outside companies.<br>Such spaces must be labeled, "Confined Space – permit entry required." | For link to online Confined Space training, see *Attachment 15* of this manual.<br><br>Read Section 6 of this Manual for more information: |
| **7. Powered Industrial Trucks** | OSHA – Powered Industrial Trucks, 1910.178 | Training & certification in the use of powered industrial trucks is required. Recertification must be completed every 3 years. This includes training, testing, and observation of use of the equipment. | Contact Stoney Miller, ext. 3520 to schedule this training/certification. |
| **8 and 1.**<br>**Personal Protective Equipment** | OSHA – Personal Protective Equipment, Subpart I | Is there the chance of flying particles, dusts, etc. entering your eyes or hitting your face? Safety glasses/face shield should be worn.<br>Chemical splashes or sprays? Chemical splash goggles and chemical gloves should be used.<br>Cuts, lacerations, punctures to the hands? Material handling gloves should be used.<br>High noise exposure? Hearing protection should be worn.<br>Objects fall in on the head? Hard hats required.<br>Welding? Welding face shields, aprons, etc. may be required.<br>Exposure to hazardous airborne chemicals? Respirators may be required but are not permitted on campus to be worn by employees or students – we do not have the required programs in place to support their use. Contact Office of Human Resources & Compliance!<br>Other hazards? Contact Office of Human Resources & Compliance. | Training in the proper use and care of the personal protective equipment may be required. For link to this online training, see *Attachment 15* of this manual.<br><br>Completion of PPE Assessment form may be required. Contact Office of Human Resources & Compliance. |

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| **8. Noise** – does this project have equipment which generates significant noise? | OSHA – Occupational Noise Exposure, 1910.95 | Noise should be measured for dBA generated. Contact Office of Human Resources & Compliance, x5038. Hearing protection may be required. Resource: *Safety Manual, Section 4*. | If hearing protection is required, training in its use and care must be completed. For link to this online training, see *Attachment 15* of this manual. |
| **8. Lock Out/Tag Out** – will the project involve any maintenance or servicing of equipment where the unexpected energization (ex., electrical, pneumatic, kinetic, hydraulic, chemical thru plumbing lines, etc.) could result in harm/injury to the person working on the equipment or to others? | OSHA – The Control of Hazardous Energy, 1910.147 | Locks and tags must be available. Requires Lock Out procedures explaining how to lock out the equipment (what power sources need to be controlled), etc. Detailed training for individuals performing the lockouts and "awareness" training for those who might be present when equipment is locked out. | The detailed training package is provided by Facilities Maintenance. Contact ext. 7151 for these materials which include a DVD. Also, read section 5 of the *Safety Manual* for additional information about our campus LOTO program. Print out Attachment 7, complete and return to Office of Human Resources & Compliance, suite 3015. |
| **8. Equipment Pinch Points, Blades, Hazard Zones** | OSHA – Machinery & Machine Guarding, Subpart O | Is equipment guarded? Are guards in place and used? Are guards interlocked or labeled? | |
| **8. Lasers –** does this equipment contain any lasers? | OSHA – General Duty Clause; ANSI Z136 | All lasers except those contained in printers/copiers, pointers, and bar code readers must be included in the campus inventory list, properly guarded, eye protection provided when necessary, etc. The Laser Safety Officer (LSO) must be notified before brining any new lasers to campus. See Section 22 of this manual. | Required for all users of lasers/laser systems; level of training depends on the Class of the laser involved. Contact LSO for training information. |
| **8. Radiation –** does this equipment contain any radiation sources or produce radiation? | 25 Pa Code, Article V, Chapters 215-236, PA Radiation Protection Act | The campus Radiation Safety Officer (RSO) must be notified prior to bringing to campus any new radiation sources/radiation producing equipment. Certain equipment must be registered with the state, inspected prior to initial operation and routinely thereafter, etc. Refer to Section 24 of this manual for additional information. | Initial training for all employees working with radiation producing equipment/sources. See Section 24 for details. |
| **8 and 9. Electrical Hazards –** does this project involve electrical work? | OSHA, NFPA 70E | Have you considered arc flash hazards? Are proper PPE and tools being used? | Do participants have sufficient knowledge of possible hazards and how to protect against them? For PowerPoint training program, contact ext. 5300 or Facility Maintenance leadership. Then complete online training quiz (see *Attachment 15* of this manual). |

| Will the Project Include/Involve? | Regulatory Agencies | What are the Requirements? | Training |
|---|---|---|---|
| **9. Alterations/modifications/ demolition to infrastructure of campus facility** – will the project require alteration, modifications or demolition of campus buildings or equipment including, but not limited to, cutting into walls, floors, ceilings, insulation? | OSHA – Asbestos, 1910.1001 | Many buildings on campus and even some equipment may contain asbestos and/or lead. **Before doing any alterations, modifications, or demolition, contact facilities services, ext. 3500.** If asbestos is involved – you cannot proceed! An outside contractor must do all asbestos abatement. If building was constructed prior to 1978, EPA's RRP Std may apply – you cannot proceed!<br>All waste generated will need to be disposed of properly. | All changes to "brick and mortar" must be reviewed with the Facilities Services department. Contact Brian Miller (ext. 7151) or Russ Ehrich (ext. 3550).<br>Although unlikely, Asbestos training may be required. Contact Human Resources & Compliance, ext. 5300, for a determination.<br>Silica training may be required. Contact Human Resources & Compliance, ext. 5300, for a determination.<br>For link to these online trainings, see *Attachment 15* of this manual. |
| **10. Changes (alterations) to grounds/ groundwater/streams/habitat/ vegetation/environment?** Includes, but is not limited to, drilling wells, stream projects, installing buildings/sheds, etc. | PA DEP, US EPA, local government agencies | Permits may be required, etc.<br>In addition, PA-1 Call or the campus electrician may need to be involved to determine if underground electrical system is present.<br>If holes are dug, fencing may be required; in addition, a closure plan may be needed to insure safety hazards (such as holes) don't remain after completion of project. | All changes must be reviewed with the Facilities Services department. Contact Brian Miller (ext. 7151) or Russ Ehrich (ext. 3550). |
| **11. International Shipments** | | Have these been handled through a broker/exporter? | |
| **12. Hot Work: Welding, Cutting or Brazing** | OSHA – Welding, Cutting, Brazing, Subpart Q | A Hot Work Permit must be used for any hot cutting, brazing or welding. This is found in the *Safety Manual*. | Resource: *Safety Manual*, Section 3 |

**Remember**: If you are uncertain if a topic applies to your project, if you need more information or would like to discuss in detail, or if you have trouble accessing any of the links supplied above, contact the Office of Human Resources & Compliance.

**NOTES:**

- OSHA's General Duty Clause – "furnish…a place…free from recognized hazards that are causing or are likely to cause death or serious physical harm…"
- Incorporation by reference – OSHA includes by reference requirements for various industry standards such as ANSI, ACGIH, etc.
- We feel a moral obligation to provide a safe environment for our students and employees; be good stewards for the earth God has given us; and to include in the education provided to our students as much as we can that will prepare them for the workplace after graduation, including an understanding of compliance impacts with various governmental regulations.

# Section 17 – EQUIPMENT PRE-START UP PROGRAM

***Policy***

Use of the Pre-Start Up Checklist (*Attachment 18*) is recommended for each piece of new, major equipment introduced to Messiah University prior to its implementation and use. It is provided as a tool to aid in regulatory compliance and the continued safety of employees, students and visitors. Items on the checklist should be answered with a "YES" or "NA" to ensure compliance with various governmental regulations and operation of the equipment in a safe manner. A "NO" indicates a non-compliance issue, a possible unsafe condition, or the need for further conversation with the Office of Human Resources & Compliance. Please send a copy of completed checklists to the Office of Human Resources & Compliance.

The term "major equipment" is used for this program and the definition is left to the discretion of the area/department. However, even if an area/department does not determine the equipment to be "major", **compliance with all elements outlined on the checklist for all equipment introduced to Messiah University is required** as these elements are mandated by government regulations and/or are necessary to ensure the safety and well-being of employees who work on or near the equipment.

This checklist does not address all potential regulatory issues (ex., installation permits) but is intended to capture many of the concerns that arise regarding employee safety. Conversations with the Office of Human Resources & Compliance or the Facilities Services Director may be advisable to determine if other compliance concerns are applicable.

**NOTE:** A voluntary informal review of the checklist is useful even with office equipment such as copiers, computers, etc.

# Equipment Pre-Start Up Checklist

*Before a new, major piece of equipment is put into operation, the items on this checklist should be considered. To be in compliance with various federal, state and local regulations, all items should be checked "YES" or "NA." If a "NO" is checked, corrections should be made.*

***Forward completed form to Office of Human Resources & Compliance.***

**Equipment:** _____ **ID/Serial #:** _____

**Location (Bldg/Rm):** _____ **Dept/Area:** _____

| ITEM | YES | NO | NA |
|---|---|---|---|
| ***Equipment Guarding:*** If there are pinch points, points of operation, or points of hazard, are they appropriately guarded? | | | |
| If guards are interlocked, do the interlocks function properly? | | | |
| If interlocks do not exist, are guards labeled "Do not operate without guard in place"? Do they require a tool to remove? | | | |
| If emergency stops are needed, do they exist? Are they accessible? Do they function properly? | | | |
| ***Lock Out/Tag Out:*** If there are energy sources that must be locked out for maintenance work, is there a written lock out procedure? Is it adequate? Is it in the proper format? Does it list all sources of energy? | | | |
| If lock out is required, are locks/tags available to employees in the area who would need to lock out equipment? Are those employees appropriately trained? | | | |
| ***Operating Procedure:*** Is an operating procedure written, if needed? | | | |
| If this is a new type of equipment and/or introduces new hazards to the work area, have employees been trained in the safe use of the equipment or is there a plan to do so? | | | |
| ***Noise:*** If the equipment generates significant noise, has it been measured? (dBA measured: _____) | | | |
| If it requires the use of hearing protection, is hearing protection available to employees? | | | |
| If needed, is the equipment labeled with the hearing protection requirement or is there another method to communicate this need to employees? | | | |
| ***Radiation:*** If the equipment has a source of radiation, has the campus Radiation Safety Officer (Lauri Norbeck) been notified? | | | |
| If the equipment has a source of radiation, has it been inspected for radiation leakage? | | | |
| If the equipment has a source of radiation, is it properly labeled as a radiation source? | | | |
| If the equipment has a source of radiation that must be registered with PA DEP, has this been done? | | | |
| ***Lasers:*** If the equipment contains a laser, is it properly labeled? (Class of laser is _____) | | | |
| If the equipment contains a laser, is eye protection required and available? | | | |
| If a Class IIIb or Class IV laser, has the Laser Safety Officer (TBD) been contacted? | | | |
| Have users of the laser completed the appropriate safety training? | | | |
| ***UV Light:*** If the equipment contains a UV source, is the equipment labeled appropriately? | | | |
| If the equipment contains a UV source, is eye protection required and, if so, is it available? | | | |
| ***Chemicals:*** If this equipment introduced a new chemical to the area's inventory (consider process chemicals; equipment oils & lubricants; items such as welding rods; metals/plastics to be machined; etc.), have Safety Data Sheet(s) been obtained and forwarded to the Office of Human Resources & Compliance? | | | |
| If the equipment uses/contains chemicals, is there proper containment for the chemicals? | | | |

| ITEM | YES | NO | NA |
|---|---|---|---|
| If there are chemical reservoirs on the equipment, are they labeled as a secondary container? | | | |
| If this equipment introduced new chemical(s) to the work area, have employees been trained on any hazards associated with these chemicals or is there a plan to do so? | | | |
| ***Wastes:*** If the equipment/process generates a waste (consider chemical wastes, spent filters, scrap mat'l, etc.), has a proper disposal method been determined? | | | |
| ***Air Emissions/Exhausts/Ventilation:*** If the equipment and/or process produces an air emission (consider CO from engines, dusts, vapors, etc.), is there exhaust or adequate ventilation provided, if needed? | | | |
| If a warning system is needed, does it exist and has its function been communicated to area employees? | | | |
| If present, have any ventilation systems or warning systems been tested? Has protocol been established to test them routinely in the future? | | | |
| Is an air permit required, and if so, has it been obtained? | | | |
| If this needs added to the Greenhouse Gas Emissions Inventory, has it been done? | | | |
| ***Personal Protective Equipment (PPE):*** If PPE is required, has a PPE assessment form been completed and forwarded to the Office of Human Resources & Compliance? | | | |
| If PPE is required, is it available for employees? | | | |
| If this is a new type of PPE for employees, have they been trained in how and when to use it? | | | |
| If PPE is required, has its use been documented in the operating procedure or in area signs? | | | |
| ***Electrical:*** If equipment includes electrical parts, are the required labels present? (Ex., power supply, breakers, panels, transformers, voltage, etc.) | | | |
| If equipment includes electrical parts, are appropriate colors used for wiring? | | | |
| If equipment includes electrical parts, is equipment hard-wired? | | | |
| If equipment includes electrical parts, are approved covers on junction boxes, pull boxes and fittings? Is proper guarding in place for live parts greater than or equal to 50 volts? | | | |
| If equipment includes electrical parts, are all openings in cabinets, boxes, and/or fittings closed or sealed? (ex., no knockouts, use of grommets, etc.) | | | |
| If equipment includes electrical parts, is there sufficient clearance in front of electrical equipment/panels/control boxes for maintenance? | | | |

***Note any issues found which could not be corrected/resolved:***

_____

_____

_____

_____

_____

_____ _____

*Employee Completing Checklist (Print)* *Date*

_____ _____

*Signature* *Title*

# Section 18 – LEAD PROGRAM

NOTE: The Winding Hill facility was completely remodeled prior to occupation by Messiah University personnel. No lead is present in the facility structure and no lead is used in any of the activities that occur within the programs located there.

Messiah University strives to ensure a safe and healthy environment for our employees, students and visitors to our campus; and to comply with environmental, health and safety regulations. The Occupational Safety and Health Administration, the U.S. Environmental Protection Agency and the Pennsylvania Department of Environmental Protection have regulations pertaining to lead exposure, the safe handling of lead and the proper disposal of lead contaminated wastes (OSHA 1910.1025; 40 CFR 745; and Title 25, ch 260-270 respectively).

## Hazards of Overexposure to Lead

Lead poses a health hazard if it becomes airborne (dust, fumes, mist) where it can be inhaled into the body or if it is ingested (consumed).

Short-term, acute (high-dose) exposure to lead can cause seizures, coma and even death. Chronic (long-term, lower dose) exposures may cause damage to blood-forming, nervous, urinary and reproductive systems. Symptoms may include loss of appetite, metallic taste, anxiety, constipation, nausea, tiredness, weakness, insomnia, headache, irritability, tremors, muscle & joint pain, dizziness, colic and abdominal pain. Kidney disease and anemia can also result from overexposure. Chronic overexposure may lead to reproductive impairment in both men and women; miscarriages, birth defects and other developmental issues. Children six years old and younger are most susceptible to the effects of lead. Even low levels of lead in the blood of children can result in behavior and learning problems, lower IQ and hyperactivity, slowed growth, hearing problems and anemia. In rare cases, ingestion of lead can cause seizures, coma and even death.

## Government Regulations for Lead

OSHA Lead Standard

The OSHA Standard requires that workplace exposure be less than the Permissible Exposure Limit (PEL) for lead and that certain programs be implemented at the Action Level (AL) (ex., employee training). OSHA also requires each employer with a workplace where the **potential** exposure to airborne lead **at any level** exists to inform employees of some basic information. Messiah University's notification is discussed later in this program.

U.S. EPA RRP Rule

Many paints manufactured prior to 1978 contained lead. U.S. EPA's Renovation, Repair and Painting (RRP) rule requires that contractors performing renovation, repair and painting projects that disturb lead-based paint in homes and child-occupied facilities built before 1978 be certified and follow specific work practices. The only **exceptions** are:

- Activities that disturb 6 square feet or less of paint per room (not including window replacement, demolition, or prohibited practices)

- Activities that disturb 20 square feet or less on the exterior of a building (not including window replacement, demolition, or prohibited practices)
- Zero-bedroom dwellings
- Housing or components that have been declared lead-free in compliance with EPA standards

To be declared lead-free, testing must be by an individual certified to perform lead testing. The required notification for occupants prior to commencement of any renovations is discussed later in this program. (Refer to *Attachment 19* for University-owned buildings impacted by this regulation.)

Because U.S. EPA broadly defines renovation as any activity that disturbs painted surfaces and includes most repair, remodeling, and maintenance activities, including window replacement, members of our Facility Services department have been certified for lead safety and will be re-certified every 5 years. All maintenance personnel have been trained in the EPA RRP requirements.

U.S. EPA and PA DEP Waste Regulations

Waste containing lead including waste contaminated with lead-based paint may be considered a hazardous waste and must be handled appropriately in compliance with PA DEP regulations (and U.S. EPA regulations). Proper waste disposal is usually part of the renovation/demolition project and the contractor is responsible for the disposal. If for any reason this is not included in the project, then the Office of Human Resources & Compliance should be contacted. ELK Environmental Services is the waste disposal company that handles the University's hazardous waste including lead-contaminated wastes that are determined to be hazardous (ex., wastes from the chemistry lab).

**Definitions**

Child-Occupied Facility – a building, or portion of a building, constructed prior to 1978, visited regularly by the same child under age 6, on at least 2 different days per week, provided that each day's visit lasts at least 3 hours and the combined weekly visits last at least 6 hours, and the combined annual visits last at least 60 hours. At Messiah University, while children often visit our Oakes Museum, they do not meet the combined annual visiting time as outlined in this definition.

Hazardous Waste Lead-Based Paint Material – lead-based paint waste for which a representative sample exhibits the characteristics of toxicity for lead (TCLP analytical results at or above 5 mg/l).

Lead – a naturally occurring, highly toxic soft metal.

OSHA's Action Level – an average exposure of 30 micro-grams per cubic meter of air measured over an 8-hour work shift.

OSHA's Permissible Exposure Level (PEL) – a time-weighted average exposure of 50 micro-grams per cubic meter of air measured over an 8-hour work shift.

Target Housing – target housing is residential housing built before 1978 including private housing and public housing. The term does not include the following: housing built after 1978, zero bedroom units such as efficiencies, lofts, residence halls, housing leased for less than 100 days,

housing for the elderly, and rental housing inspected by a certified inspector and found to be free of lead-based paint.

Zero-Bedroom Dwelling – any residential dwelling where the living area is not separated from the sleeping area. This term includes efficiency and studio apartments, dormitory housing and military barracks.

## Potential Sources of Lead at Messiah University and Prevention Against Overexposure

Paint

Lead based paints were used prior to 1978. Buildings that were built prior to this time may contain leaded paint. At Messiah University, we have buildings that fall into this pre-1978 category. (See *Attachment 19* for a listing of these buildings and the year each was constructed.) Lead based paints become a hazard if the paint is chipping or is sanded. **Anyone noticing such conditions should immediately contact the Facility Services department.**

Painting at Messiah University is done by contractors; re-painting in pre-1978 buildings is done by certified, EPA registered contractors. They are aware of the potential hazards of leaded paint in older buildings and, if the area has not been tested to verify it is lead free, they use precautions to ensure occupants do not receive exposure during these activities. Should **demolition** of these buildings occur, lead-paint contaminated waste will be disposed of as a hazardous waste in compliance with U.S. EPA and PA DEP regulations.

Water

Prior to 1986, pipes, solders and fluxes used in plumbing contained a significant amount of lead. In 1986, the required use of "lead-free" pipes, solders and fluxes in the installation or repair of any water system providing water for human consumption became law. In 1998, plumbing fixtures that were not lead-free were banned from sale in the U.S.

Messiah University obtains its water from United Water; our water is not provided by private wells except at the Bowmansdale facility. The water company does routine analysis as required by law and meets all standards; they make available to us a consumer confidence report every year. In addition, testing of Messiah University's drinking water at both the Grantham campus and Bowmansdale facility has been conducted by an outside contractor and analyzed by a certified lab; lead levels were within established guidelines and standards as outlined by the EPA. However, to ensure that lead has not leached into water that is present in plumbing lines that have not been flushed for a significant time period, **it is always a good practice to flush water for a few minutes before using it for consumption unless you know that the water line has been used regularly.**

U.S. EPA has identified water coolers that were built with lead-lined tanks. Messiah University does not have these units on campus. See *Attachment 20* for EPA's list of these water coolers.

Welding and Soldering

Very limited soldering or welding may occur where lead may be present (although many solders and metals used on campus do not contain lead); both the soldering and welding are for short periods

of time and do not occur routinely. **Exhaust is available and should be used** whenever possible for large welding operations.

Chemistry

Lead compounds are used in the chemistry and biochemistry labs. However, they are used in small quantities and **in lab hoods** with the proper exhaust.

General Precautions

Employees and students are encouraged to contact Facility Services or the Office of Human Resources & Compliance if there is visible flaking of paint or with any other concerns related to lead.

Although the **potential** for any exposure to airborne or ingestible lead at Messiah University is **extremely low**, good hygiene should always be practiced before placing anything into the mouth.

## Lead Notifications

Notification to All Employees Required by OSHA

Each employer with a workplace where the **potential** exposure to airborne lead **at any level** exists must inform employees of some basic information. This notification must be made **annually**. At Messiah University this is made in the fall via a mass email to all employees and/or included in the "Back to School" pamphlet sent via mass email to all employees. (See *Attachment 21* for the actual notification.)

Notification To Lessees and Occupants of University Apartments; Non-Zero Bedroom Dwellings and Single-Family Housing; and Child-Occupied Facilities Constructed Pre-1978 Required by EPA

The U.S. EPA pamphlet *"Protect Your Family from Lead in Your Home"* is shared with our lessees by our real estate representative. This pamphlet is also provided **annually** to employees and students residing in University owned single family residences, apartments or non-zero bedroom dwellings in buildings constructed prior to 1978. The EPA pamphlet is available on EPA's website at https://www.epa.gov/lead/protect-your-family-lead-your-home-english or https://www.epa.gov/sites/default/files/2020-04/documents/lead-in-your-home-portrait-color-2020-508.pdf

Residents in University apartments located in Fry, Mellinger, Kelly & Smith are not part of this notification; these buildings were all constructed after 1978. (See *Attachment 19* for University-owned buildings impacted, noted with AN on table.)

Notification of Renovation, Repair or Painting in pre-1978 Residential Houses, Apartments/Non-Zero Bedroom Dwellings and Child-Care Facilities

Should any renovation, repair or painting be conducted in a pre-1978 housing or child-occupied facility, including remodeling and repair/maintenance, electrical work, plumbing, painting preparation, carpentry or window replacement, EPA's pamphlet *"The Lead-Safe Certified Guide to Renovate Right: Important lead hazard information for families, child care providers and schools"* will be distributed to occupants prior to the commencement of the work. Distribution may include

hand delivery, email, or US mail; if delivered by U.S. mail, this must be sent a minimum of 7 days prior to the start of the work. This pamphlet is available on EPA's website https://www.epa.gov/lead. Additionally, informational signs may be posted where visible in these areas. (See *Attachment 19* for University-owned buildings impacted, noted with RRP on table.)

Whenever possible, confirmation of receipt of the information will be requested (or documentation indicating receipt) and retained for three years.

*NOTE:* Pre-renovation notification is not applicable for emergency renovations/repairs. In addition, the same exceptions for work practices mentioned earlier also apply to this notification:

- Activities that disturb 6 square feet or less of paint per room (not including window replacement, demolition, or prohibited practices)
- Activities that disturb 20 square feet or less on the exterior of a building (not including window replacement, demolition, or prohibited practices)
- Zero-bedroom dwellings
- Housing or components that have been declared lead-free in compliance with EPA standards

# Year of Construction of Campus Buildings

| Facility Name | Year Constructed | Apartment or Non-zero bedroom dwelling | Residential house for students or employees | Rental " Target" Property | Childcare Facility | Comments |
|---|---|---|---|---|---|---|
| **Agape Center** | **Circa 1950s** | | | | | Offices |
| **Bertram House** | **Circa 1940s** | | AN/RRP | | | Housing for Students |
| **Bittner (South Complex)** | **1973** | AN/RRP | | | | Housing for RD |
| Bowmansdale<br>*Major renovation in 1999* | 1978 | | | | | Printing/Offices/Storage |
| Boyer Hall | 2003 | | | | | Classrooms/Offices |
| Climenhaga Fine Arts Center | 1981 | | | | | Classrooms/Offices |
| **Climenhaga Homestead** | **1925** | | | | | Offices/Guest Rooms |
| Cooling/Heating/Power Plant | 2016 | | | | | |
| **Eisenhower Campus Center** | **1972** | | | | | Offices/Dining |
| Martin's Common | 2016 | | | | | Dining |
| Addition to Fitness Ctr | 2017 | | | | | |
| **Engle Health Center** | **1952** | | | | | Offices/Exam Rooms |
| Falcon Hut | 1984 | | | | | Snack Shop/Athletic Use |
| **Foreman House (Restoration)** | **Circa 1950s** | | AN/RRP | | | Housing for students |
| Frey Engineering Storage Shed | 2009 | | | | | |
| Frey Hall | 1991-92 | | | | | Classrooms/Offices |
| Fry | 1981-82 | X | | | | Housing for Students |
| Grantham Hall (North Complex) | 1995-96 | | | | | Housing for Students |
| **Greenbriar** | **Circa 1920s** | | | | | Offices for Safety |
| **Hess (North Complex)** | **1970** | AN/RRP | | | | Housing for RD |
| High Center | 2012 | | | | | Classrooms/Offices |
| **Hostetter Chapel** | **1961** | | | | AN/RRP | See note below |
| **Issachar's Loft (Martin)** | **1955** | | AN/RRP | | | Housing for employee |
| Jordan Science Center | 1999 | | | | | Classrooms/Offices |
| Kelly | 1989 | X | | | | Housing for Students |
| **Kline Hall of Science** | **1969** | | | | | Classrooms/Offices |
| **Kraybill Property** | **0** | | | | | Storage |
| Larsen Student Union | 2004 | | | | | Offices |
| **Lenhert**<br>*Major renovation 2000* | **1972** | | | | | Offices/Shops |
| **Locust Hill Garage** | **0** | | | | | Storage |
| **Mann House East** | **Circa 1940s** | | | AN/RRP | | Leased Residential |
| **Mann House West** | **Circa 1940s** | | | AN/RRP | | Leased Residential |
| **Melhorn House (Restoration)** | **Circa 1940s** | | AN/RRP | | | Housing for Students |
| Mellinger | 1985 | X | | | | Housing for Students |
| **Mill House** | **1915** | | | | | Studios/Storage |
| **Miller (North Complex)** | **1965** | AN/RRP | | | | Housing for RD |
| Mountain View (South Complex) | 1997 | | | | | |
| **Murray Library** | **1958** | | | | | Library/Offices |
| Naugle Hall | 1983 | | | | | |

| Facility Name | Year Constructed | Apartment or Non-zero bedroom dwelling | Residential house for students or employees | Rental " Target" Property | Childcare Facility | Comments |
|---|---|---|---|---|---|---|
| **Ocamb House** | **Circa 1940s** | | | | | Storage |
| **Old Main** | **1911** | | | | | Offices/Administration |
| Orchard Hill | 2008 | | | | | |
| **Reeser Garage** | **Circa 1930s** | | | | | Storage |
| **Schrag House (Rafiki)** | **1964** | | AN/RRP | | | Housing for Students |
| Smith | 1979 | X | | | | Housing for Students |
| **Sollenberger (South Complex)** | **1967** | AN/RRP | | | | Housing for RD |
| Sollenberger Sports Center | 1985 | | | | | |
| Sollenberger Sports Ctr Addition | 2017 | | | | | |
| Starry Complex | 1984 | | | | | |
| Welcome Center | 2020 | | | | | Offices/Administration |
| Winding Hill<br>*(leased-University does not own)* | ???<br>2016 - Major renovation | | | | | Classrooms/Offices |
| Witmer | 1987 | X | | | | Housing for RD |
| **Woodland (Reconciliation)** | **1973** | | AN/RRP | | | Housing for Students |
| **Young House** | **Circa 1977** | | | AN/RRP | | Leased Residential |
| | | | | | | |

*NOTE:* Significant renovation and painting was conducted in Hostetter Chapel during the summer of 2014. Exposed paint in this area is lead-free.

KEY TO TABLE:

If year is listed as "0" assume it was pre-1978.

AN – annual notification, U.S. EPA pamphlet "Protect Your Family from Lead in Your Home"

RRP – Renovations, Repair & Painting, U.S. EPA pamphlet *"The Lead-Safe Certified Guide to Renovate Right: Important lead hazard information for families, child care providers and schools"*

# Water Coolers with Lead-Lined Tanks

(From EPA Website)



## Water Coolers With Lead-Lined Tanks

The following list of model numbers represents all of the drinking water coolers with lead-lined tanks that have been identified to date. The models listed here were selected because one or more of the units in that model series have been tested and found to have lead-lined tanks. These six models are made by the Halsey Taylor Company.

| | | |
|---|---|---|
| WM 8A | GC 10ACR | GC 5A |
| WT 8A | GC 10A | RWM 13A |

## Other Water Coolers Containing Lead

### EBCO Manufacturing Company

EBCO has identified all pressure bubbler water coolers with shipping dates from 1962 through 1977 as having a bubbler valve containing lead, as defined by the LCCA. The units contain a single 50-50 tin-lead solder joint on the bubbler valve. Model numbers for those coolers in this category were not available.

The following EBCO models of pressure bubbler coolers produced from 1978 through 1981 contain one 50-50 tin-lead solder joint each:

| | | |
|---|---|---|
| CP3 | DP7SM | DPM8H |
| CP10-50 | DP10F | DP16M |
| DP20-50 | CP3H | DP7S |
| DP13A | 13P | DP7WM |
| DP7M | DP3RH | EP10F |
| DP13M-60 | DP14A-50/60 | CP10 |
| CP5M | DP12N | DP20 |
| DP14S | DPM8 | DP8AH |
| DP5F | DP15M | C10E |
| CP3-50 | DP5S | DP5M |
| 7P | DP13SM | DP13M |
| DP3R | EP5F | CP3M |
| DP13A-50 | CP5 | DP13S |
| PX-10 | 13PL | DP7WMD |
| DP7MH | DP8A | WTC10 |
| DP14M | DP10X | |
| DP15MW | DP15W | |

Pressure bubbler water coolers manufactured by EBCO and marketed under the "Oasis" and "Kelvinator" brand names with the identified model numbers have been distributed in the U.S. In addition, EBCO indicated that "Aquarius" pressure bubbler water coolers are manufactured for distribution in foreign countries, including Canada. Although unlikely, it is conceivable that an "Aquarius" cooler with one of the model numbers listed above could have been transported into the U.S.

### Halsey Taylor Company

Halsey Taylor reports using lead solder in these models of water cooler manufactured between 1978 and the last week of 1987.

| | |
|---|---|
| WMA-I | SCWT/SCWT-A |
| SWA-I | DC/DHC-1 |
| S3/5/10 D | BFC-4F/7F/4FS/7FS |
| S300/500/1000D | |

In addition to these Halsey Taylor models, Halsey Taylor indicates that the following Haws brand coolers manufactured for Haws by Halsey Taylor from November 1984 through December 18, 1987, are not lead free because they contain two tin-lead solder joints. The model designations for these coolers are:

| | | |
|---|---|---|
| HC8WT | HC14W | HCBF7D |
| HC8WTH | HC4F | HCBF7HO |
| HC14WT | HC4FH | HWC7 |
| HC14WTH | HC8F | HWC7D |
| HC14WL | HC8FH | HC2F |
| HC16WT | HC14F | HC2FH |
| HC4W | HC14FH | HC5F |
| HC6W | HC14FL | HC10F |
| HC9W | HCBF7 | |

**Note:** A number of water coolers have been deleted from the proposed list identifying them as not lead free. For information about these water coolers and others, refer to the January 18, 1990 Federal Register notice.

# Lead Notification for Employees

**OSHA 1910.1025**

Each employer with a workplace where the **potential** exposure to airborne lead **at any level** exists must inform employees of some basic information. This notification must be made annually. At Messiah University, because lead was used in the manufacture of many paints prior to 1978, there is the potential for the presence of lead paint in older buildings. Employees may have a very small potential for lead exposure if paint should flake or be sanded. Additionally, there are a few positions in which limited soldering or welding may occur and where lead may be present (although many solders and metals do not contain lead); both the soldering and welding are for short periods of time and do not occur routinely. Exhaust is available and should be used whenever possible for large welding operations. Our chemistry department has several lead compounds that are used in small quantities and in lab hoods. Once again, the potential for any lead exposure is extremely small.

***However, you should be aware of the following:***

Lead and lead compounds are used in a variety of products and operations including leaded solders and certain metal compounds. It can be found in electronic components and lead-acid batteries. It is present in hobbies such as stained glass making and hunting/shooting. Because it was once used in paints and gasoline, it is found in older buildings and in soil from exhaust emissions.

OSHA has a standard for lead and has established an eight-hour permissible exposure limit (average exposure allowed for an 8-hour work shift) of 50 micrograms per cubic meter of air.

**Health hazards associated with lead**

Lead poses a health hazard if it becomes airborne (dust, fumes, mist) where it can be inhaled into the body or if it is ingested (eaten).

Short-term, acute (high-dose) exposure to lead can cause seizures, coma and even death. Chronic (long-term, lower dose) exposures may cause damage to blood-forming, nervous, urinary and reproductive systems. Symptoms may include loss of appetite, metallic taste, anxiety, constipation, nausea, tiredness, weakness, insomnia, headache, irritability, tremors, muscle & joint pain, dizziness, colic and abdominal pain. Kidney disease and anemia can also result from overexposure. Chronic overexposure may lead to reproductive impairment in both men and women; miscarriages, birth defects and other developmental issues.

**Precautions for on- and off-the-job**

- To avoid consumption of lead, **always use good hygiene**. Wash your hands thoroughly before putting anything into your mouth.
- To avoid inhalation, if paint chips or dust are present which may contain lead, whenever possible, vacuums or wet cloths/mops should be used to clean the area. Avoid sweeping or dry cleaning which may cause the chips/dust to become airborne. If sanding old paint, take proper precautions to avoid exposure to dust.

***NOTE:*** Leaded paint that is not flaking, chipping or being sanded does not present an inhalation hazard.

- If using lead solders, be sure that adequate ventilation is present when soldering. This may include using mechanical exhaust or in small applications making sure that use is not in a closed or confined space.
- If shooting indoors (gun/firing range), ask if lead monitoring has been conducted. Such areas are often sources of overexposure to lead.
- Old plumbing (leaded pipes and solders) and even old water coolers may be sources of lead in water. **Frequent flushing of water lines prevents lead from leaching into the water.**
- **Remember that lead may be present both on- and off-the-job.**

**Potential lead sources at Messiah University**

At Messiah University, we have many buildings with original construction pre 1978. Among these are Agape, Bertram, Bittner, Bowmansdale, Climenhaga Homestead, Eisenhower, Engle, Foreman, Greenbriar, Hess, Hostetter Chapel, Issachar's Loft, Kline, Lenhert, Melhorn, Mill House, Miller, Murray Library, Old Main, Rafiki, Sollenberger, & Woodland. Paint contractors are hired when painting is needed. They are aware of the potential hazards of leaded paint in older buildings; if the area has not been tested to verify it is lead free, they use precautions to insure our employees do not receive exposure during these activities. **If chipping paint is noticed in any campus buildings, notify facility services immediately.**

Testing has been conducted for lead in campus water (at Grantham campus and Bowmansdale) by an outside contractor and analyzed by a certified lab; lead levels were within established guidelines and standards as outlined by the EPA. Also, there are no lead-lined water coolers in any University buildings.

There are no job functions where 8 hours of exposure to any type of airborne lead is present. There may be the occasional soldering or welding; these operations are not routine and usually do not extend for any significant length of time. Exhaust is provided at large welding stations. Likewise, the use of lead compounds in the laboratories is restricted to small quantities, short periods of time, and ventilation is provided by lab hoods.

The **potential** for any exposure to airborne or ingestible lead at Messiah University is **extremely low**. However, we need to make employees aware of the presence of lead and its potential hazards from overexposure. If you have any questions regarding this notification, please contact Human Resources & Compliance at ext. 5300.

For more information, OSHA's Lead Standard (29CFR 1910.1025) is available at the following website:

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10030

# Section 19 – EMPLOYEE SAFETY RESPONSIBILITIES

***Policy***

Each employee is responsible for their safety and the safety of others. For the purposes of this policy, employees include all staff, administrators, faculty, full-time, part-time, temporary and student employees.

***Responsibilities***

**All employees must comply with federal, state and local environmental, health and safety regulations as they apply to their position with the University.** In addition, the following responsibilities are considered a part of the job position:

Leadership and Supervisors

Each member of leadership/supervision shall view safety as a vital part of his or her overall responsibility. Leadership and supervisors are responsible not only for the quantity and quality of work produced by employees, but also for their occupational safety and health. Leadership and supervisors are responsible for maintaining safe working conditions. Each member of leadership/supervision shall be held accountable for the safety record of his or her area of responsibility.

Employees

Each employee must:

- Work in a safe manner at all times, making safety an integral part of every job.
- Learn and follow the University's established safe job procedures for each job you perform.
- Abide by University policy related to possessing, consuming, distributing or reporting to work under the influence of illegal drugs and alcohol. This policy will be strictly enforced and any employee found in violation may be subject to disciplinary action, including termination.
- Use equipment properly; do not abuse it. Do not remove or disable safety features, devices, or guards on any equipment.
- Wear appropriate clothing for the job.
- Use safety equipment and personal protective equipment as required - hard hats, eye protection, hearing protection, etc.
- Take an active part in and cooperate fully in the safety program.
- Whenever possible, correct unsafe acts or unsafe conditions immediately. When not possible, report them to leadership or to someone who can have them corrected.
- Keep all work areas clean and orderly.
- Attend all safety training sessions as directed; complete all online training promptly.
- Know where first aid supplies are kept and know how to obtain first aid.
- Never attempt to repair or adjust a machine while it is operating. Follow the University's lockout/tag-out procedure when adjusting or working on equipment.
- Know and understand the University's Hazard Communication program, including how to use the 3E system for accessing Safety Data Sheets.

- Comply with the Lone Worker Policy (Section 26, *Safety Manual*).
- Never block an emergency exit, fire extinguisher, or fire pull alarm.
- While there is a level of risk inherent in living life, employees are expected to minimize risk as much as possible, both for themselves, their co-workers, students and visitors. Think carefully about a task or activity and ask "What could go wrong?" Consider the potential results of your actions.

An employee who sustains a job-related injury or illness must:

- Report the incident to his or her supervisor immediately
- Complete reporting forms as instructed
- Obtain medical care from a provider specified by Messiah University for the first visit and for 90 days following

It is illegal for the University to in any way discriminate against an employee for making an injury or illness report. Detailed information on injury reporting is available in Section 9, Injuries and Illnesses, of the University's *Safety Manual*.

## Disciplinary Procedure for Safety Violations

Employees who do not follow the University's safety guidelines and the provisions of the safety program are subject to disciplinary action up to and including termination of employment. Failure to follow safety protocols is considered willful misconduct.

# Section 20 – WORKPLACE SAFETY COMMITTEE

## Policy

Messiah University holds in high regard the safety and health of its employees. We believe that incidents which injure people and damage equipment cause needless personal suffering, inconvenience, and expense. We believe that practically all incidents can be prevented by taking common sense precautions.

To this end, every reasonable effort will be made to create and maintain a safe and healthy work environment and prevent accidental injuries and illnesses.

Messiah University will not discharge, threaten with discharge, demote, suspend, or discriminate against any employee for making statements, complaints, or recommendations relating to employee safety and health. Employees will be encouraged to serve as a workplace safety committee member, to participate in workplace safety inspections, and to offer suggestions for continuously improving the safety of the workplace environment.

## Workplace Safety Committee

The University shall maintain a Workplace Safety Committee (the "Committee"), which shall meet monthly. This section of the *Safety Manual* shall serve as the by-laws of the Committee. The Committee structure and responsibilities are outlined:

### Membership

1. There will be several "core" members of the Committee who, because of their responsibilities, cannot be replaced on the Committee. There is no one who performs the same or very similar job functions related to safety in his/her area. These core members are:
    a. Employee Health & Wellness Coordinator (chair) – this position oversees the workers' compensation program for the University
    b. Natural Sciences Laboratory Program Manager – this position is the Chemical Hygiene Officer and Radiation Safety Officer for the University and oversees lab safety programs
    c. Director of the Office of Academic Success – oversees the student disability services program, including compliance with ADA
    d. Student Employment Coordinator – administers the student employment program for the University and serves on the Committee as a representative for student employees
    e. Fire and Safety Systems Coordinator - responsible for the inspection and maintenance of fire safety systems on campus and NFPA compliance
2. The number of employer representatives shall not exceed the number of employee representatives; every effort shall be made to keep the number of employee and employer representatives equitable.
    a. Employer representative – individual who, regardless of job title, and based upon the individual's authority or responsibility, does one or more of the following:
        i. Select or hire an employee
        ii. Remove or terminate an employee

        iii. Evaluate employee performance as part of the performance review process
        iv. Control the employee; direct the employee's work
    b. Employee representative – individual who is employed by Messiah University but does not possess any authority or responsibility as described for an employer representative
3. **Membership must represent all the major work functions of the University.**
4. All non-core members shall serve a continuous term of at least one year. (The only exceptions will be for retirement/termination from the University or change in the member's job position/work area which might impact area representation or employer/employee representation.)
5. New members will be brought onto the Committee as current members leave (through attrition, at their request, or to increase the involvement and knowledge of employees not previously afforded the opportunity to participate on the Committee).
6. The core members will ensure continuity as experienced committee members. These members may only be removed from the Committee by retirement/termination or change in member's job position. In such instances, the individual who replaces him/her in the job position will also serve as replacement on the Committee. The only exception is if an additional position has been created in their area/department with similar responsibilities that could adequately represent their field of experience on the Committee. If this occurs, the position would be removed from the list of core members by virtue of the fact that there is more than one employee who could now fill this role on the Committee.
7. Employees interested in becoming committee members should apply via phone, email, or in person to the committee chairperson or their leadership.
8. The committee chairperson shall report directly to the Vice President for Human Resources and Compliance. The Employee Health and Wellness Coordinator, who is the liaison with the University's Workers' Compensation Insurance Carrier, serves as the chair of the Committee and must be present at each meeting.

All committee members will be permitted to spend reasonable time away from their scheduled work assignment to perform committee duties, without loss of pay or benefits.

## Responsibilities

*Committee/Committee Members*

The responsibilities of the Committee shall include, but are not limited to the following:

1. Continuously evaluate the employee safety program and make recommendations for the University's senior administration as needed.
2. An EHS Audit program exists (Section 10 of *Safety Manual*). Reports/results of these audits will be presented to the Committee. The Committee will be solicited for recommendations in addressing issues arising from the audits. Whenever possible, members of the Committee will participate in audits conducted in their areas. The audit results are communicated in writing to area leadership, including the area's Vice President/Dean and the Vice President for Human Resources and Compliance.
3. In addition to the EHS Audit program, Committee members are encouraged to conduct inspections of office areas, parking lots, and areas which may not be covered under the

EHS program in their buildings. *Attachment 22* provides guidance in conducting these audits and *Attachment 23* is a form for documenting them. All results are to be presented at the first Committee meeting following the inspection. While these audits are at the members' discretion, occasionally the chairperson may request members to complete these audits.

4. Report specific safety hazards (when identified by Committee members, co-workers, or others) to the appropriate University administrator and document corrective measures taken.
5. Review all employee work-related illnesses and injuries in a timely manner, make sure they were investigated properly, and recommend appropriate corrective action to the appropriate University administrator.
6. Review all employee suggestions and complaints regarding occupational safety and health hazards and recommend appropriate corrective action to the area's senior administrator.
7. Discuss concerns regarding any new equipment introduced at the University.
8. Act as the eyes and ears of the University – every day.
9. Serve as liaison and resource to employees in their areas, communicating pertinent safety and health issues back to co-workers and bringing to the meeting any safety and health issues that have been brought to their attention by co-workers.
10. Bring proactive safety and health issues to each meeting.
11. Take pertinent information covered during the committee meeting and review it during the next department meeting or share it with co-workers in the most appropriate venue.

*Chair*

The chair is an active member of the Committee and, as such, shares in the Committee members' responsibilities. In addition, the responsibilities of the Safety Committee chairperson shall include, but are not limited to:

1. Preside over all meetings of the Committee.
2. Act as liaison between the Committee and the University's Vice President for Human Resources and Compliance.
3. Ensure that the Committee operates in accordance with its by-laws (safety policy and procedure).
4. Schedule and ensure that meetings are held at least monthly.
5. Solicit agenda topics, prepare a written agenda for each meeting and distribute it to each member at least one day before the meeting.
6. Delegate responsibility for follow-up action to individual committee members.
7. Prepare written minutes within one week of each meeting, distribute them to committee members and post a copy on FalconLink.
8. Retain agendas and meeting minutes for a minimum of five (5) years.
9. Ensure that the education and training requirements listed below are met.
10. Maintain a current written membership list to ensure that committee membership meets the requirements listed below and solicit new members as needed. A membership list will be available under "Safety Committee" on FalconLink so that employees campus-wide can easily identify their area representative.

11. Submit annual application to the state. This must be submitted between April 1st and June 30th of each year.
12. Participate in state audits of Committee records.

## Operation of Meetings

1. All committee decisions shall be made by majority vote of the members present at the meeting.
2. The committee must meet monthly. Additional meetings may be held as necessary, at the discretion of the committee chairperson.
3. Attendance will be taken at each meeting by members' signatures on a roster. This record shall be retained with the meeting minutes.
4. A quorum must be present (half the membership, plus one).
5. The committee shall:
    a. Approve previous meeting minutes.
    b. Review all employee job-related injuries and illnesses that occurred since the previous meeting.
    c. Examine injury/illness trends noted among employees.
    d. Review Environmental, Health and Safety Audit results.
    e. Review status of safety/health violations.
    f. Review/approve safety and health policies and procedures.
    g. Review new/revised regulations pertaining to safety and health in the workplace.
    h. Follow up rolling agenda action items.
    i. Review safety "suggestion box" suggestions/complaints.
    j. Review/implement insurance loss-control recommendations.
    k. Review any additional topics to promote safety in the workplace.
    l. Make recommendations to appropriate University administration regarding continuous improvement of safety and health in the workplace.
    m. Evaluate overall safety programs and make recommendations for improvement.

These Committee responsibilities, when relevant for the monthly meeting, shall be part of the Committee's agenda, in no particular order. They shall also be documented in the Committee's meeting minutes.

## Authority

The committee shall carry the delegated authority of the University's senior administration with respect to employee safety and health matters.

## Training

Each committee member shall receive training in employee safety and health at least once per year. Topics must address concerns that are specific to the University.

Training programs must be conducted by a person or persons with one of the following qualifications:

- A certified safety professional (CSP)

- A certified industrial hygienist (CIH)
- A person with a bachelor's degree in occupational safety and health
- A person with a bachelor's degree in science or engineering and at least two years of experience in occupational safety and health

## Safety Suggestion and Complaint Procedure

Employees are encouraged to bring safety suggestions and concerns to their leadership and/or members of the Committee. This can be done in person, via email or by phone. However, should the employee for any reason wish to remain anonymous, the University shall maintain a safety suggestion and complaint procedure to make sure that every employee has a chance to be heard.

A confidential online safety suggestion box shall be located on FalconLink. Suggestions will be sent to the Safety Committee Chair. The Chair is authorized to take immediate action as indicated by the nature of the suggestion or complaint. In addition, all completed forms shall be reviewed at the next safety committee meeting, and appropriate action shall be taken by the committee. The details of the Safety Suggestion System are documented in Section 11 of the *Safety Manual.*

# Self-Inspection Checklist – What Should I Be Looking For?

What to look for:

- Unsafe conditions (physical hazards) – statistically responsible for 10% of all injuries.
- Unsafe acts (behavior) - statistically responsible for 90% of all injuries.

It's important to be clear about what the inspectors are seeking. For example – assume that a fire extinguisher is found to be missing. This is a hazard; however, it is also a symptom of an underlying problem: Why didn't anyone in the department discover the missing fire extinguisher and replace it promptly? In other words, a safety inspection should seek to discover the organizational problems and managerial inadequacies that allow hazards to exist, not just the hazards alone.

Do not restrict the inspection to the items listed on the form. Be observant for all hazards. The inspection form is an aid to the inspection.

Take time to watch people work.

- Material handling practices – lifting, pushing, pulling
- Use of personal protective equipment – safety glasses, hearing protection, hard hats, shoes, gloves
- Safe operating procedures, standards, rules
- Alteration of machine guarding
- Overloading, crowding
- Improper use of equipment, tools
- Repetitive trauma exposures
- Horseplay

Be specific when documenting hazards and observations.

If an issue/condition presents an immediate danger, ask area leadership to have it corrected/resolved immediately; if this cannot be done, contact the Office of Human Resources and Compliance.

Ideally, safety should be built into every job. Every manager, supervisor, and employee should do a safety inspection every minute of every work shift. If a hazard is noted, it should be immediately corrected. Employees should not ignore hazards because correcting them is someone else's job, and hazards should not be allowed to threaten the employees for days or weeks until the next safety inspection takes place.

# Messiah University Self-Inspection Checklist

**Building/Location:** _____

**Completed by:** **Date:**

| Desirable Condition | Y | N | NA | Comments |
|---|---|---|---|---|
| **Parking Lots and Sidewalks:** | | | | |
| Parking areas are free of depressions, holds, and loose debris | | | | |
| Driving lanes, parking spaces, handicap ramps, and wheel stops are highly visible and in good condition | | | | |
| Sidewalks in good condition, no cracks or uneven areas | | | | |
| Walking areas clean and free of trash and spills | | | | |
| Curbs in good condition and visible | | | | |
| Handrails in place and secure | | | | |
| No oil spills in the parking lot | | | | |
| Lighting is adequate and working properly | | | | |
| Proper snow and ice removal (when applicable) | | | | |
| **Entrances/Exits and Common Areas:** | | | | |
| Doors working properly | | | | |
| Walk off mats adequate and in good condition | | | | |
| Mopping adequate in bad weather | | | | |
| *Caution Wet Floor* pylons available and used | | | | |
| Walking surfaces in good condition, free of hazards | | | | |
| Vending machines and displays not a trip hazard | | | | |
| Lighting is adequate and working properly | | | | |
| Self-closing doors are properly adjusted; do not close too fast | | | | |
| All floor to ceiling plate glass windows and doors have bars, etchings, or decals to prevent someone from walking into | | | | |
| No leaks causing wet floors | | | | |
| Electrical extension cords are not causing a tripping hazard | | | | |
| Machines in good condition | | | | |
| Personnel trained in proper lifting techniques | | | | |
| **Stairways:** | | | | |
| Handrails provided and securely fastened to the wall | | | | |
| Steps are in good condition | | | | |
| Lighting is adequate and working properly | | | | |
| Stairways are free of obstruction and storage | | | | |
| **Machine Areas/Storage Areas/Warehouse/General Work Areas:** | | | | |
| Filters clean and free from excessive residue build-up | | | | |
| Automatic extinguishing system maintained, current inspection tag, emergency pull box marked and accessible | | | | |
| Fire extinguishers available and accessible | | | | |
| Floors dry, clean and free of debris | | | | |
| Proper protective equipment available and used (gloves, goggles, safety glasses, etc.) | | | | |
| Guards in place and used | | | | |
| Equipment used and stored properly | | | | |
| Machines in good operating condition, safeguards in place | | | | |

| | | | | |
|---|---|---|---|---|
| Storage areas more than 4 feet above floor protected with guard rails, toeboards; marked with load capacity | | | | |
| Electrical panels kept closed; no storage blocking access | | | | |
| At least 18” clearance below sprinkler heads; 24” clearance from ceiling in non-sprinklered areas | | | | |
| Ladders in good condition | | | | |
| Emergency exits marked, unlocked and accessible | | | | |
| Aisles and halls free of storage | | | | |
| Stairwells and under stairs free of storage | | | | |
| Housekeeping neat and orderly | | | | |
| Flammable and combustible materials properly stored (ex., appropriate cabinets, away from ignition sources) | | | | |
| Loading dock edge marked with visibly contrasting color | | | | |
| Wheel chocks available and used | | | | |
| **Mechanical/Electrical/Utility Rooms:** | | | | |
| Rooms free of combustible materials | | | | |
| Portable fire extinguisher nearby | | | | |
| Entrance (fire) doors kept closed | | | | |
| Housekeeping good | | | | |
| Storage at least 3 feet from electrical panels | | | | |
| **Materials Handling:** | | | | |
| Employees trained in proper lifting techniques | | | | |
| Dollies are used to transport materials when possible | | | | |
| Power and hand trucks are used and well maintained | | | | |
| **Other items/issues noted during inspection; general comments; etc.:** | | | | |
| | | | | |
| | | | | |
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# Section 21 – ELECTRICAL SAFETY PROGRAM

*NOTE: Any electrical work performed at the Winding Hill facility will be done by the building owner/operator and/or outside contractors. Messiah University employees will not perform electrical work at this facility.*

Messiah University's electrical program has been written to protect the safety of employees, students and visitors to our campus. Federal and industry standards which impact electrical safety programs include:

- 29 CFR 1910 Subpart S - OSHA Electrical Safety Standards
- 29 CFR 1910.137 – Personal Protective Equipment for Electrical Protective Devices
- NFPA 70E, Electrical Safety in the Workplace

The National Electrical Codes should also be referred to when performing electrical work. There may be situations where older equipment was installed prior to current codes and regulations. When this occurs, we will do our best to ensure a safe work environment for our employees. All future installations will be in compliance with the electrical codes at the time of installation.

## Electrical Hazards and Definitions

Arc Flash – An arc flash is a fireball caused by a short circuit in high-voltage electrical equipment. It generates heat > 35,000 degrees F; a pressure blast > 3,600 pounds per square foot; hurls shrapnel and molten metal at speeds > 700 mph; and generates sound pressure levels of 165 dB (jet engine). **Five to ten arc flash incidents occur every day in the U.S.** An arc flash is often fatal if proper precautions haven't been followed – fatal burns can occur at more than 10 feet away from the source.

Electrical Burns - The most common shock-related non-fatal injury. Electrical burns occur when you touch electrical wiring or equipment that is improperly used or maintained. This type of injury typically occurs on the hands and can be very serious, requiring immediate medical attention. Skin is an infection barrier – the larger percentage of skin that is burned, the lower the survival chances. Electrical burns can be fatal!

Electric Shock - The physiological reaction, characterized by pain and muscular spasm, to the passage of an electric current through the body; can affect the respiratory system and heart rhythm; may cause burns; may result in death. Severity of the shock depends on the path of current through the body, the amount of current flowing through the body, and the length of time the body is in the circuit.

*What causes electric shock?* Electricity travels in closed circuits, usually through a conductor. Your body can be a conductor which may mean an electrical shock! Electricity will try to ground even if it means going through a person.

Freeze – Electrical shock may cause the muscles to contract. This "freezing effect" is dangerous as it increases the length of exposure. If you witness a "freeze," shut off the power; use a non-conductive object to knock the person free of the contact.

Severe Shock - A severe shock requires medical help immediately! Unseen medical issues may be present, such as internal hemorrhages, and/or destruction of tissues, nerves or muscles.

## Other Definitions

Boundaries – see diagram below

Class I - Those locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II – Locations are hazardous because of the presence of combustible dust.

Class III – Locations are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

Conductors – substances, such as metals, that have little resistance to electricity

Current – the movement of electrical charge

Grounding – a conductive connection to the earth which acts as a protective measure

Guarded – covered, fenced, enclosed or otherwise protected by means of suitable covers, casings, barrier rails or screens, mates or platforms designed to minimize the possibility, under normal conditions, of dangerous approach or accidental contact by persons or objects

NOTE: wires which are insulated, but not otherwise protected, are not considered guarded

Insulators – substances, such as wood, rubber, glass and bakelite, that have high resistance to electricity

Nominal Voltage – a nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class; may differ from the actual voltage at which a circuit operates

Qualified Person – one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved. 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. An employee may be qualified to perform specific types of electrical work or electrical work on specific equipment and may be unqualified for other types of work or other equipment.

Resistance – opposition to current flow

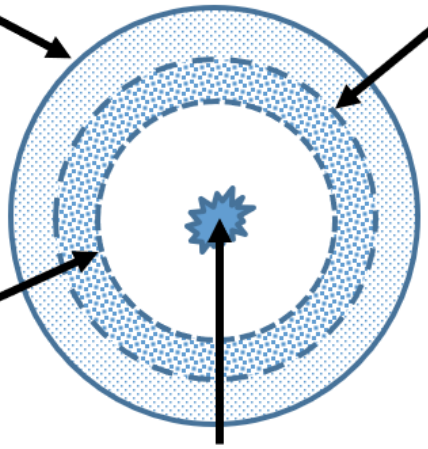
Reversed Polarity – a condition when the identified circuit conductor (the ground or neutral) is incorrectly connected to the ungrounded or “hot” terminal of a plug, receptacle or other connector

Unqualified Person – a person who is not a qualified person

Voltage – a measure of electrical force

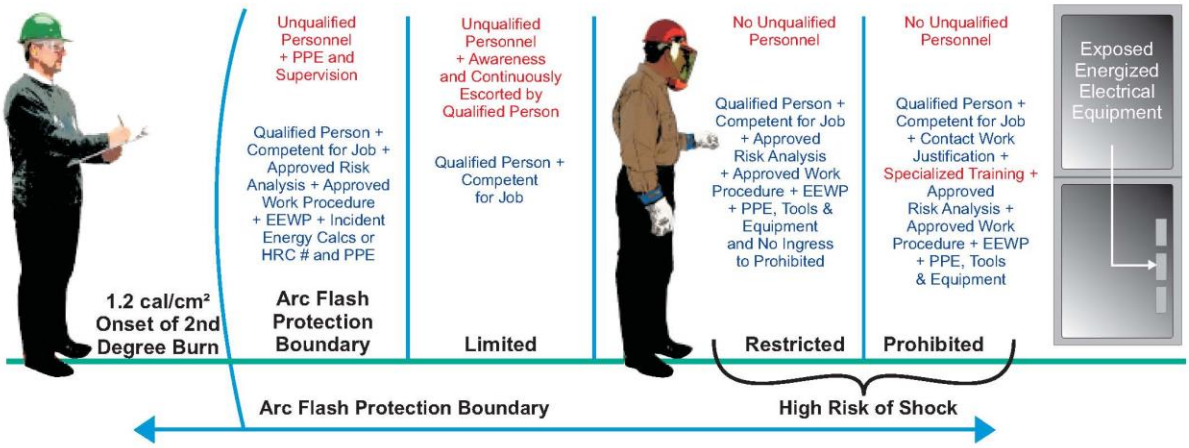
Flash Protection Boundary (Also called Arc Flash Boundary) – an approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur. **For systems that are 600 volts or less, the FPB shall be 4.0 feet. For systems 600 volts or greater, work shall be conducted by outside electrical**

Restricted Approach Boundary – **ENTERED ONLY BY QUALIFIED PERSONS** required to use **shock protection techniques and PPE**
*12 in. for 480 V*

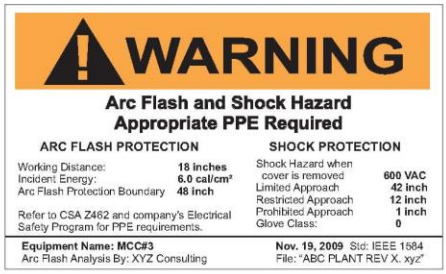



Limited Approach Boundary – an approach limit at a distance from an exposed live part within which a shock hazard exists (shock protection boundary); **ENTERED ONLY BY QUALIFIED PERSONS OR UNQUALIFIED PERSONS THAT HAVE BEEN ADVISED AND ARE ESCORTED BY A QUALIFIED PERSON.**
*10 ft. for 480 V for movable*

## Boundaries for Arc Flash Protection and Shock - Approach Limits




Example of
Detailed Arc Flash and Shock Warning Label




Note:
Arc Flash + Shock PPE for 600 V Energized Work Task as example

ESPS electrical safety™ PROGRAM SOLUTIONS inc.

CSA Z462 Table 1 / NFPA 70E Table 130.2 (C)
Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection

| | Limited | Restricted | Prohibited |
|---|---|---|---|
| 480V | 3 ft. 6 in. 1.07 m | 1 ft. 0 in. 305 mm | 0 ft. 1 in. 25 mm |
| 600V | 3 ft. 6 in. 1.07 m | 1 ft. 0 in. 305 mm | 0 ft. 1 in. 25 mm |
| 4160V | 5 ft. 0 in. 1.52 m | 2 ft. 2 in. 660 mm | 0 ft. 7 in. 187 mm |
| 13800V | 5 ft. 0 in. 1.52 m | 2 ft. 2 in. 660 mm | 0 ft. 7 in. 187 mm |



**NOTE: Determining approach boundaries to live parts can be made using *Attachment 24*.**

**All electrical work, whenever possible, shall be done with the power source disconnected and appropriately locked out. When equipment is de-energized and locked out, the arc flash hazard and shock hazard is eliminated and the boundaries and electrical PPE requirements defined later in this procedure do not apply. Qualified electrical workers shall not be asked to work on equipment that is "hot" or "live" except for these demonstrable reasons:**

1. De-energizing introduces additional or increased hazards
   - Interruption of life support equipment
   - Deactivation of emergency alarm systems
   - Cutting ventilation to a hazardous location
2. Infeasible due to equipment design or operational limitations
   - Voltage testing for diagnostics
   - Start-up testing
3. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs

## Hazard Analysis

(Arc) Flash Hazard Analysis – shall be done in order to protect personnel from the possibility of being injured by an **arc flash**. The analysis shall determine the (Arc) Flash Protection Boundary and the personal protective equipment that people within the FPB shall use.

1. Determine the flash protection boundary
2. Determine the incident energy exposure level
3. Determine the protective clothing and PPE

If a flash hazard analysis has been completed and the flash hazard distance established, the information will appear on a label on the equipment. If such a label doesn't appear, for equipment 600 V or less, use a minimum of four (4) feet.

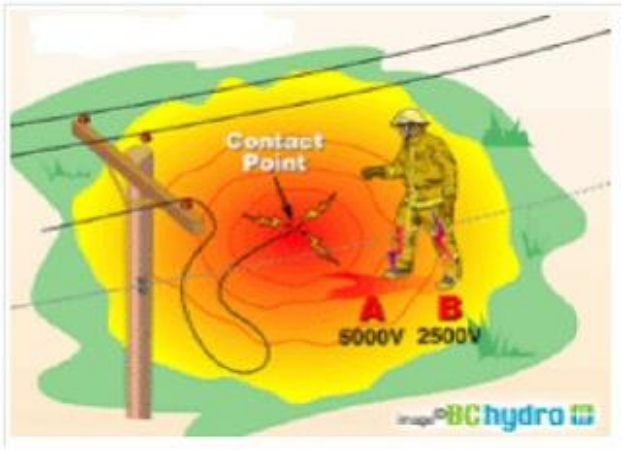
Shock Hazard Analysis – shall determine the voltage to which personnel will be exposed, boundary requirements, and the personal protective equipment necessary to minimize the possibility of **electrical shock** to personnel.

1. Determine the Operating Voltage of the System
2. Determine Shock Protection Boundaries
   NOTE: Determining approach boundaries to live parts can be made using *Attachment 24*.
   a. Limited Approach Boundary
      - 10 ft. for 480 V for movable energized object
      - 3 ft. 6 in. for fixed energized object
   b. Restricted Approach Boundary
      - 12 inches for 480 V
3. Determine the Personnel Protective Equipment

**NOTE:** If the shock hazard analysis has been conducted and the shock protection boundaries are known, they will be recorded on a label on the equipment. If such a label does not exist, use the distances shown in #2 above or *Attachment 24*.

Step Potential - During a ground fault, current flows through the grounding system to a ground rod or some type of system ground (steel structure, guy wire) seeking a return to its source. This current flow could possibly exist in, or along the surface of the ground for quite some distance around the point where the earth becomes energized. The current will follow, as nearly as possible, the conductors supplying the fault current. **Step potential** is caused by the flow of fault current through the earth. The closer a person is to the ground rod or grounded device, the greater the concentration of current and the higher the voltage.

The current flow creates a voltage drop as it flows through the earth's surface and a person standing with their feet apart bridges a portion of this drop thus creating a parallel path for current flow as seen in the figure below.




STEP POTENTIAL

The wider apart a person's legs are, the larger the voltage difference across the body. Protection from the step potential hazard should be to stay in the zone of equipotential while working. Simply being alert to this hazard is the best defense. For this reason, unqualified personnel standing on the ground are cautioned to stay clear of structures. This means that a person standing near the point where fault current enters the earth may have a large potential difference from foot-to-foot. The potential difference over the same span will be less and less as the span is moved away from either the fault current entry point or the fault current return point at the source. Should such a situation occur, the best safety action to minimize the probability of a large potential difference from foot-to-foot is to keep the feet together and jump (like a rabbit) away from the ground rod or grounded device.

## Qualification and Certification of Employees for Electrical Work

Qualified employees in the facilities maintenance department are authorized to perform electrical work on campus; determination of qualifications for various electrical maintenance tasks is made on an individual basis. Each employee must be certified by facilities maintenance leadership to be

qualified for the type of electrical work s/he performs. Certification is based on the employee's abilities and level of understanding of electricity, its hazards and appropriate safety precautions required to protect against those hazards. This certification must be made prior to performance of electrical work and must be redone if the employee's job position changes, or if his/her training, experience or performance would result in a change in the determination of qualifications. *See Attachment 25 for the "Qualification Certification" form to be used.* NOTE: Although a "qualified person" usually refers to an individual who is qualified to work on or near exposed energized electrical parts, for purposes of completion of this certification form, an individual may be unqualified to work on exposed energized parts but may be qualified to work on electrical equipment that has the power source shut off and is properly locked out. This form is to be used for certification and for understanding and agreement between the employee and leadership of the employee's abilities and electrical knowledge.

For any tasks not listed on the certification form, the employee's qualifications must be approved by supervision prior to performing work. This approval can be part of the Job Briefing.

## Tasks to Be Performed Only by Qualified Workers

Qualifications of workers and tasks they are authorized to do are identified on the "Qualification/Certification" form *(Attachment 25)*. A worker may be qualified for certain electrical tasks and not for others. Therefore, tasks to be performed by Qualified Workers are looked at on an individual basis. However, only Messiah University electricians may perform the following types of electrical work:

- Work on main switchgear provided appropriate PPE is available and used
- Locate underground utility

Additionally, any work involving 600 V power sources or greater must be performed by an electrical contractor.

## Electrical Training

All employees providing maintenance to electrical equipment or working on/near electrical circuits must be trained initially and every three years thereafter. Training for Qualified Workers should include, but is not limited to, how to identify exposed energized parts, how to determine the nominal voltage of exposed live parts, how to safeguard or work on energized parts including proper safety precautions, potential hazards of energized equipment including arc flash hazards, use of appropriate Personal Protective Equipment (PPE), proper Lockout/Tagout, etc. Training for Unqualified Workers should include, but is not limited to how electricity works, risks of working with energized equipment, tasks to be performed only by qualified workers, etc.

Retraining shall occur when:

- Changes in job assignment present a new electrical hazard
- Change in equipment or processes present a new electrical hazard
- Inadequacies in the employee's job performance related to electrical work indicates the employee has not retained the information provided in the training
- Violation of an electrical safety procedure

All training must be appropriately documented and records maintained by the Office of Human Resources & Compliance.

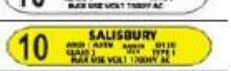
## Electrical Personal Protective Equipment (PPE)

Where feasible, the use of engineering and administrative controls shall be the first line of defense against electrical hazards. If these controls are not sufficient or are not possible, personal protective equipment (PPE) shall be used to protect against any hazards.

PPE for Shock Protection

- When wearing rubber insulating gloves which could be damaged during use, a protective outer glove should be worn over them (ex., leather).
- When an employee is working within the restricted approach boundary, the worker shall wear the required PPE.
- Non-conductive head protection shall be worn if there is a danger of head injury from electric shock or burns due to contact with live parts.
- Non-conductive protection for face, eyes, neck and chin shall be worn if there is a danger of injury from exposure to electric arcs or flashes or from flying objects. Face shields must be rated for electrical work.
- Flame Resistant (FR) clothing shall be worn if working on live circuits.
- Employees shall wear rubber insulating gloves (and sleeves, when applicable) where there is the danger of hand and arm injury due to contact with live parts. The following ratings can be found on voltage rated gloves:

**Voltage Classifications for Rubber Gloves**

| Tag Color | Class | Proof Test Voltage AC / DC | Max. Usage Voltage AC / DC | Glove Tag |
|---|---|---|---|---|
| Beige | 00 | 2,500 / 10,000 | 500 / 750 |  |
| Red | 0 | 5,000 / 20,000 | 1,000 / 1,500 |  |
| White | 1 | 10,000 / 40,000 | 7,500 / 11,250 |  |
| Yellow | 2 | 20,000 / 50,000 | 17,000 / 25,500 |  |
| Green | 3 | 30,000 / 60,000 | 26,500 / 39,750 |  |
| Orange | 4 | 40,000 / 70,000 | 36,000 / 54,000 |  |

PPE for Arc Flash Protection

*NOTE:* Arc Flash hazard exists only if working on live electrical circuits/parts. If the power is shut off and appropriately locked out, the arc flash hazard is negated.

To determine the appropriate PPE to be worn within the Arc Flash Protection Boundary, use one of the following methods:

1) If an arc flash analysis has been completed, select the PPE based on the calculated exposure level (hazard/risk) and use *Attachment 26*.
2) If an arc flash analysis has not been completed, use *Attachment 27* and *Attachment 28* to determine the level of hazard/risk involved with the task. Then use *Attachment 26* to determine what PPE is required for the hazard/risk assigned.

- When an employee is working within the flash protection/arc flash boundary, the worker shall wear the appropriate PPE and all parts of the body shall be protected; the PPE shall cover all ignitable clothing and shall allow for movement and visibility.
- Hearing protection (ear inserts) shall be worn if working within the arc flash boundary.
- Arc flash rated PPE shall cover all ignitable clothing and allow for movement and visibility. When arc flash rated PPE is worn, outer layers (ex., jackets) must also be arc flash rated.

**Remember:** Even when electrical energy sources are disconnected and locked out, proper PPE must be worn when verifying the de-energization. Once verification is made, PPE can be removed.

Inspection of PPE and Insulating Equipment Made of Rubber –

- PPE shall be maintained in a safe, reliable condition. It should be visually inspected **before each use** for holes, rips, tears, other signs of deterioration or damage, and contamination with liquids (ex., water, oils) and greases. PPE that is contaminated or damaged shall not be used.
- Rubber insulating gloves shall be tested for leaks **before each day's use**. To test, fill the glove with air; then fold over the cuff to seal air inside the glove. Listen for escaping air; hold the glove against cheek to feel air releasing; look for leaks by observing if glove deflates quickly. Repeat with the glove turned inside out.
- Equipment/PPE displaying ozone cutting or ozone checking should not be used (i.e., a series of interlacing cracks produced by ozone in rubber under mechanical stress).
- Equipment/PPE displaying an embedded foreign object or displaying swelling, softening, hardening, or becoming sticky or inelastic shall not be used.
- If an incident occurs during the work shift that could result in damage to the rubber gloves, gloves must be **re-inspected** immediately.
- Since sleeves cannot be inflated, they should be inspected along the edge as they are rolled. Rolling will stretch the sleeve along the edge, making cuts, tears and ozone cutting more visible. After the outside of the sleeve is inspected, the procedure should also be repeated with the sleeve turned inside out.
- Additionally, rubber gloves and sleeves must be tested in compliance with ASTM F496 as follows:

| | |
|---|---|
| Rubber Gloves | Before first issue; every 6 months thereafter |
| Sleeves | Before first issue; every 12 months thereafter |

If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

Rubber gloves and sleeves will be sent out to a certified lab for testing in compliance with ASTM F496. A record of these inspections must be maintained which will identify the equipment tested, the results of the test, the test date and the company conducting the test.
NOTE: Marking the equipment with the test results and date of testing is an acceptable record.

Storage of PPE – all PPE and insulated tools and test equipment shall be stored in a manner that does not present a damage hazard to the PPE, tools and/or equipment and that prevents deterioration. Whenever possible, storage should be out of sunlight; away from chemical exposure, temperature extremes, excessive humidity, and ozone; and in a protective container (i.e., plastic bag, tool box, drawer) which prevents exposure to mechanical hazards which could result in damage. Rubber gloves should be stored inside the leather protector glove for added protection during storage.

Cleaning of PPE – cleaning for all PPE, tools and equipment shall be in compliance with manufacturer recommendations. This includes no use of solvents, allowing equipment to dry completely, and visually inspecting after cleaning.

**The University has available for use the following PPE for electrical work:**

National Safety Apparel ARC Rating 40 Cal/CM2

1-Jacket

1-Bib overalls

1-ARC Flash Hood/Mask

Safety Rubber Gloves

Rubber insulating gloves, Class 0

Leather Protector Gloves (NOTE: These should be 2 inches shorter than the rubber glove)

Flame resistant (FR) clothing/coveralls

## Electrical Test Instruments, Tools, and Equipment

- Test instruments and equipment shall be rated for circuits and equipment to which they will be connected and designed for the environment to which they will be exposed and for the manner in which they will be used.
- They shall be visually inspected for external defects and damage before use on any shift. If any problems are noted, they should be removed from service immediately.
- If an incident occurs during the work shift that could result in damage to insulation, tools must be re-inspected immediately.

- Only insulated tools and equipment should be used within the Limited Approach Boundary of exposed electrical parts.
- Portable ladders used for electrical work shall have non-conductive side rails.
- Fuse handling equipment, insulated for the circuit voltage, shall be used to remove or install fuses when the fuse terminals are energized.
- Signs and barricades shall be used to prevent or limit access to areas where live electrical work is being conducted. If the potential for pedestrian traffic or other personnel not directly involved in the electrical work exists which could create a significant hazard to either the electrical maintenance personnel or the non-maintenance personnel, an attendant may be necessary to warn others away from the work area; this is at the discretion of the individual(s) performing the live electrical work.

Voltmeters

Employees performing electrical maintenance shall be issued a voltmeter. A voltmeter will display the voltage present. Employees should be familiar with the operation of their unit and should test it frequently against a known source to verify that it is functioning properly. Follow manufacturer's recommendations for use, care and calibration.

Voltmeters should be used to determine nominal voltage of exposed live parts and to verify proper lock out of electrical power sources. Use the meter to check between the current carrying conductor and ground. If there is more than one current carrying conductor, check between each conductor. Be sure to use the appropriate level of PPE for the job.

Non-contact Voltage Detector or "Sniffer" – A "sniffer" will emit a light and/or tone when near electrically energized parts. Sniffers should be tested first on a known live circuit to ensure they are functioning properly. Batteries should be replaced regularly.

Insulated hand tools – When using hand tools around energized electrical circuits, they should be properly insulated. Inspect the tools prior to each use to ensure that the insulation is not damaged, and that they are free of liquids (oils, water, etc.).

***Note:*** a small crack or breakage in the insulation invalidates the tools rating as insulated.

Insulating Blankets and Covers – These items, if used, must be inspected by a certified lab in compliance with ASTM F479 and ASTM F478 respectively as follows:

| | |
|---|---|
| Blankets | Before first issue; every 12 months thereafter |
| Covers | If insulating value is suspect |

If the insulating blanket has been tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

Power Cords, Extension Cords – All cords shall be visually inspected for external defects including missing pins, cut or frayed cords, pinched or crushed outer jacket. Inspections shall be made prior to use and when relocated (for cords that remain connected once they are put in place). If any problems are found, the cord shall be taken out of service immediately. Cords should not be used in a manner that might cause damage (ex., used to raise or lower equipment, fastened with staples, etc.).

Ground Fault Circuit Interrupters (GFCI) Protection Devices – GFCI protection devices should be inspected per the manufacturer's instructions.

## Power Source Labeling

At Messiah University, older equipment may not be properly labeled; however, as new equipment is added it should conform to the following:

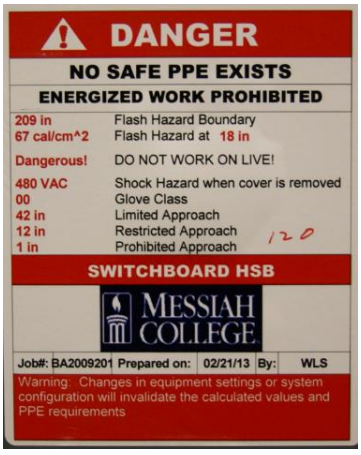
- Sub panels should indicate where power is being supplied from
- Breakers should be identified to indicate the item they are feeding or if they are spares (indicated by red dots)
- Transformers should identify their power source and what panel/equipment they are feeding

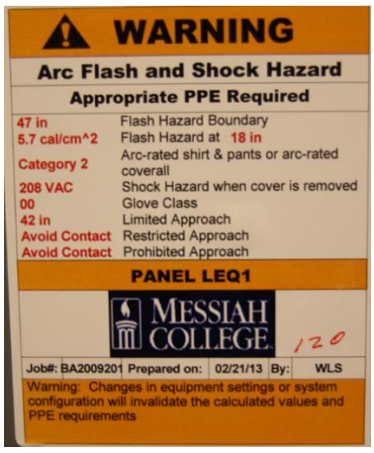
*NOTE:* If equipment has multiple power sources, they must be clearly identified. If maintenance is required and power source cannot be identified for proper lockout, contact campus electricians or personnel in Facilities Maintenance who are familiar with equipment.

Additionally, some equipment is labeled with the voltages, approach boundaries, and arc flash boundaries. Not all equipment has been identified with this information; however, as new equipment is added, every effort will be made to do so. Buildings and areas on campus in which arc flash analysis has been conducted and in which equipment is labeled include:

| | |
|---|---|
| Agape Center | Kline/Jordan |
| Anderson Field | Larson Student Union |
| Boyer Hall | Lenhert Building |
| Eisenhower Campus Center | Murray Library |
| Frey Academic Hall | Pump House |
| Hostetter Chapel | Softball Field |

*Below are examples of these labels:*




## Electrical Installations: Guarding, Cabinets, Boxes, Fittings Wire Colors

- Junction boxes, pull boxes and fittings must have approved covers.
- Use a clamp or rubber grommet to protect a connector going into cabinet or box and to seal the opening unless the conductor is in a conduit which fits tightly into the opening.
- Unused openings in cabinets, boxes and fittings must be closed (no missing "knockouts").
- Guard live parts of electric equipment operating at 50 volts or more against accidental contact by:
    - Approved cabinets/enclosures, or
    - Location or permanent partitions making them accessible only to qualified persons, or
    - Elevation of 8 feet or more above the floor or working surface
- Mark entrances to guarded locations with conspicuous warning signs.
- Where electrical equipment is in locations that can suffer physical damage, it must be guarded.

Wiring Colors

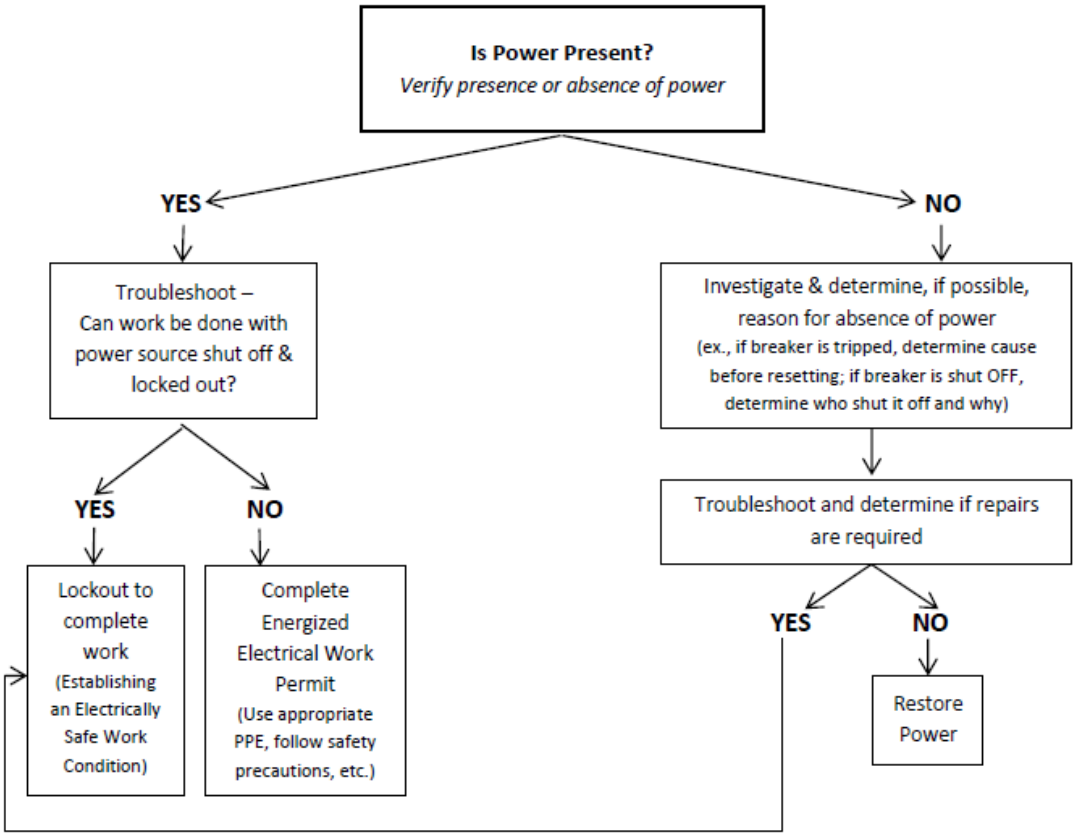
Messiah University has adopted color codes for wiring. Some older wiring may not be in compliance but newer and future wiring should comply with the following:

| **120 – 208 volt** | |
|---|---|
| Black: | Energized |
| Red: | Energized |
| Blue: | Energized |
| White: | Neutral |
| Green: | Ground |

| **277 – 480 volt** | |
|---|---|
| Brown: | Energized |
| Orange: | Energized |
| Yellow: | Energized |
| Gray: | Neutral |
| Green: | Ground |

## General Guidelines for Electrical Maintenance

The following flow chart is provided to outline general steps to take in approaching an electrical maintenance project. However, this is general information and may not apply to every situation. It should only be used as a guideline.




## Safety Precautions/Safe Work Practices for Electrical Work

In addition to the safety precautions already mentioned in this program, the following general safety practices should be followed:

- **Whenever possible, de-energize electric equipment before inspection or repair (Lockout/Tagout) and always verify success of lock out.**
    - *Lock out all sources of power* to the equipment – some equipment may have multiple sources including electrical feeds. NOTE: Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded, if the stored electric energy might endanger personnel.
    - *Tagging must accompany the lock and contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.* A lock may be placed without a tag only under the following conditions:
        - Only one circuit or piece of equipment is de-energized, and
        - The lockout period does not extend beyond the work shift, and
        - Employees exposed to the hazards associated with the reenergizing of the circuit or equipment are familiar with this procedure.

    - *Consider what might keep the equipment from operating* in addition to the lock out you've applied. For example, interlocks, if breached, could give you a false sense of security; emergency stops, if activated, could keep equipment from starting.
    - *Clear the area* of personnel who could be injured if the equipment inadvertently starts.
    - Finally, verify the effectiveness of our lock out. *Try to start the equipment or test the electrical circuit* after verifying that there is nothing else besides your lock out that could keep the power off (step 2). *With electrical work, this step should include the use of a voltmeter.*
- Keep electric tools properly maintained.
- Not all energized current carrying conductors are copper.
- In older panels, the main bus bar may be aluminum.
- These are signs of a problem – don't ignore them:
    - Tripped circuit breakers or blown fuses
    - Warm tools, wires, cords, connections, or junction boxes
    - GFCI that shuts off a circuit
    - Worn or frayed insulation around wire or connection
    - **All hazards are made worse in wet conditions!**
- Consider every electrical conductor or circuit part energized until proven otherwise.
- Remove metal jewelry (rings, watches, bracelets, necklaces).
- Whenever possible, ensure adequate working space.
- Ensure adequate illumination.
- Clear work area of other people or communicate to them the work being done and precautions needed.
- Wear proper PPE for the job.
- Do not use bare hands when working with exposed energized electrical conductors or circuit parts above 50 volts to ground.
- Do not reach blindly into areas that may contain exposed live parts.
- Remember that de-energizing an electrical circuit or conductor and making it safe to work on is in itself a potentially hazardous task.
- Apply proper Lockout/Tagout to equipment.
- Use voltmeter to ensure power is off.
- Do not conduct electrical work if alertness is impaired.
- When working in an area that contains live parts, employees shall use protective shields, barriers, or insulating materials as necessary to avoid contact with these parts.

## Hazard/Risk Evaluation Procedure for Electrical Work

Use the tables in *Attachment 27* to determine the hazard/risk level associated with the task to be performed.

## Job Briefing for Electrical Work

Before starting each job, the employee in charge shall conduct a job briefing with the employees involved. The employee in charge may be leadership or senior electrical maintenance personnel

with the training and experience to recognize the hazards and an understanding of the safety procedures which must be followed. The job briefing does not need to be face-to-face; it may be by radio, telephone, text, work order, etc.

The briefing shall cover such subjects as:

- Hazards associated with the job
- Work procedures involved
- Special precautions
- Safety boundaries
- Voltage levels involved; foreign voltage sources (secondary sources)
- Energy source controls
- PPE requirements
- Removal of all conductive articles (ex., jewelry) which could present an electrical contact hazard
- Tools needed
- Who should be notified; are barricades needed?
- Potential for arc flash
- Are employees performing the work qualified and certified?
- Emergency response, emergency procedures

The only exception is for routine work **and/or** if the employee, by virtue of training and experience, can reasonably be expected to recognize and avoid hazards involved in the job.

## Establishing Electrically Safe Work Conditions

**Establishing an electrically safe work condition is the process of turning off the power, verifying that it is off and ensuring it stays off while work is being performed. There are six steps in this electrical safety process:**

1. Identify power source. Determine all possible sources of electric supply to the equipment being worked on.
2. Disconnect power sources. After properly interrupting the load current, open the disconnecting means for each source.
3. Verify that the power is off. Wherever possible, visually verify that all blades of the disconnecting means are fully open, or that drawout-type circuit breakers are racked out to their fully disconnected position.
4. Lockout/Tagout. Apply LOTO devices in accordance with the University's policy (see Section 5). Normally these are padlocks to keep the disconnecting means open, and tags that identify the person(s) responsible for applying and removing the locks.
5. Verify again that power is off. Test for the presence of voltage.
6. Discharge stored electrical energy (and install safety grounds under certain conditions).

*NOTE:* Only qualified persons can establish an electrically safe work condition. Electrical conductors and equipment are considered energized until the process of establishing an electrically safe work condition is completed. Safe work practices should be followed and appropriate PPE should be worn.

**Electrically Safe Condition Established**

Once these six steps have been completed, electrical energy has been removed from all conductors and equipment and cannot reappear unexpectedly. Under these circumstances, PPE is not needed, and unqualified persons can perform work such as cleaning and painting on or near electrical equipment. Obviously, only electrically qualified persons should perform technical work within the scope of the National Electrical Code.

## Electrical Testing, Troubleshooting and Voltage Measuring

Testing, troubleshooting and voltage measuring may be completed without an energized electrical permit provided appropriate safe work practices and PPE are used.

**NOTE:** You must wear PPE after disconnecting the conductor or circuit from the energy source to verify it is de-energized. Once verification of de-energization is made, PPE can be removed.

# Energized Electrical Work Permit

**Reminder: Qualified electrical workers shall not be asked to work on equipment that is "hot" or "live" except for these demonstrable reasons:**

1. De-energizing introduces additional or increased hazards
    a. Interruption of life support equipment
    b. Deactivation of emergency alarm systems
    c. Cutting ventilation to a hazardous location
2. Infeasible due to equipment design or operational limitations
    a. Voltage testing for diagnostics
    b. Start-up testing
3. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs

If live parts (operating at 50 volts or more) are not placed in an electrically safe work condition, work to be performed shall be considered energized electrical work and shall be performed by written permit only (see *Attachment 29* for permit). The job briefing should include both leadership and a qualified electrician. Authorization should be by Facility Services Director or Facility Maintenance Manager.

At least two qualified persons must be present for all energized work requiring a permit. If both qualified employees are working on the live circuit, an attendant is required to control any unqualified person from entering the limited approach boundary. The attendant can be an unqualified person as long as s/he remains outside the limited approach boundary.

**Exception:** Testing, troubleshooting and voltage measuring may be completed without an energized electrical permit provided appropriate safe work practices and PPE are used.

**NOTE:** You must wear PPE after disconnecting the conductor or circuit from the energy source in order to verify it is de-energized. Once verification of de-energization is made, PPE can be removed.

Work in close proximity to any part of an energized electrical power circuit that the employee could contact in the course of their work is not permitted, unless the employee is protected against electric shock by de-energizing and grounding the circuit, or guarding it effectively by insulation or other means.

Copies of all permits should be forwarded to the Office of Human Resources & Compliance for record retention where they will be maintained for three years. Any issues/concerns should be noted along with recommendations for improvements to the program.

## Electrical Contractors

All work involving 600 V power sources or greater will be completed by an electrical contractor. All electrical contractors must comply with OSHA and NFPA standards and follow all federal, state and local regulations. Contractors must supply the appropriate PPE and equipment for their employees and ensure that their employees are qualified for the work being performed. It is the responsibility of the contractor to consult and coordinate with Facilities Services to determine what potential hazards exist and what safety procedures must be taken to protect both the contract workers and Messiah University employees and students. However, it is also the responsibility of Facilities Services to provide the contractor with all known information pertinent to electrical safety and the work being performed.

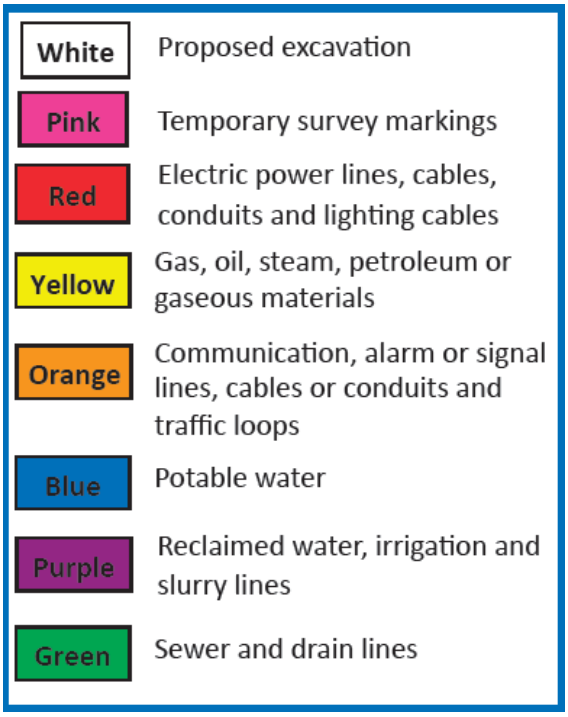
## PA-1 Call (Pennsylvania One Call System)

The PA-1 Call System is a program to assist in collecting the most accurate information to prevent damage to underground facilities and to maintain the safety of all personnel involved in the excavation/digging process.

Because the Messiah University campus has an abundance of underground utilities (e.g., lines, pipes, wires, cables, and fiber optics for communications, water, sewer, propane, and electric), any groundbreaking on campus requires the initiation of a PA-1 Call. Groundbreaking includes but is not limited to digging of holes, ditches, trenches, cutting of cement, removal of trees and shrubs which includes root systems, etc.

Once called, the applicable utility companies/facility owners have three (3) business days in which to respond to the request. During that time, any underground utilities must be marked so that excavation can safely avoid contact with these buried utilities. Once identified, the requestor has 10 days in which work must begin. If for any reason the work is delayed beyond that time, a new PA-1 Call must be initiated.

Marking for underground facilities must be maintained until the job is finished. The marking is as follows:




Anyone on campus who has a need for a PA-1 Call must first call Facility Services to verify that excavation/digging is permissible in that area on campus and that Facility Services is aware of the project. Facility Services will then explain how to initiate the PA-1 Call; the requestor must initiate this call.

Non-compliance with the PA-1 Call System, or failure to comply with the ground markings when excavating/digging, may result in removal from the job. This applies to Messiah University employees and employees of contractors who may be performing the work.

## Response to an Electrical Accident

1. Call 911 immediately.
2. TURN OFF THE POWER. Be aware of potential secondary sources of electricity.
3. Attempt to remove the victim from the power with dry wood or other insulating type of material.
4. Administer CPR and first aid until additional emergency responders arrive.

# Determining Approach Boundaries to Live Parts

(the following tables were taken from portions of NFPA 70E)

*Approach Boundaries to Energized Conductors or Circuit Parts for Shock Protection for **Alternating Current Systems** (dimensions are from energized source to employee)*

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| Nominal System Voltage Range, Phase to Phase | Limited Approach Boundary | | Restricted Approach Boundary; includes Inadvertent Movement Adder |
| | Exposed Movable Conductor | Exposed Fixed Circuit Part | |
| < 50 V | Not specified | Not specified | Not specified |
| 50 V-150 V | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | Avoid contact |
| 151 V-750 V | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | 0.3 m (1 ft 0 in) |
| **For system 600 volts or less, the Flash Protection Boundary shall be 4 feet.** | | | |
| **NOTE: For voltage sources greater than or equal to 600, work must be performed by an electrical contractor.** | | | |

*Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection for **Direct Current** Voltage Systems*

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| Nominal Potential Difference | Limited Approach Boundary | | Restricted Approach Boundary; includes Inadvertent Movement Adder |
| | Exposed Movable Conductor | Exposed Fixed Circuit Part | |
| < 100 V | Not specified | Not specified | Not specified |
| 100 V-300 V | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | Avoid contact |
| 301 V-1 kV | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | 0.3 m (1 ft 0 in) |
| **For system 600 volts or less, the Flash Protection Boundary shall be 4 feet.** | | | |
| **NOTE: For voltage sources greater than or equal to 600, work must be performed by an electrical contractor.** | | | |

# Qualification Certification for Electrical Work

**Employee Name (print)** _____
**Employee Signature** _____
**Employee ID #** _____
**Job Title** _____
**Certification Completed By** _____
**Date** _____

*For each task, supervision must determine if the employee is qualified or unqualified based on his/her abilities, knowledge and level of understanding of electricity, its hazards and appropriate safety precautions to be used to protect against those hazards. Consider all aspects of the task, including use of appropriate PPE, Lock Out/Tag Out, etc.* ***This form should be redone if the employee's job position changes, or if his/her training, experience or performance would result in a change in the determination of qualifications.*** *The results of this certification should be reviewed with the employee; the employee's signature indicates agreement with this determination of qualifications.*

| Task | Qualified | Unqualified |
|---|---|---|
| Electrical work with power source off and proper LOTO applied (ex., ballast replacement; switch or outlet replacement; test and replace fuse; etc.) | | |
| Proper operation of voltage meter | | |
| Trouble shoot causes for tripped breakers | | |
| Replace breaker in electrical panel in compliance with electrical codes | | |
| Trouble shoot three-phase energized equipment | | |
| Trouble shoot energized equipment > 50 volts | | |
| Run new service to equipment in compliance with electrical codes | | |
| Locate underground electrical utilities | | |
| Reset building main switchgear, if labeled and appropriate PPE is available | | |
| | | |
| Other: | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**NOTE:** For any tasks not listed above, employee's qualifications must be approved by supervision prior to performing work. (This approval can be part of Job Briefing.)

**Retain Copy in Facilities Maintenance Records**

# Electrical Protective Clothing and Personal Protective Equipment (PPE)

The following table is taken in part from NFPA 70 E, 130.7(C)(16):

| ARC Flash PPE Category | Protective Clothing and PPE |
|---|---|
| 1 | **Arc-Rated Clothing, minimum Arc Rating of 4 cal/cm²**<br>Arc-rated long-sleeve shirt and pants or arc-rated coverall<br>Arc-rated face shield or arch flash suite hood<br>Arc-rated jacket, pants, rainwear or hard hat liner (AN)<br>**Protective Equipment**<br>Hard hat<br>Safety glasses or safety goggles (SR)<br>Hearing protection (ear canal inserts)<br>Heavy duty leather gloves<br>Leather work shoes (AN) |
| 2 | **Arc-Rated Clothing, minimum Arc Rating of 8 cal/cm²**<br>Arc-rated long-sleeve shirt and pants or arc-rated coverall<br>Arc-rated flash suit hood or arc-rated face shield and arc-rated balaclava<br>Arc-rated jacket, parka, rainwear, or hard hat liner (AN)<br>**Protective Equipment**<br>Hard hat<br>Safety glasses or safety goggles (SR)<br>Hearing protection (ear canal inserts)<br>Heavy duty leather gloves<br>Leather work shoes (AN) |
| 3 | **Arc-Rated Clothing, selected so that the system Arc Rating meets the requested minimum Arc Rating of 25 cal/cm²**<br>Arc-rated long sleeve shirt (AR)<br>Arc-rated pants (AR)<br>Arc-rated coverall (AR)<br>Arc-rated arc flash suit jacket (AR)<br>Arc-rated arc flash suit hood<br>Arc-rated gloves<br>Arc-rated jacket, park, rainwear or hard hat liner (AN)<br>**Protective Equipment**<br>Hard hat<br>Safety glasses or safety goggles (SR)<br>Hearing protection (ear canal inserts)<br>Leather work shoes (AN) |
| 4 | **Arc-Rated Clothing, selected so that the system Arc Rating meets the requested minimum Arc Rating of 40 cal/cm²**<br>Arc-rated long sleeve shirt (AR)<br>Arc-rated pants (AR)<br>Arc-rated coverall (AR)<br>Arc-rated arc flash suit jacket (AR)<br>Arc-rated flash suit pants (AR)<br>Arc-rated arc flash suit hood<br>Arc-rated gloves<br>Arc-rated jacket, park, rainwear or hard hat liner (AN)<br>**Protective Equipment**<br>Hard hat<br>Safety glasses or safety goggles (SR)<br>Hearing protection (ear canal inserts)<br>Leather work shoes |

AN – as needed (optional) AR – as required SR – selection required

NOTE: If required clothing is not available, then the next higher level of clothing protection must be worn.

Arc-rated gloves = rubber insulating gloves with leather protectors – this combination satisfies the arc flash protection requirement.

# Hazard/Risk Category Classifications for Arc Flash PPE for Both Alternating Current and Direct Current Equipment

The following table is a portion of Table 130.7(C)(15)(A)(a) from NFPA 70E. This table should be used to determine the hazard/risk associated with the task.

Arc Flash Hazard Identification for Alternating Current (ac) and Direct Current (dc) Systems

| Task | Equipment Condition | Arc Flash PPE Required |
|---|---|---|
| Reading a panel meter while operating a meter switch | Any | No |
| Normal operation of a circuit breaker (CB), switch, contactor, or starter | All of the following:<br>The equipment is properly installed<br>The equipment is properly maintained<br>All equipment doors are closed and secured<br>All equipment covers are in place and secured<br>There is no evidence of impending failure | No |
| | One or more of the following:<br>The equipment is not properly installed<br>The equipment is not properly maintained<br>Equipment doors are open or not secured<br>Equipment covers are off or not secured<br>There is evidence of impending failure | Yes |
| For ac systems: Work on energized electrical conductors and circuit parts, including voltage testing | Any | Yes |
| For dc systems: Work on energized electrical conductors and circuit parts of series-connected battery cells, including voltage testing | Any | Yes |
| Voltage testing on individual battery cells or individual multi-cell units | All of the following:<br>The equipment is properly installed<br>The equipment is properly maintained<br>Covers for all other equipment are in place and secured<br>There is no evidence of impending failure | No |
| | One or more of the following:<br>The equipment is not properly installed<br>The equipment is not properly maintained<br>Equipment doors are open or not secured<br>Equipment covers are off or not secured<br>There is evidence of impending failure | Yes |
| Removal or installation of CBs or switches | Any | Yes |
| Removal or installation of covers for equipment such as wireways, junction boxes, and cable trays that does not expose bare energized electrical conductors and circuit parts | All of the following:<br>The equipment is properly installed<br>The equipment is properly maintained<br>There is no evidence of impending failure | No |
| | Any of the following:<br>The equipment is not properly installed<br>The equipment is not properly maintained<br>There is evidence of impending failure | Yes |
| Removal of bolted covers (to expose bare energized electrical conductors and circuit parts). For dc systems, this includes bolted covers, such as battery terminal covers. | Any | Yes |

Table 130.7(C)(15)(A)(a) from NFPA 70E, *continued*

| Task | Equipment Condition | Arc Flash PPE Required |
|---|---|---|
| Removal of battery intercell connector covers | All of the following:<br>The equipment is properly installed<br>The equipment is properly maintained<br>Covers for all other equipment are in place and secured<br>There is no evidence of impending failure | No |
| | One or more of the following:<br>The equipment is not properly installed<br>The equipment is not properly maintained<br>Equipment doors are open or not secured<br>Equipment covers are off or not secured<br>There is evidence of impending failure | Yes |
| Opening hinged door(s) or cover(s) (to expose bare energized electrical conductors and circuit parts) | Any | Yes |
| Perform infrared thermography and other noncontact inspections outside the restricted approach boundary. This activity does not include opening of doors or covers. | Any | No |
| Application of temporary protective grounding equipment after voltage test | Any | Yes |
| Work on control circuits with exposed energized electrical conductors and circuit parts, 120 volts or below without any other exposed energized equipment over 120 V including opening of hinged covers to gain access | Any | No |
| Work on control circuits with exposed energized electrical conductors and circuit parts, greater than 120 V | Any | Yes |
| Insertion or removal of individual starter buckets from motor control center (MCC) | Any | Yes |
| Insertion or removal (racking) of CBs or starters from cubicles, doors open or closed | Any | Yes |
| Insertion or removal of plug-in devices into or from busways | Any | Yes |
| Insulated cable examination with no manipulation of cable | Any | No |
| Insulated cable examination with manipulation of cable | Any | Yes |
| Work on exposed energized electrical conductors and circuit parts of equipment directly supplied by a panelboard or motor control center | Any | Yes |
| Insertion and removal of revenue meters (kW-hour, at primary voltage and current) | Any | Yes |
| For dc systems, insertion or removal of individual cells or multi-cell units of a battery system in an enclosure | Any | Yes |
| For dc systems, insertion or removal of individual cells or multi-cell units of a battery system in an open rack | Any | No |
| For dc systems, maintenance on a single cell of a battery system or multi-cell units in an open rack | Any | No |
| For dc systems, work on exposed energized electrical conductors and circuit parts of utilization equipment directly supplied by a dc source | Any | Yes |

Table 130.7(C)(15)(A)(a) from NFPA 70E, *continued*

| Task | Equipment Condition | Arc Flash PPE Required |
|---|---|---|
| Arc-resistant switchgear Type 1 or 2 (for clearing times of <0.5 sec with a protective fault current not to exceed the arc-resistant rating of the equipment) and metal enclosed interrupter switchgear, fused or unfused of arc resistant type construction, tested in accordance with IEEE C37.20.7:<br>-Insertion or removal (racking) of CBs from cubicles<br>-Insertion or removal (racking) of ground and test device<br>-Insertion or removal (racking) of voltage transformers on or off the bus | All of the following:<br>The equipment is properly installed<br>The equipment is properly maintained<br>All equipment doors are closed and secured<br>All equipment covers are in place and secured<br>There is no evidence of impending failure | No |
| | One or more of the following:<br>The equipment is not properly installed<br>The equipment is not properly maintained<br>Equipment doors are open or not secured<br>Equipment covers are off or not secured<br>There is evidence of impending failure | Yes |
| Opening voltage transformer or control power transformer compartments | Any | Yes |
| Outdoor disconnect switch operation (hookstick operated) at 1 kV through 15 kV | Any | Yes |
| Outdoor disconnect switch operation (gang-operated, from grade) at 1 kV through 15 kV | Any | Yes |
| Note: Hazard identification is one component of risk assessment. Risk assessment involves a determination of the likelihood of occurrence of an incident, resulting from a hazard that could cause injury or damage to health. The assessment of the likelihood of occurrence contained in this table does not cover every possible condition or situation. Where this table indicates that arc flash PPE is not required, an arc flash is not likely to occur.<br>*The phrase *properly installed*, as used in this table, means that the equipment is installed in accordance with applicable industry codes and standards and the manufacturer's recommendations. The phrase *properly maintained*, as used in this table, means that the equipment has been maintained in accordance with the manufacturer's recommendations and applicable industry codes and standards. The phrase *evidence of impending failure*, as used in this table, means that there is evidence of arcing, overheating, loose or bound equip0ment parts, visible damage, deterioration, or other damage. | | |

**Reminder: Work on 600 V or greater must be performed by electrical contractor.**

# Arc Flash Hazard PPE Categories

Table 130.7(C)(15)(A)(b) - Arc-Flash Hazard PPE Categories for Alternating Current (ac) Systems

| Equipment | Arc Flash PPE Category | Arc-Flash Boundary |
|---|---|---|
| Panelboards or other equipment rated 240 V and below<br><br>Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in) | 1 | 485 mm<br>(19 in) |
| Panelboards or other equipment rated >240 V and up to 600 V<br><br>Parameters: Maximum of 25 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in) | 2 | 900 mm<br>(3 ft) |
| 600-V class motor control centers (MCCs)<br><br>Parameters: Maximum of 65 kA short-circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in) | 2 | 1.5 m<br>(5 ft) |
| 600-V class motor control centers (MCCs)<br><br>Parameters: Maximum of 42 kA short-circuit current available; maximum of 0.33 sec (20 cycles) fault clearing time; working distance 455 mm (18 in) | 4 | 4.3 m<br>(14 ft) |
| 600-V class switchgear (with power circuit breakers or fused switches) and 600 V class switchboards<br><br>Parameters: Maximum of 35 kA short-circuit current available; maximum of 0.5 sec (30 cycles) fault clearing time; working distance 455 mm (18 in) | 4 | 6 m<br>(20 ft) |
| Other 600-V class (277 V through 600 V, nominal) equipment<br><br>Parameters: Maximum of 65 kA short circuit current available; maximum of 0.03 sec (2 cycles) fault clearing time; working distance 455 mm (18 in) | 2 | 1.5 m<br>(5 ft) |
| NEMA E2 (fused contactor) motor starters, 2.3 kV through 7.2 kV<br><br>Parameters: Maximum of 35 kA short circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 910 mm (36 in) | 4 | 12 m<br>(40 ft) |
| Metal-clad switchgear, 1 kV through 15 kV<br><br>Parameters: Maximum of 35 kA short circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 910 mm (36 in) | 4 | 12 m<br>(40 ft) |
| Arc-resistant switchgear Type 1 or 2 [for clearing times of < 0.5 sec (30 cycles) with a perspective fault current not to exceed the arc-resistant rating of the equipment], and metal-enclosed interrupter switchgear, fused or unfused of arc-resistant-type construction, tested in accordance with IEEE C37.20.7, 1 kV through 15 kV<br><br>Parameters: Maximum of 35 kA short circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 910 mm (36 in) | N/A (doors closed) | N/A (doors closed) |
| | 4 (doors open) | 12 m<br>(40 ft) |
| Other equipment 1 kV through 15 kV<br><br>Parameters: Maximum of 35 kA short circuit current available; maximum of 0.24 sec (15 cycles) fault clearing time; working distance 910 mm (36 in) | 4 | 12 m<br>(40 ft) |
| Note: For equipment rated 600 volts and below, and protected by upstream current-limiting fuses or current-limiting circuit breakers sized at 200 amperes or less, the arc flash PPE category can be reduced by one number but not below arc flash PPE category 1. | | |

**Reminder: Work on 600 V or greater must be performed by electrical contractor.**

Table 130.7(C)(15)(A)(b) - Arc-Flash Hazard PPE Categories for Direct Current (dc) Systems

| Equipment | Arc Flash PPE Category | Arc-Flash Boundary |
|---|---|---|
| Storage batteries, dc switchboards, and other dc supply sources<br>100 V > Voltage < 250 V<br><br>Parameters:<br>Voltage: 250 V<br>Maximum arc duration and working distance: 2 sec @ 455 mm (18 in) | | |
| Short-circuit current < 4 kA | 1 | 900 mm<br>(3 ft) |
| 4 kA ≤ short-circuit current < 7 kA | 2 | 1.5 m<br>(5 ft) |
| 7 kA ≤ short-circuit current < 15 kA | 3 | 1.8 m<br>(6 ft) |
| Storage batteries, dc switchboards, and other dc supply sources<br>250 V ≤ Voltage ≤ 600 V<br><br>Parameters:<br>Voltage: 600 V<br>Maximum arc duration and working distance: 2 sec @ 455 mm (18 in) | | |
| Short-circuit current 1.5 kA | 1 | 900 mm<br>(3 ft) |
| 1.5 kA ≤ short-circuit current < 3 kA | 2 | 1.2 m<br>(4 ft) |
| 3 kA ≤ short-circuit current < 7 kA | 3 | 1.8 m<br>(6 ft) |
| 7 kA ≤ short-circuit current < 10 kA | 4 | 2.5 m<br>(8 ft) |
| Note: Apparel that can be expected to be exposed to electrolyte must meet both of the following conditions:<br>(1) Be evaluated for electrolyte protection in accordance with ASTM F1296, *Standard Guide for Evaluating Chemical Protective Clothing*<br>(2) Be arc-rated in accordance with ASTM F1891, *Standard Specification for Arc Rated and Flame Resistant Rainwear*, or equivalent | | |

# Energized Electrical Work Permit

**Location/Room #:** _____ **Date:** _____

**Equipment Description:** _____ **Work Order #:** _____

**Employee Performing Work:** _____ **Position Title:** _____

**Employee Performing Work:** _____ **Position Title:** _____

**Description of Work:** _____

**Check why circuit/equipment cannot be de-energized for work:**

☐ De-energizing introduces additional or increased hazards (ex., Interruption of life support equipment, Deactivation of emergency alarm systems, Cutting ventilation to a hazardous location)

☐ Infeasible due to equipment design or operational limitations (ex., Voltage testing for diagnostics, Start-up testing)

☐ Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs

**APPROACH BOUNDARY:** Use the following distances for the power source being worked on unless equipment is labelled with boundary; if so, use boundary on label. *(Circle the applicable maximum voltage/boundary for work being performed.)*

| Nominal System Voltage Range, Phase to Phase | Limited Approach Boundary | | Restricted Approach Boundary; includes Inadvertent Movement |
|---|---|---|---|
| | Exposed Movable Conductor | Exposed Fixed Circuit Part | |
| < 50 V | Not specified | Not specified | Not specified |
| 50 V-300 V | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | Avoid contact |
| 301 V-750 V | 3.0 m (10 ft 0 in) | 1.0 m (3 ft 6 in) | 0.3 m (1 ft 0 in) |
| **For systems 600 volts or less, the Flash Protection Boundary shall be 4 feet unless calculations have been made to determine boundary.** | | | |
| **NOTE: For voltage sources greater than or equal to 600, work must be performed by an electrical contractor.** | | | |

**BARRICADE NEEDED?** If any question below is answered "YES," than a barricade should be posted at the distance identified above. *(Check appropriate box for each question.)* **EVEN IF NO ITEM IS ANSWERED YES, THE EMPLOYEE PERFORMING THE WORK MAY USE HIS/HER DISCRETION IN ESTABLISHING A BARRICADE TO KEEP PEOPLE AT A SAFE DISTANCE FROM WORK AREA.**

| YES | NO | N/A | |
|---|---|---|---|
| | | | Areas with children present. |
| | | | Machines nearby with sources of liquid which could be sprayed/splashed by other employees. (Ex., dishwasher) |
| | | | Other: |

**PERSONAL PROTECTIVE EQUIPMENT (PPE) required for work:** As a minimum, the PPE noted below for the power source being worked on should be used. *(Check all that apply.)*

☐ Rubber gloves, Class _____ ☐ Hearing protection, ear plugs (inserts) ☐ Arc rated clothing (pants, shirt, coverall)

☐ Leather over-glove ☐ Hard hat & arc-rated liner ☐ Arc rated flash hood/face shield/balaclava

☐ Safety glasses or goggles ☐ Rubber sleeves ☐ Arc rated flash suit

☐ Face shield rated for electrical work ☐ FR clothing (pants, shirt, or coverall) ☐ Other:

***NOTE:*** *Work on power sources of 600 volts or greater must be performed by electrical contractors; they must supply their own PPE and use it appropriately and incompliance with all regulations.*

**ADDITIONAL EQUIPMENT PRECAUTIONS** *(Check all that apply):*

☐ Barricades/Boundaries ☐ Non-conductive covers/Blankets ☐ Voltage rated tools, insulated

☐ Attendant ☐ LOTO (other circuits, etc.)

**SAFE WORK PRACTICES:** The following safe work practices listed below should be followed at all times.

- Inspect all tools and PPE before use.
- Do NOT leave energized circuits/equipment unattended until work is complete or equipment is de-energized/locked.
- Shield live conductors or circuits when possible.
- Use common sense.

Additional Safe Work Practices/Precautions to be used for this job: _____

**APPROVALS:**

| **University Electrician (Print)* | | *Signature* |
|---|---|---|
| | | |
| *Maintenance Leadership* | | *Signature* |

* Qualified University electrician performing the work may sign permit; leadership signature is not required. For all other individuals performing work, maintenance leadership is required on permit. After completion, forward to HR&C for record retention.

# Section 22 – LASER SAFETY PROGRAM

*NOTE: There are no lasers located at the Winding Hill facility with the exception of laser printers and laser pointers. Should a laser that would need to comply with this section be introduced at this facility, the Office of Human Resources & Compliance should be contacted immediately.*

While OSHA does not have a specific standard for laser use, ANSI Z136.1-2014 is the most current standard used by industry, medicine, research and the government as the foundation for laser safety programs.

**NOTE: For laser manufacture**, the Center for Devices and Radiological Health (CDRH), Food and Drug Administration (FDA) regulates product performance. All laser products sold in the USA since August 1976 **must be certified by the manufacturer** as meeting certain product performance (safety) standards, and each laser must bear a label indicating compliance with the standard and denoting the laser hazard classification.

The word "laser" stands for "Light Amplification by Stimulated Emission of Radiation." Lasers are cavities containing a gain medium, such as a crystal, liquid, gas, or dye and optics to control the light path within the cavity. They produce and amplify light into an intense beam of small cross-sectional area. Lasers range in power from the low-level (<1 mW) lasers used in bar code scanners to the very powerful lasers (in excess of 20 kW) that can be used for industrial cutting and welding. Hazards vary depending on the laser's class and use. Laser light is nonionizing and ranges from the ultra-violet (100 - 400nanometers), visible (400 - 700nm), and infrared (700nm - 1mm).

## Laser Classes

Lasers are grouped into four hazard classes, with Class 1 being largely nonhazardous and Class 4 lasers presenting the greatest danger. For the purposes of implementation of this laser safety program, the laser class is defined by the potential laser class an employee/student is exposed to under normal use.

Laser classes also apply to systems in which lasers are used. In general, a system may have a lower laser safety class than the laser source it uses. For example, if there is a Class 3b laser (source) confined inside a system/housing (that is properly interlocked, etc.) so that the potential exposure to laser hazards is only a Class 1, then compliance with the safety requirements of this program would be for the Class 1 *system*, not the Class 3b laser *source*. If at any time the enclosure is breached so that potential exposure to the Class 3b laser exits, then the safety requirements for a Class 3b laser must be met.

### Class 1

A Class 1 laser is considered safe based upon current medical knowledge and is exempt from most control measures. An example of a Class 1 laser or laser system might be a laser printer. There may be a more hazardous laser embedded in the enclosure of a Class 1 product, but no harmful radiation can escape the enclosure. If the enclosure is disassembled, then all precautions must be taken for the class of the more hazardous laser exposed.

## Class 2

A Class 2 laser or laser system must emit a visible laser beam. Because of its brightness, Class 2 laser light will be too dazzling to stare into for extended periods. Momentary viewing is not considered hazardous and the eye's automatic blinking reflex is normally enough to protect an individual from the hazard potential of accidental exposure. Intentional extended viewing, however, is considered hazardous.

## Class 3

There are two categories for Class 3 lasers:

### Class 3a

*Class 3a* lasers are those that normally would not produce injury if viewed only momentarily with the unaided eye. They may present a hazard if viewed using collecting optics, e.g., telescopes, microscopes, or binoculars. Example: HeNe lasers above 1 milliwatt but not exceeding 5 milliwatts radiant power. Many laser pointers also fall under this classification.

### Class 3b

*Class 3b* lasers can cause severe eye injuries if beams are viewed directly or specular reflections are viewed. A Class 3b laser is not normally a fire or skin hazard. Messiah University requires additional safety training beyond what is included as an appendix to this section for those working with Class 3b lasers and systems. Operation within a marked, controlled area is also recommended. Example: Visible diode lasers above 5 milliwatts but not exceeding 500 milliwatts radiant power.

## Class 4

Class 4 lasers are a hazard to the eye from the direct beam and specular reflections and sometimes even from diffuse reflections. Class 4 lasers can also start fires and can damage skin. Very stringent control measures are required for a Class 4 laser or laser system. For Class 4 lasers or systems, eye protection is required and facility interlocks and further safeguards are used. Laser safety training is required for all users of Class 4 lasers.

# Laser Maintenance

In addition, any maintenance conducted on a Class 3b or Class 4 laser must be done by licensed laser maintenance personnel. Messiah University presently has no one licensed to perform maintenance on a Class 3b or Class 4 laser system. Maintenance does not include routine alignment procedures on lasers with open-air cavities containing free-space optics provided that the details of these operations are addressed in a Standard Operating Procedure. Questions regarding compliance on laser maintenance should be directed to the Laser Safety Officer.

**REMINDER:** If maintenance is conducted on a Class 1, 2 or 3a laser system that exposes an internal laser that is a Class 3b or Class 4 laser, then all precautions associated with maintenance on a Class 3b or Class 4 laser must be followed.

## Laser Hazards

| Hazard | Class 1 | Class 2 | Class 3a | Class 3B | Class 4 |
|---|---|---|---|---|---|
| **Eye Damage** | No | Must stare into it and overcome natural blinking reflex | If viewed through collecting optics | Immediate and irreversible from direct beam and specular reflections | Immediate and irreversible from direct beam, specular reflections, diffuse reflections |
| **Skin burns** | No | No | No | No | Thermal burns |
| **Fires** | No | No | No | No | Potential fire hazard |
| **Smoke** | No | No | Anytime lasers are used for precision burning, whether it's human tissue in surgery or metal in laser cutting, the smoke generated may present possible hazards. | | |
| **Non-Beam** | Lasers can create electrical hazards if they are incorrectly installed; they can create an explosion hazard if the housing is inadequate. | | | | |

## Laser Safety Officer

Messiah University has a laser safety officer (LSO) who oversees the safe use of lasers on campus. Among the responsibilities of the LSO are:

- Maintain an inventory list of all lasers on campus except laser printers/copiers, bar code readers and laser pointers.
- Provide and document training, and retain training records.
- Assess all new lasers and laser systems of Class 3a or greater introduced on campus (except those in laser printers/copiers, bar code and laser pointers).
- Inspect all lasers/laser systems prior to implementation and annually thereafter; maintain a record of inspections.
- Prescribe both engineering and procedural control measures.
- Approve and give guidance to Standard Operating Procedures.
- Approve area signs and equipment labels.
- Perform hazard evaluation where required.
- Classify and verify classification of laser systems.
- Determine personnel requiring medical surveillance.
- Maintain a log of monthly laser eyewear inspections.
- Investigate all laser incidents.

The LSO has the authority to shut down any laser/laser system due to safety concerns.

### Who Is the Laser Safety Officer?

Messiah University's LSO is Abaz Kryemadhi, Professor of Physics in the Department of Computing, Mathematics, and Physics (CMP).

## Laser Safety Precautions, General

- Enclose the laser beam path to the greatest possible degree.
- Position the laser beam path below both sitting and standing eye level wherever possible.
- Never aim a laser at a person or an uncontrolled reflective surface. Be cognizant of this if using a laser pointer.
- Put on assigned protective eyewear before turning on a laser, and make sure everyone else in the room is also wearing appropriate eye protection, if required.
- For Class 3a and greater: limit the occupants of the room to those involved in the laser's use.
- For a Class 3a or greater: students working with the laser must be directly supervised by personnel authorized to use these sources by the Laser Safety Officer
- Select the correct eyewear by checking the frame or lens for information on wavelength protection and optical density. Higher optical density protects you against higher laser power. It is imperative that you wear laser safety eyewear suited to the wavelength range of your laser source. Failure to do so will result in insufficient protection.
- Even if you are wearing laser protective eyewear, never look directly into any laser beam.
- Inspect protective eyewear before each use. Check for pits, cracks, discoloration, and other filter or frame damage that could let light in. Do not use damaged eyewear. Replace damaged eyewear immediately.
- Conduct high-powered laser operations in limited-access controlled areas where warning signs are posted.
- Turn lasers off when not in use.
- Use proper signage to indicate the presence of a laser hazard. For Class 3b and Class 4 lasers, a lighted sign should indicate when the laser is in use.
- Ensure that lasers are labeled to indicate their maximum output.
- If smoke plumes are generated during laser use, consider installing local exhaust ventilation.

## Laser Safety Precautions, Laser Levels

Laser safety levels using a Class 3a laser are to be treated as any other Class 3a laser source for the purposes of laser safety. However, because of the potential for greater exposure, adherence to the following guidelines is required.

- Laser levels pose a hazard to pilots of private and commercial airlines when operated outdoors, especially those equipped with a vertical beam path. When used outdoors, care must be taken to ensure that the vertical beam path is appropriately blocked.
- Laser levels should be used only in enclosed spaces, and all persons present should be informed of the operation of the laser level and the hazards it presents. Laser levels may not be used in an open space where persons may enter and leave unmonitored, and thus may be unwittingly exposed to the rotating beam.

## Engineering Control Methods for Lasers

| Control Measure | Classification | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3a | 3b | 4 |
| Protective Housing | X | X | X | X | X |
| Interlocks on Protective Housing | ◆ | ◆ | ◆ | X | X |
| Key Controls | - | - | - | • | X |
| Collecting Optics | X | X | X | X | X |
| Fully Open Beam Path | - | - | - | X (NHZ) | X (NHZ) |
| Limited Open Beam Path | - | - | - | X (NHZ) | X (NHZ) |
| Laser Operation Indicator | - | - | - | X | X* |
| Laser Warning Sign | - | - | • | X | X |
| Barriers and Laser Curtains | - | - | - | • | X |
| Class 4 Controlled Area | - | - | - | - | X |

- not required
- • to be determined by LSO
- X required
- ◆ required if housing Class 3b or Class 4 laser
- NHZ Nominal Hazard Zone analysis required

## Procedural Control Measures for Lasers

| Control Measure | Classification | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3a | 3b | 4 |
| Standard Operating Procedure | - | - | - | X | X |
| LSO Training | - | - | - | X | X |
| Personnel Restriction | - | - | - | X | X |
| Laser Eye Protection | - | - | • | X | X |
| Skin Protection | - | - | - | - | X |

- not required
- • recommended
- X required

## Laser Training

Anyone working with a laser/laser system must be properly trained. Training is required initially. Retraining is only required if safety requirements change or if there is a reason to believe that retraining should be conducted (ex., violations of safety procedures by the individual).

Individuals working with Class 1, 2, or 3a laser/laser system must read *Attachment 30*, sign and date a copy of the document, and forward it to the LSO for record retention.

Individuals working with Class 3b or IV laser/laser system must contact the LSO. The LSO will provide the necessary laser safety training which must be successfully completed by the employee/student prior to working with the Class 3b or Class 4 laser. The LSO will retain documentation of the training.

## Laser Eyewear

All laser eyewear must be approved for use with the laser involved and appropriately marked. In addition to inspection before each use for pitting, cracks or other signs of deterioration, laser eyewear must be inspected monthly and a log of the inspection must be kept by the LSO. Contact the LSO to ensure that eyewear in your area is included in this inspection program.

## Laser Inventory List

The LSO will maintain a list of all lasers/laser systems of Class 3a, Class 3b, and Class 4 lasers on campus. The only exceptions will be those lasers contained in laser printers/copiers, bar code readers, etc. of Class 1 or Class 2 and laser pointers of Class 3a. The listing will include the class of the laser/laser system, the power source, the physical location, the use, and a contact person responsible for the laser/laser system

## New Lasers/Laser Systems

**The LSO must be informed of all new lasers or laser systems brought to campus PRIOR to their arrival.** (The only exceptions are those contained in laser printers/copiers, bar code readers and laser pointers.) The LSO must approve the new laser/laser system for use on campus. This may require implementation of safety protocol and safety systems. Discussions should occur with the LSO to determine the necessary safety requirements for the laser/laser system and the environment in which it will be placed. **The LSO will make a final inspection and must give final approval of the laser/laser system prior to actual use on campus.** The Laser Registration Form *(Attachment 31)* must be completed and forwarded to the LSO.
The LSO will:

- add the laser/laser system to the campus inventory list;
- ensure that all personnel (employees and students) involved complete the appropriate training prior to use of the laser and that all general safety rules have been implemented;
- ensure that the appropriate eye protection has been obtained and will be used;
- ensure that a standard operating procedure and lock out procedure have been written (this may need to be completed after the laser is brought on campus);
- ensure that the proper protocol has been established: this may include lighted signage indicating when the laser is in operation;
- ensure that exhaust is provided when needed to protect against fumes or particles if generated during use; etc.

## Dismantling Laser Systems

If a laser system is being dismantled to salvage parts, and the internal laser is a Class 3a, 3b or 4 laser, the LSO must be contacted. He or she will determine if the proposed use or retention of the laser(s) salvaged is acceptable.

## Class 4 (IV) Lasers

The University presently has no Class 4 systems in use. In addition to compliance with all requirements mentioned under the previous section, before a Class 4 laser may be introduced to the campus, consideration must be given to eye mapping required for all individuals who will be working with the laser, protection of both personnel and the work environment from any potential fire hazards, and additional measures required for restricting access to the Class 4 laser when in operation. The LSO must be consulted and involved in these decisions.

## Servicing of Lasers

All servicing of lasers/laser systems must be done by a certified maintenance person who has been appropriately trained on the type/class of laser involved. This statement does not apply to routine alignment procedures that are outlined in the Standard Operating Procedure approved by the Laser Safety Officer provided that all safety measures are followed.

## Laser Incident

If there is a laser incident/accident that resulted in injury, damage to University property or a release to the environment **OR** could have resulted in injury, damage to University property or a release to the environment, the laser must be immediately shut down and locked out. The LSO must be contacted and an investigation must occur. As a minimum, the investigation should answer the following questions:

- What happened?
- What was the root cause?
- What can be done to prevent it from happening again? What corrective action/measures must be implemented?

The laser/laser system cannot be restarted and put into use until all recommended corrective actions as a result of the investigation have been completed.

# Laser Safety Training

*This document is intended to inform individuals working with Class 1, 2 and 3a lasers of potential hazards and general safety requirements. The form below must be completed and submitted to the Laser Safety Officer (LSO) prior to working with such lasers/laser systems. It does not meet the training required for individuals working with Class 3b and Class 4 lasers/laser systems. Individuals working with Class 3b or 4 lasers/laser systems must contact the LSO. The LSO will provide the necessary laser safety training which must be successfully completed by the employee/student prior to working with the Class 3b or 4 laser. The LSO will retain documentation of all laser training.*

Lasers are grouped into four hazard classes, with class 1 being largely nonhazardous and Class 4 lasers presenting the greatest danger.

***Class 1*** lasers are **considered safe based upon current medical knowledge** and are exempt from most control measures. An example of a Class 1 laser or laser system might be a laser printer. There may be a more hazardous laser embedded in the enclosure of a Class 1 product, but no harmful radiation can escape the enclosure. **If the enclosure is disassembled, then all precautions must be taken for the class of the more hazardous laser exposed.**

***Class 2*** lasers or laser systems must emit a visible laser beam. Because of its brightness, a Class 2 laser light will be too dazzling to stare into for extended periods. Momentary viewing is not considered hazardous and **the eye's automatic blinking reflex is normally enough to protect an individual from the hazard potential of accidental exposure**. Intentional extended viewing, however, is considered hazardous.

***Class 3:*** There are two categories for Class 3 lasers:

***Class 3a*** lasers are those that normally would not produce injury if viewed only momentarily with the unaided eye. They may **present a hazard if viewed using collecting optics**, e.g., telescopes, microscopes, or binoculars. Example: HeNe lasers above 1 milliwatt but not exceeding 5 milliwatts radiant power.

***Class 3b*** lasers **can cause severe eye injuries if beams are viewed directly or specular reflections are viewed**. A Class 3 laser is **not normally a fire or skin hazard**. Example: visible HeNe lasers above 5 milliwatts but not exceeding 500 milliwatts radiant power. Messiah University requires additional safety training for those working with Class 3b lasers and systems. Operation within a marked, controlled area is also recommended.

***Class 4 -*** Class 4 lasers are a **hazard to the eye from the direct beam and specular reflections and sometimes even from diffuse reflections**. Class 4 lasers **can also start fires and can damage skin**. **Very stringent control measures are required for a Class 4 laser or laser system**. For Class 4 lasers or systems, eye protection is required and facility interlocks and further safeguards are used. Laser safety training is required for all users of Class 4 lasers. In addition, any maintenance conducted on a Class 3b or Class 4 laser must be done by licensed laser maintenance personnel. Messiah University presently has no one licensed to perform maintenance on a Class 3b or Class 4 laser system.

***General Laser Safety Precautions***

- Enclose the laser beam path to the greatest possible degree.
- Position the laser beam path below both sitting and standing eye level wherever possible.
- Never aim a laser at a person or an uncontrolled reflective surface. Be cognizant of this if using a laser pointer.
- Put on assigned protective eyewear before turning on a laser, and make sure everyone else in the room is also wearing appropriate eye protection, if required.
- For Class 3a and greater: limit the occupants of the room to those involved in the laser's use.

- For a Class 3a or greater: students working with the laser must be directly supervised by personnel authorized to use these sources by the Laser Safety Officer.
- Select the correct eyewear by checking the frame or lens for information on wavelength protection and optical density. Higher optical density protects you against higher laser power. It is imperative that you wear laser safety eyewear suited to the wavelength range of your laser source. Failure to do so will result in insufficient protection.
- Even if you are wearing laser protective eyewear, never look directly into any laser beam.
- Inspect protective eyewear before each use. Check for pits, cracks, discoloration, and other filter or frame damage that could let light in. Do not use damaged eyewear. Replace damaged eyewear immediately.
- Conduct high-powered laser operations in limited-access controlled areas where warning signs are posted.
- Turn lasers off when not in use.
- Use proper signage to indicate the presence of a laser hazard. For Class 3b and Class 4 lasers, a lighted sign should indicate when the laser is in use.
- Ensure that lasers are labeled to indicate their maximum output.
- If smoke plumes are generated during laser use, consider installing local exhaust ventilation.

***Laser Safety Officer (LSO)***

Messiah University has a Laser Safety Officer who maintains an inventory of all lasers/laser systems, provides training and retains documentation. The LSO must approve all new lasers/laser systems. Before bringing any new lasers or laser systems to the University campus, approval must be received from the LSO. The LSO will work with laser users to ensure the safety of the operation by defining safety controls, keep a log of monthly laser eyewear inspections, and investigate all laser incidents/accidents.

If a laser incident/accident occurs, the laser must be immediately taken out of service and locked out; the LSO must be contacted; and an investigation must occur before the laser can be put back into operation.

For additional information on the University's Laser Safety Program, refer to Section 22 in the *Safety Manual*. If you have any questions regarding the program or the safe use of lasers, contact the Laser Safety Officer, Abaz Kryemadhi, Professor of Physics in the Department of Computing, Mathematics and Physics

***I have read and understand the information contained in this document:***

| | |
|---|---|
| *Print Name* | *Signature* |
| *Department/Job Title* | *Date* |

**Return signed document to Abaz Kryemadhi, Suite 3041 for record retention.**

Revision date: October 2021

# Messiah University Laser Registration Form

*All faculty and personnel bringing Class 3a, Class 3b and Class 4 lasers or laser systems onto campus must register the laser with the current laser safety officer (LSO), Dr. Abaz Kryemadhi.* ***Please read Section 22 of the Safety Manual to determine your responsibilities and then complete this form.***

**RETURN THE COMPLETED FORM TO:**

**Abaz Kryemadhi**
Frey 329
email: akryemadhi@messiah.edu; phone ext. 2384

| | | | |
|---|---|---|---|
| **Laser Class** *(ANSI Laser Classification by Manufacturer)* | | **Laser Type** *(e.g. Gas: HeNe, Argon, DPSS, Diode, TiSapph, etc.)* | |
| **Nominal Output Power** *(Laser power as listed by the manufacturer)* | | **Measured Output Power** *(Laser power as measured by the LSO for Class IIIa and greater)* | |
| **Power Supply Model** | | **Power Supply Serial** | |
| **Cooling** *(Air, water, etc.)* | | **Wavelength** *(If multiple lines, list range; e.g. visible, NIR, UV)* | |
| **Laser Manufacturer** | | | |
| **Laser Model** | | | |
| **Laser Serial/ID #** | | | |
| **Location of Laser** *(Building and Room #)* | | | |
| **Emergency Contact** *(Principal Investigator or Supervising Personnel)* | | | |
| **Describe intended use of laser:** | | | |

**Reminder:** *Individuals working with class 3b or 4 lasers/laser systems must contact the LSO. The LSO will provide the necessary laser safety training which* ***must be successfully completed by the employee/student prior to working with the class 3b or 4 laser.*** **Contact the LSO for training, if applicable.**

*Name (Print)* _____ *Signature* _____

*Title* _____ *Date* _____

Revision Date: October 2021

# Section 23 – COMPRESSED GAS CYLINDERS

Compressed gas cylinders can be extremely hazardous and even deadly. Cylinders can explode and have been known to act as a missile, becoming a flying projectile. Some gases are flammable; some are asphyxiants; some are oxidizers. They can be reactive, corrosive or toxic. Some gases may have more than one of these characteristics. Because of the potential hazards associated with compressed gases, it is important that safety precautions are taken.

OSHA 29 CFR 1910.101, 1910.102, 1910.252, 1910.253, the Compressed Gas Association Pamphlet P-1-1965 and NFPA 55 give requirements for the safe handling, storage and use of compressed gas cylinders, regulators, and piping. (Other regulations govern the transport of gas cylinders including 49 CFR parts 171-179.) Although this section deals primarily with gas cylinders, it also includes auxiliary equipment such as regulators, safety systems, and piping. It does not include the large propane tanks such as those used for heating buildings. (Fire extinguishers are not included in this program. The program for them is managed by the Fire Safety Coordinator.)

Messiah University has many types of compressed gases for various uses and in different sizes. Uses include fire suppression, food services, fork lift fuel, heating fuel, laboratories, medical use and welding. Among the gases used are:

| Gases | Lighter or Heavier than Air |
|---|---|
| Acetylene | Lighter |
| Argon | Heavier |
| Butane (hydrocarbon gas) | Heavier |
| Carbon Dioxide | Heavier |
| Helium | Lighter |
| Hydrogen | Lighter |
| Liquefied Petroleum Gas | Heavier |
| Nitrogen | Slightly lighter |
| Oxygen | Heavier |
| Propane (hydrocarbon gas) | Heavier |
| Propylene | Heavier |

## Definitions

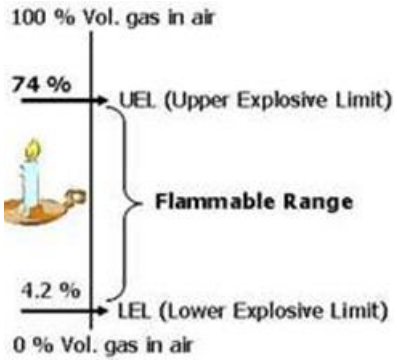
Asphyxiant – Gas that reduces the amount of breathable air in a location.

Compressed Gas - “Material or mixture having in the container an absolute pressure exceeding 40 psi at 70°F or, regardless of pressure at 70°F, having an absolute pressure exceeding 104 psi at 130°F or any liquid material having a vapor pressure exceeding 40 psi absolute at 100°F as determined by ASTM Test D-323”

Cryogenic Liquid – Refrigerated liquefied gas with normal boiling point below -130°F. Hazards include those of the gas, frostbite and asphyxiation if breathable oxygen in air is displaced.

Density/Vapor Density – Roughly proportional to the molecular weight of the gas; a comparison of the weight of the gas to air (1.0); heavier-than-air gases will have a vapor density greater than 1.0; lighter gases will have a vapor density less than 1.0.

Explosive Limits/Flammable Limits – Percentage of gas within the LEL and UEL where combustion may occur and be sustained; outside of this "range" the mixture is either too lean or too rich to support combustion.




Lower Explosive Limits (LEL) aka Lower Flammable Limits (LFL) – Least percentage of gas, mixed with the proper proportions of air, whereby having necessary heat applied, combustion may result; below this percentage of gas in air, the mixture is too lean to burn.

Upper Explosive Limits (UEL) aka Upper Flammable Limits (UFL) – Greatest percentage of gas that when proportioned with air may permit sustained combustion; above this percentage of gas in air the mixture is too rich to burn.

Gas - State of matter in which material has a very low density and viscosity; can expand and contract in response to temperature and pressure changes; easily diffuses into other gases; distributes itself inside a container; if the temperature is dropped and pressure increased, the gas can be changed to a liquid or semi-solid state.

Hydrocarbon Gas – contains flammable hydrogen and combustible carbon in the make-up. Such gases are flammable and colorless but are non-toxic and non-corrosive.

Inert Gas - Gas which does not react with other materials (e.g. argon, helium, neon). It can be an *asphyxiant* which reduces the amount of breathable air in a location and is, therefore, often used in fire suppression systems, purging and cleaning.

Liquefied Petroleum Gas (LPG) - include mixes that are primarily propane, primarily butane and, most commonly, mixes including both propane and butane. LPG is heavier than air, unlike natural gas, and thus will flow along floors and tend to settle in low spots, such as basements. There are two main dangers from this. The first is a possible explosion if the mixture of LPG and air is within the explosive limits and there is an ignition source. The second is suffocation due to LPG displacing air, causing a decrease in oxygen concentration.

Pressure Relief Valve (PRV) – Most gas containers will have a pressure relief valve. This may be activated by pressure, temperature or spring to permit the container contents to escape in order to avert a container rupture.

The valve assembly consists of the valve hand wheel, the valve body and valve plug, and the safety or pressure relief device.

## Identification and Receipt of Cylinders

- The contents of compressed gas cylinders must be clearly identified. Gas identification should be stenciled or stamped on the cylinder or a label. If the cylinder does not legibly identify the contents, it should not be accepted. **Do not rely on the color of the cylinder for identification**. Color-coding is not reliable because cylinder colors may vary by supplier.
- Inspect the cylinder for signs of corrosion, dents, bulges, gauges or other damage. If any of these signs are present, do not accept the cylinder.
- **Cylinders should come with a safety cap**

## Cylinder Storage

- Do not store cylinders near highly flammable substances such as oil, gasoline, or combustible waste.
- Do not store cylinders near elevators or in locations where heavy moving objects might fall on them.
- Secure cylinders for storage (with chain or other means) to prevent them from falling over.
- Store with safety caps (valve protectors) in place when not connected for use.
- Oxidizers (oxygen) must be separated from flammable gases and empty cylinders must be isolated from filled cylinders in storage. (Oxygen cylinders must be stored 20 feet from flammable gas cylinders or an appropriate fire wall must be provided.)
- **Never store acetylene cylinders on their side.**
- Indoor cylinder storage should be in a well-ventilated, cool, dry location free from corrosive materials. Protect from bare ground to prevent rusting.
- Store out of direct sunlight and away from sources of heat and ignition; temperatures must not exceed 125 F. When the temperature increases, the volume increases. Rule of thumb:
    - Increase gas temperature 500 degrees = double pressure
    - Increase gas temperature 1,000 degrees = triple pressure
    - Increase gas temperature 1,500 degrees = quadruple pressure

## Moving Cylinders

- Always have safety cap in place when moving or transporting cylinders.
- Do not transport cylinders with the regulator in place.
- Do not lift cylinders by the cap.
- Never drop cylinders or permit them to strike against each other or against other surfaces violently.
- Avoid dragging or sliding cylinders.
- Use appropriate cylinder carts or hand truck with cylinder firmly secured for moving.

## Cylinder Use

- Be familiar with the properties and hazards of the gas inside the cylinder before use (this information is available on the Safety Data Sheet).

- Cylinder caps should be removed by hand or using the appropriate cylinder wrench. NEVER use any other tool to remove safety caps. If cap cannot be removed, contact supplier for replacement and do not use.
- Keep cylinder valves closed at all times except when cylinder is in active use.
- Be sure cylinder is properly supported during use to prevent it from being knocked over. Larger cylinders should be secured to a wall or lab bench by a clamp or chain
- Ensure usage of the appropriate pressure regulating device.
- Inspect the regulator and cylinder valves for grease, oil, dirt and solvent before use. Never use grease or oil to lubricate regulators or cylinder valves because this can cause an explosion.
- Do not mix regulators, gauges, hoses and other appliances provided for a specific type of gas with incompatible materials/gases.
- Open cylinder slowly. Point valve opening away from yourself and others. Stand with the cylinder between yourself and the regulator (cylinder valve outlet facing away) when opening the cylinder valve.
- Check for leaks at connections using soapy water.
- Acetylene or other flammable gas cylinder valves should only be opened using ½ turns of the spindle, and preferably no more than ¾ of a turn. This reduces the risk of explosion and allows for the cylinder valve to be closed quickly, cutting off the gas flow.
- Never use copper fittings or tubing on acetylene tanks – an explosion may result.
- Oxygen cylinder valves should be opened all the way during use.
- Avoid the use of a wrench on a valve equipped with a hand wheel. Never hammer on the valve wheel.
- For frozen, corroded valves, contact the supplier.
- Use check valves if cylinder is apt to be contaminated by feedback of materials.
- Before removing a regulator, close the cylinder valve and release all the pressure from the regulator.
- Provide a forklift cylinder change-out area which maximizes safety for the operator and other staff and provide ventilation, fire extinguisher and PPE.
- Never leave the valve open when equipment is not in use, even when empty; air and moisture may diffuse through an open valve, causing contamination and corrosion within the cylinder.
- Use the cylinder valve for turning gas off, not the regulator.
- When connecting and disconnecting regulators and lines, safety glasses and face shields should be worn.
- Close the cylinder valve and release all pressure before removing the regulator from the cylinder.
- Do not place cylinders where they might become part of an electric circuit.
- When cylinders are used in conjunction with electric welding, precautions must be taken against accidentally grounding cylinders and allowing them to be burned by electric welding arc.

- **Label empty cylinders as EMPTY or MT.**
- **Handle empty cylinders as carefully as full ones; residual pressure can be dangerous.**

## Additional Safety Precautions

- Smoking is not permitted on University property. However, because of the seriousness of smoking around compressed gas cylinders, it is being reiterated: **SMOKING IS NOT PERMITTED WHERE GAS CYLINDERS ARE STORED OR USED.**
- Never attempt to repair or alter cylinders, valves, or safety relief devices.
- Never use cylinders as rollers, supports, or for any other purpose than to contain the contents received.
- **Lecture bottles** are very small compressed gas cylinders that are usually not returnable to the supplier. Therefore, **it is the policy of Messiah University to prohibit the purchase of lecture bottles whenever possible.**
- Empty gas cylinders should be returned to the supplier. If for any reason this is not possible, Facility Services must be contacted to ensure proper disposal; they may be a hazardous waste.
- Notify cylinder owner if any condition might have permitted a foreign substance to enter the cylinder or valve. (Provide details of incident and serial number).
- Because materials impregnated with oxygen can be ignited with static electricity, compressed oxygen should never be used to blow off clothing or in lieu of compressed air.
- Adequate fire extinguishers should be available near areas where cylinders of flammable gases are used or stored.
- Air guns should only be used with compressed air and cannot exceed 30 psi. Air guns should not be altered for use.

## Cylinder Leaks

- Never try to repair a leaking cylinder. Contact the supplier.
- It is important to know if the gas is heavier or lighter than air. This will help you determine where the gas (particularly if it is colorless and odorless) is accumulating or the path of travel. Refer to table at beginning of this section for this information.
- To detect gas leaks on cylinder fittings or at connections, use soapy water.
- If a cylinder is leaking, follow the instructions below.

| Type of Gas | Action to Take |
|---|---|
| Flammable, inert or oxidizing gas | Remove cylinder to an isolated, well-ventilated area, away from possible ignition sources. Allow to remain isolated until gas has discharged. Post appropriate warnings. |
| Corrosive gas | Remove cylinder to isolated, well-ventilated area. Direct stream of gas into an appropriate neutralizing agent. |
| Toxic gas | Remove cylinder to isolated, well-ventilated area but only if possible while maintaining personal safety. It may be necessary to evacuate building. |

## Hoses and Connections

- Examine hoses regularly for leaks. Repair leaks promptly and properly.
- Do not use unnecessarily long hoses.
- Keep hoses free of kinks and away from high traffic areas.
- Store hoses in a cool, dry place and protect them from hot objects and sparks.

## Emergency Shutoffs and Alarms

- All emergency shut-off systems and emergency alarms for compressed gas systems should be tested routinely for proper function.

## Employee Training

- Only properly trained personnel should handle compressed gas cylinders. Training should be completed prior to the start of work with compressed gas cylinders and repeated if a refresher is needed.
- A training program is available to comply with training requirements. Refer to *Attachment 15* of this *Safety Manual* for a link to this online training program.
- In addition to the completion of the training program, review of this section of the *Safety Manual* should be completed before an employee begins work with compressed gas cylinders.

## Highly Toxic Gases

Use of highly toxic gases shall not be permitted on campus without the knowledge and permission of the area vice president/provost and the vice president for human resources and compliance. The Office of Human Resources & Compliance and the appropriate lab manager or area director must also be notified. Proper precautions such as respiratory protection, isolated storage, forced ventilation and training may be required. Some common highly toxic gases include:

| | | |
|---|---|---|
| Carbonyl Fluoride | Hydrogen Cyanide | Nitrogen Dioxide |
| Chlorine | Hydrogen Selenide | Ozone |
| Fluoride | Nickel Carbonyl (liquid) | Phosgene |
| Germane | Nitric Oxide | Phosphine |

# Section 24 – RADIATION SAFETY PROGRAM

*NOTE: There is no radiation producing equipment located at the Winding Hill facility. Should a source of radiation be introduced at this facility, the Office of Human Resources & Compliance should be contacted immediately.*

***Policy***

It is the policy of Messiah University to comply with the provisions of the Pennsylvania Radiation Protection Act, and specifically 25 Pa Code, Article V, Chapters 215 through 236.

***Definitions***

***Analytical X-ray machine***—An assembly of components utilizing X-rays to determine the elemental or chemical composition or to examine the microstructure of materials usually by X-ray diffraction or fluorescence.
***Electron microscope***—Equipment utilizing the wave characteristics of electrons that have been accelerated by an electric field to visualize the microscopic structure of material.
***Fail-safe characteristics***—A design feature which causes X-ray production to cease, beam port shutters to close or otherwise prevents emergence of the primary beam, upon the failure of a safety or warning device.
***Ionizing radiation***—Radiation consisting of directly ionizing charged particles—such as electrons, protons, alpha particles and the like—having sufficient kinetic energy to produce ionization by collision, or consisting of either indirectly ionizing uncharged particles—such as neutrons—or photons which can liberate directly ionizing particles or can initiate a nuclear transformation.
***NRC***—United States Nuclear Regulatory Commission or its authorized representatives.
***Radiation producing machine***—A device capable of producing ionizing radiation except those devices with radioactive material as the only source of radiation.
***Radiation safety officer (RSO)***—An individual who has the knowledge and responsibility to apply appropriate radiation protection regulations.
***Radiation source***—An apparatus, device, equipment, radiation-producing machine or material, other than a nuclear power reactor and nuclear fuel located on a plant site, emitting or capable of emitting ionizing radiation.
***Radioactive material***—A material—solid, liquid or gas—which emits radiation spontaneously.
***Radioactivity***—The transformation of unstable atomic nuclei accompanied by the emission of radiation.
***Registration***—The act of registering with the Department under this article.
***Pennsylvania's Department of Environmental Protection (DEP)*** – The state department with jurisdiction over the radiation regulations.

## Radiation Sources and Radiation Production Equipment

- All radiation sources and radiation producing equipment on campus must be approved by the University's Radiation Safety Officer.
- All radiation sources and radiation producing equipment must be properly registered with PA DEP, if required.

    - Within 30 days of acquisition or elimination.
    - Notification will be made to the state by the RSO; therefore, the RSO must be informed in advance of any changes in inventory.
- All operational equipment/sources must be inspected semi-annually for leakage and interlock/fail-safe characteristic functionality. If equipment is not operational or is not intended for use at the time of inspection, it must be locked out and cannot be put back into operation until a leakage and interlock/fail-safe characteristic inspection is conducted.
- All radiation sources and radiation producing equipment must be properly labeled. Each radiation producing machine must be labeled in a conspicuous manner which cautions individuals that radiation is produced when it is energized. For example:

**''CAUTION—RADIATION**
**THIS EQUIPMENT PRODUCES RADIATION**
**WHEN ENERGIZED.''**

- All areas where such equipment/sources are used must be appropriately labeled with proper signage. PA DEP form 2900-FM-RP0003, Notice to Employees must be displayed. License/ certificate of registration or a notice which describes the document and states where it may be examined must be posted.
- The RSO must be notified if any radiation producing equipment/sources is re-located on campus.
- Operating procedures for the equipment must be readily available at the unit.
- No human use of radiation equipment shall be permitted (ex., x-ray equipment for medical purposes).

## Responsibilities of Radiation Safety Officer (RSO)

The Manager for the Natural Sciences Laboratory Program serves as the campus RSO. The responsibilities of the RSO shall include:

- Accompanying any state inspectors conducting audits of the University's radiation safety program, radiation producing equipment/sources, or radiation records.
- Managing licensing/certification for radiation producing equipment as required by PA DEP.
    - Notify PA DEP within 30 days in writing of any changes to the number of machines, address of University, or individual serving as RSO.
    - Ensure annual fee and renewal are provided to the state within the allotted time-frame.
- Maintaining all records pertaining to the radiation program (certificates of registration/licenses, audits, inspections, calibrations, training, etc.).
- Maintaining an inventory of all radiation producing equipment and sources on campus. This should include equipment name/model number, serial number, room location and department of ownership.

- Reporting any stolen, lost or missing licensed or registered equipment/sources to the state by phone immediately after it becomes known and follow-up with a written report within 30 days.
- Conducting leakage and interlock/fail-safe characteristic inspections of all radiation producing equipment and sources every 6 months or ensuring that such inspections are conducted. (NOTE: for alpha particle producing sources, unless present in exempt quantities, inspection must occur every 3 months. The University does not presently have any alpha particle producing sources that are not exempt. For some equipment, annual inspection is sufficient; however, as the University operates on a two-semester schedule, conducting inspections every 6 months on all equipment ensures that equipment is in compliance each semester of use.)
- Ensuring that inspection equipment used to test leakage and interlock/fail-safe is properly calibrated (annually).
- Notifying the state of any exposure incidents to individuals of radiation levels exceeding acceptable limits.
- Giving oversight to the University's radiation safety program.

## Licensing of Radioactive Material

The University presently has no radioactive material (ex., isotopes) emitting radiation at a level that requires licensing and has no license from the state to receive, possess, use, transfer, own or acquire such radioactive material. **Thoughts about obtaining any radioactive material must be discussed with the RSO before any action is taken! In addition to concurrence from the RSO, approval by the School Dean is required before any radioactive materials may be brought on campus that require licensing by the state.** The radiation safety program does not currently include requirements necessary for the introduction of such radioactive materials.

**NOTE:** Certain low-level quantities of radioactive material may be received, possessed, used, or acquired without license. For example, the Department of Computing, Mathematics & Physics has low-level isotopes in their inventory that are not regulated by state or federal agencies due to the low-level of radiation emitted. Although they do not require the semi-annual inspection and the area does not require labeling, they will be included in our inspection program along with all other radioactive sources on campus. Additionally, an inventory of these isotopes must be maintained and is provided in *Attachment 32*. **ALL radioactive material, regardless of any exemptions from the state, MUST be approved by the RSO before it is acquired or introduced to campus.**

## Inspection of Radiation Producing Equipment

Specific requirements for analytical equipment including X-ray equipment, X-ray gauging equipment, electron microscopes and X-ray calibration systems are defined under 25 Pa Code, Article V, Chapter 227.

- Any equipment used for conducting inspections must be properly calibrated and the calibration must be within one year of the inspection.

- All radiation producing equipment/sources shall be inspected every 6 months to ensure that:
    - leakage and interlock/fail-safe characteristics function properly
    - all warning lights (ex., X-Ray On) are illuminated when equipment is energized
    - all required warning labels are present and legible (ex., "Caution Radiation – This Equipment Produces Radiation When Energized" required for electron microscope).
- If any problems are found during inspection, the equipment shall immediately be taken out of service and locked out.
- After any repairs are made to equipment, an inspection of the equipment must be conducted before it can be put back into operation.
- If equipment is relocated on campus, an inspection of the equipment must be conducted before it can be put back into operation.
- If equipment has been in storage (or locked out for lack of use), it must be inspected before it can be put back into operation unless the previous inspection was within the past six months and the equipment was not moved for storage.
- All inspection records and all calibration records must be retained for a minimum of 4 years.

## Personnel Monitoring Devices

The University presently is not required to utilize personnel monitoring devices per 25 Pa Code, Article V, Chapter 227.14. If new radiation equipment/sources are added to the campus, the RSO will evaluate if personnel monitoring devices are required; however, introduction of such equipment/sources will be discouraged.

## Radiation Training Requirements

All employees working with radiation producing equipment/sources must be trained initially and re-trained if any problems or concerns arise indicating the need for re-training. Training should include:

1. Familiarity with the operating procedure for the specific equipment being used. If the employee is the individual who is introducing the equipment to campus, the manufacturer's operating manual should be reviewed prior to operation.
2. Explanation of radiation.
3. Effects of overexposure to radiation.
4. Common sources of radiation in the environment.
5. Sources/equipment on campus.
6. General safety rules when working with radiation producing equipment.
7. How to report concerns related to operation of the equipment.

*Attachment 32* may be used to meet training requirements # 2-7.

# Training Communication on Radiation

*What is radiation?*

Radioactive materials give off a form of energy that travels in waves or particles. This energy is called radiation. Radiation is a form of energy present everywhere. Radiation released into the environment is measured in units called *curie*. The dose of radiation that a person receives is measured in units called *rem*. Radiation cannot be detected by the senses (sight, smell, etc.) but even the smallest amounts can be measured by instruments.

*How can I be exposed to radiation?*

Radiation exposure occurs every day. It is present in naturally occurring sources (elements in the soil, radon, rays from the sun), and man-made sources (microwave ovens, TV sets, building materials, smoke detectors). It can also occur from medical exposure (x-rays, diagnostic tests, treatments), and from exposure in manufacturing, research, and military.

*How does radiation cause health effects?*

Radioactive materials that decay spontaneously produce ionizing radiation, which has sufficient energy to strip away electrons from atoms (creating two charged ions) or to break some chemical bonds. Any living tissue in the human body can be damaged by ionizing radiation in a unique manner. The body attempts to repair the damage, but sometimes the damage is of a nature that cannot be repaired or it is too severe or widespread to be repaired. Also, mistakes made in the natural repair process can lead to cancerous cells. The most common forms of ionizing radiation are alpha and beta particles, or gamma and x-rays.

*What kinds of health effects does exposure to radiation cause?*

In general, the **amount** and **duration** of radiation exposure affects the severity or type of health effect. The type of radiation and the route of exposure can also have an impact. Health effects can be caused from chronic (long-term, low-level) exposure or from acute (short-term, high-level) exposures.

Chronic Health Effects:

Cancer is considered by most people the primary health effect from radiation exposure. Simply put, cancer is the uncontrolled growth of cells. Ordinarily, natural processes control the rate at which cells grow and replace themselves. They also control the body's processes for repairing or replacing damaged tissue. Damage occurring at the cellular or molecular level can disrupt the control processes, permitting the uncontrolled growth of cancer cells. This is why ionizing radiation's ability to break chemical bonds in atoms and molecules makes it such a potent carcinogen.

Other chronic effects also occur. Radiation can cause changes in DNA, the "blueprints" that ensure cell repair and replacement produces a perfect copy of the original cell. Changes in DNA are called mutations. Sometimes the body fails to repair these mutations or even creates mutations during repair. The mutations can be teratogenic or genetic. Teratogenic mutations are caused by exposure of a fetus in the uterus and affect only the individual who was exposed. Genetic mutations are passed onto offspring.

### Acute Health Effects:

Acute effects appear in cases of exposure to high levels of radiation and become more severe as exposure increases. Many non-cancerous health effects of radiation are acute. Unlike cancer, health effects from acute exposure to radiation usually appear quickly. Acute health effects include burns and radiation sickness. Radiation sickness is also called radiation poisoning. It can cause premature aging or even death. If the dose is fatal, death usually occurs within two months. The symptoms of radiation sickness include nausea, weakness, hair loss, skin burns or diminished organ function.

#### *Is any amount of radiation safe?*

There is no firm basis for setting a "safe" level of exposure above background for chronic effects. However, there do appear to be threshold exposures for the various acute effects. (Please note that the acute effects in the following table are cumulative. For example, a dose that produces damage to bone marrow will have produced changes in blood chemistry and be accompanied by nausea.)

| Exposure (rem) | Health Effect | Time to Onset (without treatment) |
|---|---|---|
| **5-10** | changes in blood chemistry | |
| **50** | nausea | hours |
| **55** | fatigue | |
| **70** | vomiting | |
| **75** | hair loss | 2-3 weeks |
| **90** | diarrhea | |
| **100** | hemorrhage | |
| **400** | possible death | within 2 months |
| **1,000** | destruction of intestinal lining, internal bleeding, and death | 1-2 weeks |
| **2,000** | damage to central nervous system, loss of consciousness, and death | Minutes, hours, to days |

#### *Aren't children more sensitive to radiation than adults?*

Yes, because children are growing more rapidly, there are more cells dividing and a greater opportunity for radiation to disrupt the process. EPA's radiation protection standards take into account the differences in sensitivity due to age and gender.

**Fetuses are also highly sensitive to radiation. The resulting effects depend on which systems are developing at the time of exposure. For this reason, pregnant women should be especially careful if working with radiation sources.**

#### *How much radiation are people generally exposed to annually?*

The amount of radiation exposure is usually small. It is estimated that the average person in the U.S. receives about **one-third of a rem per year**. This can vary depending on influences such as medical treatment/therapy.

*What is the cancer risk from radiation? How does it compare to the risk of cancer from other sources?*

Each radionuclide represents a somewhat different health risk. However, health physicists currently estimate that overall, if each person in a group of 10,000 people exposed to 1 rem of ionizing radiation, in small doses over a lifetime, we would expect 5 or 6 more people to die of cancer than would otherwise. In this group of 10,000 people, we can expect about 2,000 to die of cancer from all **non-radiation** causes. The accumulated exposure to 1 rem of radiation would increase that number to about 2,005 or 2,006.

*What are the risks of other long-term health effects?*

Other than cancer, the most prominent long-term health effects are teratogenic and genetic mutations.

Teratogenic mutations result from the exposure of fetuses (unborn children) to radiation. They can include smaller head or brain size, poorly formed eyes, abnormally slow growth, and intellectual disability. Studies indicate that fetuses are most sensitive between about eight to fifteen weeks after conception. They remain somewhat less sensitive between six and twenty-five weeks.

Genetic effects are those that can be passed from parent to child. Health physicists estimate that about fifty severe hereditary effects will occur in a group of one million live-born children whose parents were both exposed to one rem. About 120 severe hereditary effects would occur in all descendants.

In comparison, all other causes of genetic effects result in as many as 100,000 severe hereditary effects in one million live-born children. These genetic effects include those that occur spontaneously ("just happen") as well as those that have non-radioactive causes.

*What limits do the EPA set on exposure to radiation?*

Health physicists generally agree on limiting a person's exposure beyond background radiation to about 100 rem per year from all sources. Exceptions are occupational, medical or accidental exposures. (Medical X-rays generally deliver less than 10 rem).

Information obtained from http://www.epa.gov/radiation/.

*What are radiation sources/radiation producing equipment at Messiah University?*

| Equipment | Location | Department of Ownership |
|---|---|---|
| Scanning Electron Microscope (non-medical) | Kline 231 | Department of Biological Sciences |
| X-ray Diffractometer (non-medical) | Kline 317 | Department of Chemistry & Biochemistry |

In addition, the Department of Computing, Mathematics & Physics has radioactive isotopes in their inventory. These are not regulated by state or federal agencies due to the low level of radiation they emit. The Technician in the Physics Lab is responsible for maintaining an up-to-date inventory list of these radiation sources and providing it to the RSO. No additions/deletions of these sources should occur without prior approval of the RSO.

*What is my exposure at Messiah University?*

This equipment is inspected every 6 months. Radiation levels are measured immediately outside the units during normal operation. Where interlock or failsafe systems exist, they are also tested to ensure proper functionality (ex., interlocked door is open while equipment is in operation to ensure that the unit shuts off immediately and no radiation leakage occurs). In all instances, measured levels cannot exceed the background levels.

*What should I do to protect myself if I work with this equipment?*

- Know and follow all operating procedures.
- Never try to open/breech interlocks or failsafe systems during operation.
- If any damage to equipment is noticed, stop using the equipment immediately and report it to the Radiation Safety Officer (RSO) (ex., cracked aperture/window; bent door). Be sure equipment is locked out so others can't use it until it is verified safe for use.
- Do not consume food or beverages in work area.

*Who is the Radiation Safety Officer? Who should I go to if I have questions or concerns?*

The Manager of the Natural Sciences Laboratory Program is the University's RSO (Lauri Norbeck).

# Section 25 – PERSONAL PROTECTIVE EQUIPMENT (PPE)

***Policy***

It is the policy of Messiah University to be in compliance with OSHA's Personal Protective Equipment (PPE) Standards (OSHA 1910.132, 1910.133, 1910.135, 1910.136, and 1910.138). **The University's Respirator Program and compliance with 1910.134 is discussed in Section 8 of this manual. The University's Electrical Safety Program and compliance with OSHA 1910.137 and NFPA 70E is discussed in Section 21 of this manual.**

Personal protective equipment and area-owned protective equipment is available for employee use. This procedure outlines the University's PPE program. Departments will document specific uses of PPE for procedures in their areas

## General Rules for PPE

Failure to comply with the required use of PPE may lead to disciplinary contacts including termination of employment.

***NOTE:*** *Areas may have more stringent guidelines but cannot have less stringent*.

### Requirements for Use

- When PPE is required, employees **must** use it. When PPE is not required, employees may choose to use it.
- When PPE is required, PPE will be provided by the University. Employees are not to bring or use PPE from other sources.
- Defective or damaged PPE shall not be used.
- For information on operations requiring PPE use, refer to the section in this program and to area procedures for the specific PPE.
- **Employees within five (5) feet of an operation where safety glasses or hearing protection are required must also wear the appropriate PPE.** For example, if a grinder is being used (safety glasses are required for the operator due to the potential of flying particles), then safety glasses must be worn by anyone within five (5) feet of the grinder as the hazard of flying particles exists. If hearing protection is required when using a power tool, then anyone within five (5) feet of that tool when it is in use must wear hearing protection. For other types of PPE, common sense should be used to determine if others in the nearby proximity of the operation also need to use PPE.
- **PPE should not be modified in any way by the user.** For example, ventilation holes should not be made in PPE such as hard hats, goggles, earmuffs, etc.
- **If working with hazardous liquids where the potential for splashing exists, chemical resistant gloves and chemical splash goggles should be worn as minimum PPE protection unless the procedure states otherwise.**

## Personal Use and Shared PPE

- Whenever possible, chemical resistant gloves, chemical splash goggles and safety glasses should NOT be shared. **Personal equipment should be issued and should be marked with the employee's name, initials or other means of identification of ownership.**
- **When PPE is shared, whenever possible, a method to clean/disinfect equipment between uses must be available.** Shared equipment should be stored in a manner that does not add to the potential for contamination.

## Storage of PPE

- Personal issued protective equipment should be stored outside of the area of use, if possible, to prevent additional contamination (example, store in lockers, offices, plastic bags, etc.).
- All PPE should be stored in a manner to protect against physical damage. This includes protection from chemicals, dust, UV light, humidity, and extreme temperatures.

# Eye and Face Protection

**When to wear it:**

Appropriate eye or face protection must be worn if there is the potential for hazards from flying particles, molten metal, liquid chemicals, chemical gases or vapors, significant airborne dust, or potentially injurious light radiation.

**Proper fit should be maintained:**

- Safety glasses should not slide down face to expose eyes.
- Goggles should make a protective seal with the face when fitted properly.
- Welding helmets and face shields should be properly fitted to ensure they do not fall off during work operations.
- Contact lenses may be worn under primary safety eye protection.

## Safety Glasses

- Safety glasses should comply with ANSI Z87.1-2010 or ANSI Z87.2.
- Safety glasses must include appropriate side protection.
- Safety glasses should display the ANSI Z87.1, Z87.2 or Z87+ mark to indicate they meet regulatory requirements for protection. This mark is usually found on the temple piece.
- Safety glasses must be worn in all shop areas if equipment is in operation.
- Safety glasses must be worn when using any portable power tools or hand tools.
- If safety glasses are personal issue and not area owned, employees are expected to keep them readily available so they can be donned when needed.

### *Prescription Safety Glass Program*

The University has a program that supplements the cost of prescription safety glasses. Messiah University will pay a "base price" for prescription safety glasses that includes a selection of frames

and corrective lenses. The cost of the eye exam and any upgrades to the safety glasses' style will be at the employee's expense. The University will pay for initial prescription safety glasses and for replacement glasses when the employee's prescription changes. Employees will pay for replacement glasses due to loss or damage as a result of irresponsible care of PPE; however, damage incurred during work which was the result of the protection provided will be covered by the University (ex., cracked or pitted lenses due to flying objects or particles striking the glasses). The following employees will be covered under this program:

- Full-time employees required to wear safety glasses for at least 50% of their work hours and who wear prescription lenses will be covered under the University's program for prescription safety glasses. Such purchases must be in line with the University's safety glass purchasing program. **Leadership (area director/school dean) will identify employees who meet this 50% requirement and must forward a list of eligible employees to the program administrator (Office of Human Resources & Compliance). After receiving the list, the program administrator will inform the employees that they are eligible for this prescription safety glass program.**
- If an employee needs to wear safety glasses to perform his/her duties, but is not a full-time employee or is not required to wear them for at least 50% of his/her work hours, the University will supply non-prescription safety glasses.

For details on the prescription safety glass program, how it works and what the employee must do to participate, see *Attachment 33*. For answers to commonly asked questions regarding this program, see *Attachment 34*.

## Face Shields

- Face shields should only be worn over primary eye protection (safety glasses or goggles).
- Face shields should be used when the potential exists for splashes **to the face** from corrosive liquids and/or HOT liquids.
- Face shields used for protection against light radiation should have the proper filter for the hazard source.
- Face shields will normally be "shared" equipment, owned by the department and available for employee use as required.

## Chemical Splash Goggles

- When pouring or working with hazardous liquids (acids, caustics, eye irritants) where there is the potential for splashes, splatters, or significant aerosolization of the liquid, safety splash goggles must be worn as minimum PPE.
- Safety goggles cannot be worn in lieu of chemical splash goggles when working with chemicals. (Safety goggles have air vents on the side and/or top which could allow the entry of the chemical substance into the protected area.)
- It is at the discretion of area management if chemical splash goggles will be supplied as personal equipment or "shared" area owned equipment.

## Head Protection

Head protection shall be used when working in areas where there is a potential for injury to the head from heavy falling objects.

- Hard hats shall always be used in construction areas.
- Hard hats should bear a label inside the shell that lists the manufacturer, the ANSI designation and the class of the hat.
- "Bump hats" are not to be used as protection against falling objects or in lieu of hard hats.
- It is at the discretion of area management if head protection will be supplied as personal equipment or "shared" area owned equipment.

## Foot Protection

Sturdy footwear must be worn when working in areas where chemicals, power tools, maintenance and shop equipment, material handling equipment (both powered and non-powered equipment including carts), lawn care equipment, and similar items are expected to be used or when heavy items are moved. The use of steel toe and/or composite toe shoes is encouraged.

Sturdy footwear is defined as a complete shoe of solid construction so as not to compress or collapse easily. The shoes should have a solid sole that surrounds and protects the toes and heel as well as a slip-resistant sole. Open-toed and open-heeled shoes shall not be permitted (sandals, flip flops, etc.).

In areas where such activities are not normally performed, if the need occurs, the employee conducting the task must comply with the proper foot protection; other occupants who may be wearing non-compliant footwear (ex., open-toed shoes) should remain a safe distance from the work being done. For example, if furniture is being moved into an office area, the occupants may be wearing open-toed shoes. In such a situation, they are expected to stay a safe distance away from the affected area while the work is being conducted. The employees actually conducting the work shall be in sturdy shoes.

***Dining Services***

Employees working in Dining Services may be required to wear slip-resistant shoes. Athletic shoes/sneakers normally meet this requirement. For specific positions which require this footwear and for information detailing what is acceptable footwear, refer to Dining Services' "Policies and Procedures."

***Facilities Maintenance, Grounds, Certain Positions in Campus and Building Services, Engineering Technicians***

Full-time employees working in Facility Maintenance, Grounds, certain positions in Campus and Building Services, and the Engineering Technicians **must** wear protective footwear (safety shoes) when performing work where the potential for crushing or compressing the foot/toes exists (ex., potential to drop or roll heavy object on foot). **The protective footwear must have steel-toes, alloy-toes or composite toes and, as required by OSHA 1910.136, must comply with the appropriate ANSI standards.**

In addition, for electricians the protective footwear must also be rated for electrical hazard protection. This is also recommended for anyone whose work includes a significant amount of exposure to electrical hazards.

Messiah University will supplement a portion of the cost of this protective footwear for full-time employees in these positions provided that **purchases are made through the online Lehigh CustomFit program**. Each fiscal year the University will credit an amount to their account in CustomFit; employees will be responsible for paying any cost over this allotment. The CustomFit program will be administered by the Office of Human Resources & Compliance; however, **it is the responsibility of the department managers to inform the Office of Human Resources & Compliance of changes in staffing which would result in additions or deletions to the list of employees eligible for this program**. The University will not supplement the cost of protective footwear for part-time and seasonal employees in these positions; however, the use of steel toe, alloy toe or composite toe shoes is encouraged and sturdy shoes must be worn as a minimum.

Instructions on ordering from the Custom Fit program are found in *Attachment 35*.

## Hand Protection

Hand protection shall be worn when hands are exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, and electrical dangers.

It is at the discretion of area management if gloves will be supplied as personal equipment or "shared" area owned equipment.

### Chemical Resistant Gloves

Chemical resistant gloves must be worn when handling hazardous chemicals.

Follow procedures to ensure that the right glove is being used for protection. For example, special thermal gloves should be used when working with cryogenics. Neoprene gloves may be better with certain chemicals than n-butyl gloves and vice versa. Manufacturers offer tables for chemical compatibility with various glove materials. The following are examples of some factors that may influence the selection of protective gloves for a workplace:

- Type of chemicals handled
- Nature of contact (total immersion, splash, etc.)
- Duration of contact
- Area requiring protection (hand, forearm, arm)
- Grip requirements (dry, wet, oily)
- Thermal protection
- Size and comfort
- Abrasion/resistance requirements

When disposing of gloves keep in mind the hazards that may be present (ex., oils, greases, liquid chemicals, bloodborne pathogens, etc.) and dispose of properly.

## Disposable Gloves

- Disposable gloves should only be worn when working with chemicals if:
    - Dexterity is a key consideration; and
    - Actual chemical exposure is not anticipated, except for accidental occurrence; and
    - Large quantities of chemicals are not being handled; and
    - There is little chance of mechanical damage occurring.
- Disposable gloves should NEVER be used with certain chemicals, regardless of quantity (ex., mercury and cryogenics). Specific area procedures will address these concerns.
- Disposable gloves should never be reused.
- Latex disposable gloves shall not be used (due to the potential for developing latex allergy) except if other disposable gloves do not provide protection against the chemical(s) being handled.

## Reusable Gloves

- Gloves that are intended for reuse should be cleaned at the end of each work shift (as a minimum) and should be checked at the beginning of each work shift (as a minimum) for tears and leaks. To check chemical resistant gloves, gather them together at the opening and slowly roll them towards the fingertips. This will create a "balloon" effect; if the air leaks out quickly or the glove deflates, there is good probability that the glove has a hole which would allow chemicals to enter. Gloves that fail this test should not be used.
- To prevent chemical exposure, when removing gloves that have been used, rinse or wash before removal. Using one gloved hand, remove the glove from the other hand. Then using the ungloved hand, slide it inside the cuff of the glove that is still worn and push the glove off.
- When using gloves for protection against hazardous liquid chemicals, if possible, turn the edge of the cuff about one inch. If liquid is on the gloves and you hold your hands up, this "turned cuff" will catch the liquid and prevent it from dripping down your arms.

## Material Handling Gloves/Cut Resistant Gloves

- Dining Services will provide cut-resistant gloves for use when working with sharp implements (i.e., knives, blades, etc.) in the area. Refer to Dining Services' policy for requirements on their use.
- **Hand protection shall not be worn if the protection actually increases the potential for injury.** For example, when working with machinery that has spinning or rotating parts such as a lathe, gloves should not be worn. In such situations, gloves are "loose clothing" that can be caught and pulled into machinery.
- Electrical gloves shall be worn and inspected in compliance with the Electrical Safety Program (see Section 21 of the *Safety Manual*).

## Hearing Protection

Below are some general guidelines regarding hearing protection. Refer to Section 4 of this manual for more information regarding hearing protection and the University's Hearing Conservation Program.

- Hearing protection must be worn when operating any portable power tools unless an exception has been documented.
- The use of disposable ear plugs instead of earmuffs is encouraged. Ear plugs afford better protection when used in conjunction with safety glasses as the temple of the glasses can interfere with the seal of the muff. Disposable plugs typically have a higher Noise Reduction Rating (NRR).
- The use of disposable ear plugs aid in better hygiene; when used, muffs and reusable plugs should be routinely cleaned and disinfected. Reusable ear plugs should be washed with soap and warm water after use. Earmuffs should be wiped clean with a damp cloth.
- The University will purchase hearing protection for use where required. If there is a medical reason why an employee cannot insert plugs into his/her ears, muffs will be supplied.
- Reusable or disposable ear plugs are personal hearing protection. It is at the discretion of area management if earmuffs will be supplied as personal equipment or "shared" area owned equipment.

## Flame Resistant (FR) Clothing

- The use of Flame Resistant (FR) clothing is outlined in the Electrical Safety Program, Section 21 of the *Safety Manual*.
- The University will provide a pair of FR coveralls for each employee who has a need for FR clothing under the Electrical Safety Program.
- The coveralls will be replaced based on wear, not on time of use.

## Respirators

The use of respirators by employees is very limited. Refer to Section 8 of this manual for details on the Messiah University Respirator Program.

## Personal Fall Protection

### Definitions for Fall Protection

*Anchorage* – a secure point of attachment for equipment such as lifelines, lanyards, or deceleration devices.

*Body belt* – a strap with means both for securing about the waist and for attaching to other components such as a lanyard used with positioning systems, travel restraint systems, or ladder safety systems.

*Body harness* – straps that secure about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders, with a means of attaching the harness to other components of a personal fall protection system.

*Competent person* – a person who is capable of identifying existing and predictable hazards in any personal fall protection system or any component of it, as well as in their application and uses with related equipment, and who has authorization to take prompt, corrective action to eliminate the identified hazards.

*Personal fall arrest system* – a system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these.

*Personal fall protection system* – a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples include personal fall arrest systems, positioning systems, and travel restraint systems.

*Positioning systems* – means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or windowsill, and work with both hands free.

*Qualified* – a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

*Travel restraint* – a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface.

## General Rules for Fall Protection

1. Fall protection purchased shall meet the requirements of OSHA 1910.140(c).
2. Employees required to wear fall protection such as belts, lanyards, and lifelines must be trained in the inspection and use of those devices.
3. Body belts are prohibited as part of a personal fall arrest system.
4. Lifelines cannot be made of natural fiber rope. Polypropylene rope must contain an ultraviolet inhibitor.
5. Personal fall protection systems and their components must be used exclusively for fall protection and not for any other purpose such as hoisting equipment or materials.
6. A personal fall protection system and its components subjected to impact loading must be removed from service immediately and not used again until a competent person inspects the system and components and determines that it is not damaged and is safe for use again.
7. Personal fall protection systems must be inspected before initial use during each work shift for mildew, wear, damage and other deterioration, and defective components must be removed from service.
8. Rope, belts, lanyards and harnesses used for personal fall protection must be compatible with all connectors used.

9. Anchor points must be rated to withstand 5,000 pounds of force, per person. Persons utilizing belts, lanyards, lifelines, and harnesses used for personal fall protection must have their own dedicated anchor points. Anchor points are not to be shared between people.
10. Rope, belts, lanyards, lifelines, and harnesses used for personal fall protection must be protected from being cut, abraded, melted or otherwise damaged.
11. Prompt rescue must be provided in the event of a fall. This should be planned prior to work that might require such rescue.
12. Personal fall protection systems must be worn with the attachment point of the body harness located in the center of the employee's back near shoulder level.
13. Personal fall arrest systems should be rigged in such a manner that the employee cannot free fall more than 6 feet or contact a lower level. A free fall may be more than 6 feet only if it can be demonstrated that the manufacturer designed and tested the system to allow a free fall of more than 6 feet.

## PPE Training

Training in the use of PPE shall occur at the start of employment if the employee works in a position where the use of PPE is required. If an employee not previously trained in PPE moves to a new position which requires the use of PPE, training shall occur. In Operations, all employees shall complete the training at the start of employment, regardless of PPE use. The only exception in Operations will be student employees who will only be required to complete the PPE training if their work involves the use of PPE.

Re-training shall occur if:

- Changes in the workplace render previous training obsolete;
- Changes in the type of PPE to be used render previous training obsolete;
- An employee's non-compliant use of assigned PPE indicates that additional training is needed.

All training shall be properly documented and training documentation shall be retained for the length of employment.

## PPE Hazard Assessment

A written workplace evaluation shall be completed by the area to determine if hazards are present or are likely to be present, and what PPE is necessary to protect against such hazards. These assessments must be completed for each new process when it is added unless a similar process already exists. These assessments shall be forwarded to the Office of Human Resources & Compliance for review and record keeping. See *Attachment 36* for the form to be used in these assessments.

# Prescription Safety Glasses Program and Procedure

OSHA, in a clarification of the PPE Standard, identified safety glasses as a PPE item that does not need to be provided by the employer but that can be required of the employee to provide. This clarification was based on the fact that this item of PPE can be readily used/worn outside of the workplace and it is difficult for the employer to prevent this from happening. Although the University is not required to supply this PPE, we wanted to minimize the burden to the employee by subsidizing the cost.

The University will pay for initial prescription safety glasses and then for replacement glasses when the employee's prescription changes. The cost of the eye exam and any upgrades to the safety glasses' style will be at the employee's expense. Employees will pay for replacement glasses due to loss or damage as a result of irresponsible care of PPE; the University will pay for replacements if the damage is incurred during work as the result of the protection provided (ex., cracked or pitted lenses due to flying objects or particles striking the glasses).

## *Who Is Covered?*

Full-time employees who are required to wear safety glasses for at least 50% of their work hours and who wear prescription lenses will be covered under the University's program for prescription safety glasses. Such purchases must be in line with the University's safety glass purchasing program.

**Leadership (directors/school deans) will identify employees who meet this 50% requirement and you will be informed if you are eligible.** Leadership (directors/school deans) must also forward a list of full time employees who meet this criterion to the program administrator (Office of Human Resources & Compliance).

**NOTE:** If an employee needs to wear safety glasses to perform his/her duties, but is not a full-time employee or is not required to wear them for at least 50% of his/her work hours, the University will supply non-prescription safety glasses.

## *To Order Through the University Vendor*

The University utilizes the SafeVision occupational prescription eyewear program. The following instructions must be followed:

1. The employee must complete the OSHA required PPE training available through Qualtrics at http://messiah.qualtrics.com/SE/?SID=SV_29qieBoz4JpyXVr. NOTE: This training is only required for the initial request. Re-training is not normally required and is not necessary for future orders when prescriptions change.
2. You will need a current eye glass prescription. **The prescription cannot be more than one (1) year old. Messiah University will not pay for your eye exam. The prescription MUST include your PD (pupil distance) measurement. Eyewear cannot be ordered without this measurement.**
3. Contact the Office of Human Resources & Compliance to set up a time to view and select from the frames available. Bring your prescription with you to this appointment.
4. You will be contacted when your safety eyewear arrives.
5. **Employee Co-Payments:** If the employee decides to upgrade the prescription safety glasses with specialty lenses (ex., tinted), s/he will be required to pay for such items. This payment must be made at the time the order is placed with a credit card

# FAQs for Prescription Safety Glasses Program

**Q – Why do I have to purchase my prescription safety glasses through the University's vendor?**

A – You do not need to purchase your prescription safety glasses through the University's choice of vendor. If you choose to bear the full cost of your glasses, you may purchase them wherever you wish provided they meet the ANSI Z87.1 or ANSI Z87.2 standard. However, the University will pay the cost of the base price (lenses and specific brand frames) through SafeVision. If the employee chooses a lens or lens coating that increases the cost, then the extra cost is at the expense of the employee.

**Q – Why can't the University give me the money they would pay for the SafeVision glasses?**

A – SafeVision ensures that the prescription safety glasses meet OSHA (and ANSI) standards. Through this program, the University doesn't need any additional documentation/receipts/invoices. No special paperwork needs to be completed to ensure that the employee is not taxed for this money. SafeVision not only makes purchasing the glasses simple for the employee, it also makes the administration simple for the employer.

**Q - Why isn't the University paying for my eye exam?**

A –The employee would need to bear the cost of an eye exam if his/her job did not require safety glasses. Therefore, this is not a cost unique to the employee's job position.

**Q – Why are prescription safety glasses only funded by the University if my prescription changes?**

A – The University is paying for eye protection that meets safety standards and provides good vision. If your vision has not changed and the standard for safety glasses has not changed, there is no need for the University to bear the additional cost of a new pair. Additionally, if your safety glasses become broken due to your negligence, the University will not be responsible for replacement.

**Q – Is the money the University spends on my safety glasses taxable?**

A – No, it is not taxable. It will not show up on your paystub or W-2 form as income.

**Q – Why must you work at least 50% of your time in a function that requires the use of safety glasses in order to receive this benefit?**

A – OSHA does not require the employer to pay for safety glasses. Furthermore, the use of non-prescription (Plano) safety glasses/goggles is acceptable over prescription glasses to provide adequate eye protection. However, we recognize that this is not comfortable or functional for an extended period of time. Unfortunately, the University simply cannot support a safety glass subsidy for all employees so criteria had to be set. We will evaluate this again in the future.

**Q – Who decides if at least 50% of the employee's time is in a job function that requires the use of safety glasses?**

A – This decision is made by area leadership (area director/school dean with input from managers and supervisors). Leadership (directors/school deans) must also forward a list of full-time employees who meet this criterion to the program administrator (Office of Human Resources & Compliance). If you are eligible, you will be informed. If you believe you should be eligible, but have not received confirmation, you should discuss this with your leadership.

# CustomFit Program

# Workplace Evaluation/Hazard Assessment for Personal Protective Equipment

**Department:** _____

**Work Area(s)/Location(s):** _____

**Job(s)/Task(s):** _____

*NOTE: Multiple locations and/or multiple tasks may be included in one assessment if tasks are similar or if similar task(s) exist in more than one area.*

During the walk-through evaluation, observe:

(a) sources of motion that could result in striking, pinching, collision, etc.;
(b) sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;
(c) types of chemical exposures;
(d) sources of harmful dust;
(e) sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;
(f) sources of falling objects or potential for dropping heavy or sharp objects;
(g) sources of sharp objects which might pierce the feet or cut the hands;
(h) sources of rolling or pinching objects which could crush the feet;
(i) sources of loud or high noise;
(j) layout of workplace and location of co-workers;
(k) any electrical hazards; and
(l) any fall hazards, especially from heights ≥ 4 feet, where physical barriers are not present to prevent fall

*Check all of the following hazard potentials you noted during your observations:*

- ☐ Impact (striking, collision)
- ☐ Compression (crushing, roll-over)
- ☐ Heat
- ☐ Light (optical) radiation
- ☐ Tripping/slipping/falls
- ☐ Penetration
- ☐ Chemical exposure
- ☐ Harmful dust
- ☐ Noise

*Check all PPE that should be used to protect against these hazard potentials:*

- ☐ Safety Glasses
- ☐ Chemical resistant gloves
- ☐ Face shield
- ☐ Hearing protection *(should be verified by actual noise measurements; contact Office of Human Resources & Compliance)*
- ☐ Splash Goggles
- ☐ Material handling gloves
- ☐ Safety shoes
- ☐ Fall protection

Other PPE: _____

***NOTE:*** *Messiah University has limited the use of air purifying respirators on campus. If you feel an air purifying respirator is needed for this activity, contact the Office of Human Resources & Compliance. Employees may not use air supplied respirators. Dust masks are available but are for optional use only for employee comfort.*

**Other controls or notes:**

**CERTIFICATION:** I certify this hazard assessment was conducted and the signature below indicates acknowledgement.

| Name (Print) | Signature | Date |
|---|---|---|

# Section 26 – LONE WORKER POLICY

A lone worker is an employee who is working alone when others are not in the area to provide help in an emergency situation. For the purposes of this policy, an emergency does not need to be directly related to work being done or the potential for injury on the job. For example, a lone worker who is completing office/desk work would still need to follow this policy as a fall or heart attack could result in the need for help when no one is available in the immediate area.

## During an Employee's Regular Work Hours when the University Is Open

During regular work hours, all departments should have protocols in place to protect any employee working alone without regular/routine communication with others and/or regular foot traffic in the work area. The protocol should include a method and stated frequency for the employee to check in with others as well as a procedure to be followed to ensure the employee's safety and well-being should such contact not occur. This includes lone employees whose regular work hours are after normal business hours. For example, a lone Facilities Maintenance employee working on equipment in a mechanical room could be required to give radio-contact to a particular person on a regular basis.

## During Hours Outside of the Employee's Regular Workday

Lone employees working late or returning to campus outside of their regular work hours do so at their own risk. The University does not have a means to follow up with employees who choose to work alone on campus outside of regular work hours. Therefore, it's important for any employee staying late or returning to campus outside of regular work hours to have established his or her own follow up protocol. For example, an employee returning to campus alone should have a contact (such as a family member, friend, etc.) who will call the Department of Safety or the police if the employee does not respond to a "check-in" call.

The only exception to this is lone employees who are **scheduled** by their supervisors to work late or return to campus outside of their regular work hours. In such situations, the department is responsible for having a protocol in place to ensure the safety of the employee.

## When the University is Closed and During Breaks

When the University is closed for Christmas break and emergencies, only essential employees are permitted to be on campus. For other holidays and breaks when classes are suspended but the University is not closed, an employee not regularly scheduled to work returns to campus at his/her own risk and needs to have established his or her own follow up protocol as referenced above.

If an employee is required to be on campus during a break and will be working alone, his/her department needs to have a protocol in place to monitor and connect with the employee as referenced above.

**PLEASE NOTE:** On the main campus and at the Bowmansdale building, employees choosing to return to work outside of their regular work hours and outside of the University's regular work day (and not for a special event or program), are expected to contact Dispatch to inform Dispatch of their presence and provide contact information such as a cell phone number. They are expected to

also close out their work on campus during off hours by letting Dispatch know when they are leaving. This practice allows the University to manage broader safety issues **but is not intended to replace the personal protocol the employee is required to establish.**

# Section 27 – POWERED INDUSTRIAL TRUCK PROGRAM

OSHA 1910.178

This program covers the use of fork trucks/forklifts, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electrical motors or internal combustion engines.

NOTE: This program does not apply to compressed air or nonflammable compressed gas-operated industrial trucks nor to vehicles intended primarily for earth moving or over-the-road hauling. This program also does not include powered platforms, man-lifts, or vehicle-mounted work platforms which are regulated under a separate OSHA standard (ex., aerial lifts, bucket trucks).

Messiah University has the following powered industrial trucks:

| Unit | Department/Area of Ownership |
|---|---|
| Forklift DAE G25E | Facility Maintenance |
| Forklift TOY 66393 | Grounds |
| Crown MT20 | Messiah Press |

*NOTE: There are no powered industrial trucks located at the Winding Hill facility. Should such equipment be introduced at this facility, the Office of Human Resources & Compliance should be contacted immediately.*

## Training and Certification Program for Powered Industrial Trucks

Training for all powered industrial trucks must consist of the following:

1. Formal instruction (may be any format, including classroom lecture, video, or other audio/visual aids, etc.).
2. Practical training and demonstration by trainer.
3. Evaluation of operator's performance in the workplace (demonstration of competency).

The trainer should be an individual qualified by virtue of his/her extensive knowledge and/or training. Training may be provided by more than one individual provided each is qualified in the content of the training conducted.

Training must be related to the specific equipment the operator will be certified to use and should include, as appropriate:

- Truck/equipment related topics
- Difference between truck/equipment and automobile
    - Center of gravity
    - Weight
    - Hydraulics
    - Tires
    - Visibility
    - Turning Radius
- Controls
- Engine operation
- Steering, maneuvering, turning

- Visibility
- Fork and attachment adaptation
- Vehicle capacity (capacity chart, capacity plate on truck)
- Vehicle stability including explanation of stability triangle
- Vehicle inspection and maintenance
- Refueling (propane, gasoline, batteries)
- Operating limitations
- Machine specific requirements (owner's manual)
- Workplace related topics
    - Surface conditions
    - Types of load
    - Pedestrian traffic
    - Aisles
    - Ramps
    - Low ventilation areas
- Safety restraint device (seatbelt)
- Roll-over protective structures
- 3-point contact
- Manuals kept at machine
- Overhead power lines
- Parking

A list of approved drivers for each powered industrial truck shall be maintained by the trainer. The trainer shall provide to the area/department which "owns" the equipment a copy of this list (unless the trainer is in the same area/department, in which case a copy is unnecessary).

## Retraining

Retraining shall be conducted if any of the following occurs:

- Operator is observed operating equipment in an unsafe manner.
- Operator is involved in an accident or near miss.
- Operator received an inadequate evaluation pertaining to the operation of the equipment.
- Workplace conditions change.
- Operator is assigned to use a different classification of equipment than what s/he was previously trained on.

## 3-Year Refresher Evaluation

A refresher evaluation (observation of operator using equipment in the workplace) is required once every three years. It must include "hands on," as a minimum, but may include "retraining" if there are problems observed during the "hands on" evaluation or if supervision feels there would be benefit in including retraining.

## Training Documentation

Certification documentation must include:

- Name of operator
- Date of training
- Date of evaluation
- Identity of trainer/evaluators
- Make/model of all equipment on which operator demonstrated proficiency

Copies of documentation (including training, retraining, and 3-year evaluations) should be retained by the trainer.

## Pre-shift Inspections of Powered Industrial Equipment

Each piece of equipment should have a pre-shift inspection procedure/list which should be reviewed by the operator before using the equipment for the first time during the shift. If equipment is not used, it need not be inspected. Inspections should be per the manufacturer's recommendations, if available (see the Manufacturer's Manual). If the equipment does not pass the inspection, it should be locked out until repairs are made. See *Attachment 37* for example of checks to be performed, where applicable. This is just provided as an example; each unit may have its own checklist specifically designed for its unique needs.

## General Safety Rules for Powered Industrial Equipment

- Employees should only operate equipment they have been certified to use.
- Seatbelts, if available, must be worn at all times when operating the equipment.
- Pre-shift inspection must be completed before using equipment each working shift.
- If equipment does not pass the pre-shift inspection, it should be locked out until it can be repaired.
- When deficiencies are noted during a pre-shift inspection, repairs must be documented.
- Do not attempt to jump from equipment if it begins to tip over.
- All nameplates and markings must be in place and maintained in a legible condition. Serial number/manufacturer's plate must be on all forklifts; if missing, contact manufacturer for replacement.
- Modifications to equipment must be approved in writing by the manufacturer and be performed by a qualified individual. If modifications impact the capacity, operation or maintenance of equipment, instruction plates, tags or decals must be changed accordingly.
- A copy of the manufacturer's operating manual must be kept with equipment.
- If the manufacturer's manual states that a fire extinguisher is mounted on the equipment, it must be present and inspected in compliance with OSHA requirements for portable fire extinguishers.
- If battery charging is required for the equipment, it must be done in an area that has been designated (with signage) for that purpose. Appropriate PPE (goggles, face shield, gloves) must be available if the battery is not sealed and battery fluids are checked. Neutralizers and eye wash stations must also be present. Training should be given in safe maintenance of batteries.

## Stability of Powered Industrial Trucks

Information on the stability of powered industrial trucks must be included in training. The definitions below taken from the OSHA standard help to explain the principle of stability. However, for detailed explanations on the stability triangle, longitudinal stability, lateral stability and dynamic stability, refer to Appendix A in OSHA Standard 1910.178.

**Center of gravity** is the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

**Counterweight** is the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

**Fulcrum** is the truck's axis of rotation when it tips over.

**Grade** is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).

**Lateral stability** is a truck's resistance to overturning sideways.

**Line of action** is an imaginary vertical line through an object's center of gravity.

**Load center** is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

**Longitudinal stability** is the truck's resistance to overturning forward or rearward.

**Moment** is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

**Track** is the distance between the wheels on the same axle of the truck.

**Wheelbase** is the distance between the centerline of the vehicle's front and rear wheels.

## Basic Principles of Stability

To determine the stability of a powered industrial truck, a few basic principles must be understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped). The "stability triangle" is used in most stability discussions.

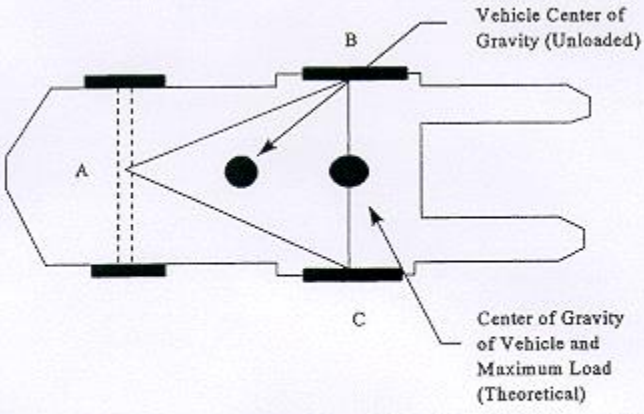
Whether an object is stable depends on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This principle can be seen in the way a seesaw or teeter-totter works: that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and it will not move. However, if there is a greater moment at one end of the device, the device will try to move downward at the end with the greater moment.


The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, *if the distance from the front wheels (the approximate point at which the vehicle would tip forward) to the load's center of gravity multiplied by the load's weight is less than the distance from the front wheels to the vehicle's center of gravity multiplied by the vehicle's weight, the system is balanced and will not tip forward.* However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

## Stability Triangle

Almost all counterbalanced powered industrial trucks have a three-point suspension system, that is, the vehicle is supported at three points. This is true even if the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. Figure 1 depicts the stability triangle.

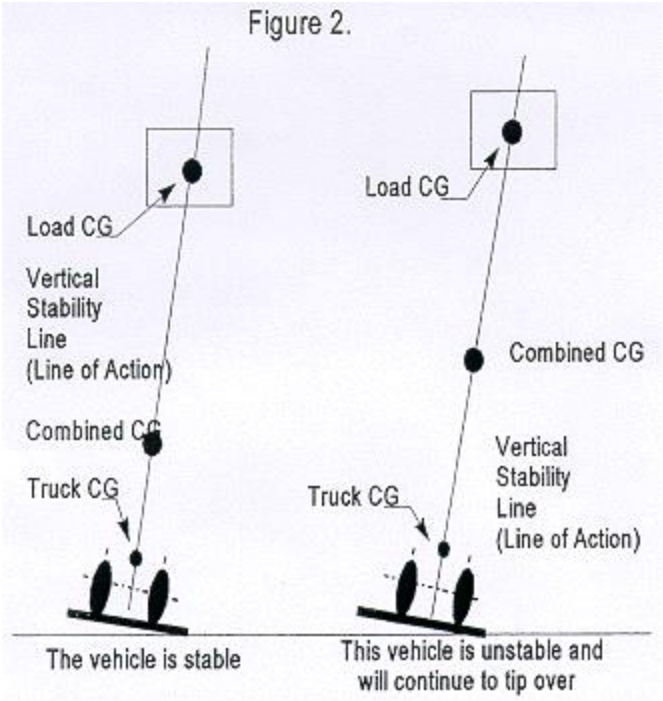
**Figure 1.**




Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over. (See figure 2.)




## Longitudinal Stability

The axis of rotation when a truck tips forward is the front wheels' points of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. When a truck is stable, the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load moment slightly exceeds the vehicle-moment, the truck will begin to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in loss of steering control. If the load-moment greatly exceeds the vehicle moment, the truck will tip forward.

## Lateral Stability

The vehicle's lateral stability is determined by the line of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over. Refer to Figure 2.

**Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.**

## Dynamic Stability

Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer

and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc., are important stability considerations. When determining whether a load can be safely handled, **the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics**. *For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted forward cautiously.* However, no precise rules can be formulated to cover all of these eventualities.

## Work Platform Requirements

If a work platform is attached to the industrial powered truck, it must be approved for use with the truck by the manufacturer of the truck. In addition, the following applies:

- The width of the platform can extend no further than 10 inches past the wheelbase on either side of the equipment.
- The platform must be physically attached to the forks.
- The equipment must be attended to at all times within 25 feet and direct line of sight.
- Fall protection must be available; this should consist of a rail or if a rail is not present, then a fall arrest system.
- The equipment should not be driven with the platform occupied.

# Safety and Operational Checks (Prior to Each Shift)

Have a **qualified** mechanic correct all problems.

| **Engine Off Checks** | **OK** | **NA** | **Maintenance** |
|---|---|---|---|
| Leaks – Fuel, Battery, Hydraulic Oil, Engine Oil or Radiator Coolant | | | |
| Tires – Condition and Pressure | | | |
| Forks, Top Clip Retaining Pin and Heel – Check Condition | | | |
| Load Backrest – Securely Attached | | | |
| Hydraulic Hoses, Mast Chains, Cables and Stops – Check Visually | | | |
| Overhead Guard – Attached | | | |
| Finger Guards – Attached | | | |
| Propane Tank (LP Gas Truck) – Rust Corrosion, Damage | | | |
| Safety Warnings – Attached (Refer to Parts Manual for Location) | | | |
| Battery – Check Water/Electrolyte Level and Charge | | | |
| All Engine Belts – Check Visually | | | |
| Hydraulic Fluid Level – Check Level; Dipstick | | | |
| Engine Oil Level – Dipstick | | | |
| Transmission Fluid Level – Dipstick | | | |
| Engine Air Cleaner – Squeeze Rubber Dirt Trap or Check the Restriction Alarm (if equipped) | | | |
| Fuel Sedimentor (Diesel) | | | |
| Radiator Coolant – Check Level | | | |
| Operator's Manual – In Container | | | |
| Nameplate – Attached and Information Matches Model, Serial Number and Attachments | | | |
| Seat Belt – Functioning Smoothly | | | |
| Hood Latch – Adjusted and Securely Fastened | | | |
| Brake Fluid – Check Level | | | |
| Operator Protection<br>Sitdown Truck - Seat Belt – Functioning Smoothly<br>Man-up Truck – Fall protection/Restraining means - Functioning | | | |
| **Motor/Engine On Checks – Unusual Noises Must Be Investigated Immediately** | | | |
| Accelerator or Direction Control Pedal – Functioning Smoothly | | | |
| Service Brake – Functioning Smoothly | | | |
| Parking Brake – Functioning Smoothly | | | |
| Steering Operation – Functioning Smoothly | | | |
| Drive Control – Forward/Reverse – Functioning Smoothly | | | |
| Tilt Control – Forward and Back – Functioning Smoothly | | | |
| Hoist and Lowering Control – Functioning Smoothly | | | |
| Attachment Control – Operation | | | |
| Horn and Lights – Functioning | | | |
| Alarms - Functioning | | | |
| Hour Meter - Functioning | | | |
| Battery Discharge Indicator – Functioning | | | |
| Cab (if equipped) – Heater, Defroster, Wipers – Functioning | | | |
| Instrument Monitors/Gauges: Ammeter, Engine Oil Pressure, Hour Meter, Fuel Level, Temperature, Instrument Monitors – Functioning | | | |

# Section 28 – SILICA EXPOSURE CONTROL PROGRAM

Due to the potential hazards of respirable crystalline silica, exposure to crystalline silica is regulated under OSHA's Silica Standard, 1910.1053. For an additional resource, see OSHA's publication 3911-07 2017, Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for General Industry and Maritime.

## Definitions

*Action Level* – 25 micrograms per cubic meter of air as a time-weighted average (TWA). Exposures at or above the OSHA action level trigger requirements for exposure assessment and medical surveillance.

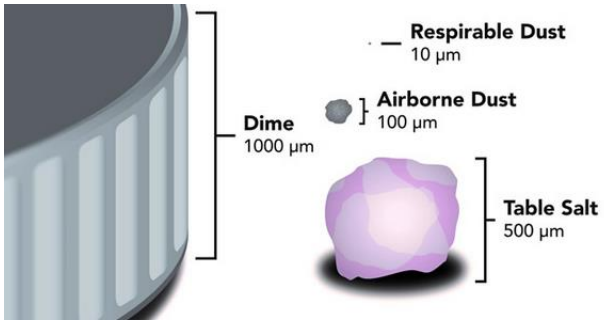
*Crystalline Silica* – Crystalline silica is a common mineral found in naturally occurring and man-made materials such as stone, artificial stone, and sand. There are three types of crystalline silica covered by OSHA's Standard: quartz, cristobalite, and trydimite. Amorphous silica, like silica gel, is not crystalline silica.

*High-Efficiency Particulate Air (HEPA) Filter* – A filter that is at least 99.97% efficient in removing mono-dispersed particles of 0.3 micrometers in diameter. Use of a HEPA filter vacuum is a housekeeping method that minimizes employee exposure to respirable crystalline silica.

*Permissible Exposure Limit (PEL)* – 50 micrograms per cubic meter of air as a time-weighted average (TWA). Anyone entering an area or performing a task where exposure to respirable crystalline silica is at or above OSHA's PEL must wear a respirator.

*Regulated Areas* – Workplace areas where exposures to respirable crystalline silica are, or can reasonably be expected to be, above the PEL. Such areas must be demarcated with limited access. Respirators must be supplied and required to all who enter. Signage must be posted at entrances in compliance with OSHA required verbiage. There are no regulated areas at Messiah University.

*Respirable Crystalline Silica* – "Respirable" refers to very small particles (typically at least 100 times smaller than ordinary sand) generated during the manufacturing of products such as glass, pottery, ceramics, brick, concrete, and artificial stone. Abrasive blasting with sand or glass beads, and cutting or grinding items that contain crystalline silica such as concrete, bricks or pottery can also generate respirable silica. These particles can be breathed into the lungs as they are too small for the body's natural filtration system (ex., nasal hair, mucous, etc.) to remove them. (See illustration below.)



*Sorptive Silica* – Sorptive clays are excluded from OSHA's Silica Standard as they are not crystalline silica. An example of an item containing sorptive clay and not crystalline clay is kitty litter.

## Potential Hazards Associated with Respirable Crystalline Silica Exposure:

- Lung cancer
- Silicosis – a disabling, non-reversible and sometimes fatal lung disease that usually occurs after many years of exposure to fine respirable crystalline silica
- Lung effects – other non-malignant respiratory diseases such as chronic bronchitis
- Kidney effects – kidney disease including nephritis and end-stage renal disease
- Autoimmune disorders and cardiovascular disease – concern that silica exposure may be associated with these
- Smoking – preliminary conclusions indicate that the risk of silica-related disease is strongly influenced by smoking

## Written Exposure Control Plan for Silica

OSHA requires a written Exposure Control Plan for all employers covered by the standard. An employer is covered if there are operations or areas that have respirable crystalline silica at or above the Action Level. If no employee exposures exceed this level under any foreseeable conditions, then employers are excluded from the standard. It is important to note that OSHA considers **failure of engineering controls such as ventilation systems to be a "foreseeable condition."** For example, if exposure is below the Action Level due, in part, to the use of a ventilation system, the process cannot be excluded from the standard.

At Messiah University, the greatest potential for exposure to respirable silica exists in the ceramic studio and its support areas (weighing room, mixing area, etc.). Results of air monitoring conducted in this area were below the Action Level; however, the low exposure was, in part, due to the ventilation system utilized during the clay mixing and ceramic making processes. For this reason, the University must comply with the requirements of the OSHA Standard when employee exposure is at the Action Level. This section of the Safety Manual serves as the University's written Exposure Control Plan and will be reviewed annually in compliance with the requirements of the Standard.

## Additional OSHA Requirements

The following table outlines the OSHA requirements for silica in the workplace:

| Employee Exposure less than Action Level in all foreseeable conditions | Employee Exposure greater than or equal to Action Level but less than PEL (or if foreseeable condition exists) | Employee Exposure greater than or equal to PEL |
|---|---|---|
| **Not covered by Standard** | Exposure Assessment | All requirements in previous column plus… |
| | Medical Surveillance * | Respirator Required |
| | Written Exposure Control Plan and annual review | Compliance with OSHA's Respirator Standard |
| | Training for employees prior to start of job assignment | Regulated Areas (demarcation; danger signage; restricted access; respirator use by all entering; etc.) |

*See section on Medical Surveillance for explanation and dates for compliance

## Silica Exposure Assessment: In what areas on campus is crystalline silica present?

*Art and Design:*

- Ceramics created in the ceramic studio contain crystalline silica. This is present in the clay mix and glazes. Air monitoring has been conducted during the "worst case" scenario: the mixing process that includes measuring dry clays, adding them to the mixer, the final mixing process where water is gradually added, and the clean-up after this process. Ventilation systems are present and must be used. Sampling results indicated that, with the use of the ventilation systems, the airborne exposure was below the Action Level. Note: Pre-mixed clay will be used beginning in 2021 and moving forward, thereby eliminating the risk of exposure during the mixing process.

*Campus and Building Services:*

- Prior to 2021, employees cleaning the ceramic studio area may have been cleaning residues containing silica. Wet operations or HEPA vacuum were required, never dry sweeping.

*Engineering/Collaboratory:*

- Soil/sand/concrete (silica-containing materials) – such materials are used sporadically. For example, a student might mix concrete for 15 minutes per day, 2 or 3 days, and then this process would not be repeated for several months or longer. Also, the first few minutes during this process is the only time that there is the potential for exposure to dry dust; thereafter, the mixture is wet and the potential for dust is eliminated. Objective data based on the length of exposure time to any dry materials indicates that the Action Level for an 8-hour TWA will never be reached. Other future uses, if they occur, must be documented in a Project/Activity Approval form (see *Section 16* of this *Safety Manual*) and reviewed by the Office of Human Resources and Compliance for potential exposure before work begins.

*Facility Maintenance:*

- Cement mix – Less than 50 pounds/year is used by maintenance. The mixing lasts only a few minutes and is very small scale (cement mixer is not used). Once the cement is in wet form, no dust is generated. Objective data based on the length of exposure time to the dry mix and the very small quantity involved indicates that the Action Level for an 8-hour TWA will never be reached.
- Blocks/bricks/cement – Maintenance may have a need to drill into blocks/bricks/cement. This would happen on a very rare, very short-term basis (minutes, not hours) and is not part of any routine work performed by maintenance personnel. Any long term or large projects involving drilling/cutting/grinding of blocks/bricks/cement is done by contractors and not University employees. Objective data based on length of exposure time to any dry dust that might be generated indicates that the Action Level for an 8-hour TWA will never be reached.
- Additionally, as work by maintenance which might involve crystalline silica is not routine (may only be once a year or even less frequently; usually arises from unplanned maintenance repairs) and not for any significant length of time (always less than 4 hours),

*Table I – Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica* in the Silica Standard for Contractors (OSHA 1926.1153) is used to ensure safe employee exposure. None of the operations which may be conducted require a respirator based on this table. If a respirator is required for any work, it is contracted to outside vendors. See https://www.osha.gov/silica/SilicaConstructionRegText.pdf. Additional information is provided by OSHA in their fact sheets for contractors found at https://www.osha.gov/pls/publications/publication.searchresults?pSearch=Controlling+Silica+Dust+in+Construction+&pSearch. These are also referenced when maintenance must perform work involving silica containing materials.

**NOTE: In all areas across campus, before introducing any new process or substance in which crystalline silica is present, the Office of Human Resources & Compliance MUST be contacted to determine if air monitoring must be conducted and what safety precautions must be implemented.**

## Training on Silica

Anyone working with materials known to contain crystalline silica and in which the silica could become respirable must be informed of the potential hazards, the safety precautions, and proper housekeeping practices prior to beginning their work with the substance. This includes all employees in Art & Design who work in/with ceramics (not necessary after 2021); all facility maintenance personnel; all campus and building services workers who clean in the ceramic studio (not necessary after 2021); and all Engineering/Collaboratory personnel who work with projects where crystalline silica is present. This training is accomplished through a Qualtrics program.

## Medical Surveillance for Silica

- Employees exposed to the PEL for 30 or more days a year must be given Medical Surveillance beginning June 23, 2028. The University has no areas that meet or exceed the PEL.
- Employees exposed to the Action Level for 30 or more days a year must be given medical surveillance beginning June 23, 2020. While the University has no areas that exceed the Action Level, if the ceramic areas in Art & Design should begin using dry clay again, it was only below the Action Level due, in part, to ventilation systems. Therefore, any employee exposed for 30 days or more per year of dry clay in this area would fall under this requirement. If employee exposure is less than 30 days per year in areas that utilize a ventilation system for exposure control to crystalline silica, documentation must be available to support this and should include employee name and ID#, dates of exposure, and the location of exposure. As this documentation is part of the employee's workplace exposure, it must be retained for the work-life of the employee plus 30 years. This record should be provided to the Office of Human Resources & Compliance annually. *Attachment 38* may be used for recording this information but is not required, provided documentation containing the same information is used.
- When applicable, medical examinations must be given within 30 days of start of assignment and every 3 years thereafter.

- OSHA stipulates what medical tests are required, who must give them (PLCHP), and that all costs, including employee's time and travel, must be paid by the employer.

## Safe Work Practices If Silica May Be Present

In areas where crystalline silica may be present, the following safe work practices must be followed to prevent or minimize the generation of respirable dust:

- Do not eat, drink, smoke or apply cosmetics in areas where crystalline silica dust is present. Wash your hands and face outside of dusty areas before performing any of these activities.
- Where ventilation is provided, it must be used even if it is not necessary to maintain exposure below the Action Level. If visible dust emissions are noticed or increase, the process should be shut down and facility maintenance must be contacted immediately to verify the exhaust system is functioning properly.
- If a wet operation is feasible, it must be used. For example, if wet cutting/grinding is an option, it should be used instead of dry cutting/grinding.
- Compressed air (guns) must **not** be used where respirable crystalline silica is present.
- When handling dry materials containing crystalline silica, use extreme caution to prevent generation of dust. If possible, when pouring or transferring dry material from one container to another, minimize distance between containers and minimize the quantity poured to reduce dust emission. Whenever possible, transfer in a ventilated area (ex., outside, under exhaust drop, etc.).
- Dust masks are available for **voluntary** use in areas where generation of respirable crystalline silica may occur. Use of dust masks must be in compliance with the *Respirator Program, Section #8* of the *Safety Manual*. There are no campus exposures where dust masks are required.

If dust is present on clothing, if possible use a HEPA vacuum to remove it before leaving area.

## Housekeeping Requirements If Silica Is Present

The following housekeeping guidelines must be followed in areas where respirable crystalline silica may be present:

- For cleaning areas, a vacuum equipped with a HEPA filter, or wet wiping, or a combination of the two must be used.
- Dry sweeping is prohibited in areas where silica dust may be present (ex., Ceramic Studio, Clay Storage, etc.).
- Never use compressed air in cleaning.
- Proper cleaning should occur at the end of the task (and throughout the task if significant dust is generated). After completing the task, do not allow dust to remain in area where it can be disturbed and become airborne.

Do not allow residues from wet mixtures to remain where they can become dry and then pulverized to release respirable silica.

## Signage

In areas where crystalline silica is known to be present or where dust containing crystalline silica may be generated, **warning** labels should be displayed at door entrances or immediately inside areas. Examples of these areas include the ceramic studio, clay storage room, and clay mix area (prior to 2021). Contact the Office of Human Resources & Compliance for the proper signage. This is for compliance with the Hazard Communication program.

Delineation is not required in any areas as the PEL is not exceeded. Likewise, signage does not need the word *danger* included.

## Written Procedures and Syllabi for Processes Where Silica Is Present

Where written procedures exist for processes where silica is present, they should include the appropriate warnings and safety precautions. Additionally, syllabi for ceramic courses (prior to 2021) should also include the appropriate safety precautions (see Safe Work Practices and Housekeeping) and warning. An example of the warning:

***WARNING*** *- Crystalline silica is present in (list materials). Respirable crystalline silica dust may cause cancer and damage to lungs. Avoid generating dust. Wet wipe surfaces or clean with HEPA vacuum to prevent dust from becoming airborne. Never dry sweep or use compressed air.*

# Workplace Exposure in Areas Where Silica Dust May Be Present

**Employee's Name:** _____ _____
*Last Name (PRINT)* *First Name (PRINT)*

**Employee's ID #:** _____

**Employee's Job Title:** _____

| Days of Exposure | Date of Exposure | Location(s) of Exposure & Activities Generating Exposure |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
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| 24 | | |
| 25 | | |
| 26 | | |
| 27 | | |
| 28 | | |
| 29 | | |
| 30 | **PRIOR TO 2021, employees working with the dry ceramic clays in the ceramic areas of Art & Design for 30 or more days a year must be given medical surveillance. Contact the Office of Human Resources & Compliance immediately if this occurs.** | |

*Forward completed form to the Office of Human Resources & Compliance for record retention.*

# Section 29 – 3D PRINTERS

This 3D Printer Policy establishes the minimum requirements necessary for the safe use of 3D printers at Messiah University.

3D, or additive, printing creates a solid object from a digital design file. The process is achieved through a printer that lays down successive layers of the printing medium until a solid object is completely formed. Studies have indicated that 3D printers are capable of generating potentially harmful concentrations of ultrafine particles (UFP) and chemical vapors during the print process and during processes used following printing to treat the finished product. Elevated concentrations of volatile organic compounds (VOC) can also be produced during the printing process.

The two most commonly used types of 3D printer media are plastics: Polylactic Acid (PLA) and Acrylonitrile Butadiene Styrene (ABS). When heated during the print process, both media types produce large concentrations of ultrafine particles (UFP). Generally speaking, ABS represents a greater health and safety risk than PLA media.

## General Safety Requirements for 3D Printers

- Areas must notify the Office of Human Resources & Compliance before obtaining a 3D printer.
- All printers must be installed in compliance with the manufacturer's recommendations.
- The use of PLA is strongly encouraged over the use of ABS.
- All areas using any medium must obtain Safety Data Sheets (SDSs) in compliance with OSHA's Hazard Communication Standard and forward copies to the Office of Human Resources & Compliance for inclusion in the online SDS system. SDSs must also be obtained for any other chemical substances used in the printing or finishing process.
- All safety interlocks must be functional and enabled during the printing process.
- Operators should be protected from any hot surfaces.
- Signs should be posted in the area warning of potential hazards of 3D printing.
- Time spent in the room when the printer is in use should be minimized as much as possible. For this reason, rooms being occupied for offices should not be used for 3D printers.
- Printers shall not be used to create any type of weapon (ex., guns/ghost guns, knives, sharp blades, etc.)

## Ventilation Requirements for 3D Printers

- 3D printers using PLA media exclusively may be set-up in workspace with dedicated ventilation (supply and return air).
- The number of PLA printers in one location should be limited by the size of the space. One printer per standard office-sized room and no more than two printers for a standard classroom or workroom may operate at the same time.
- 3D printers using ABS media, including printers designed and set-up to use both PLA and ABS, may only be used in work areas having a dedicated exhaust system (supply and return air). However, air monitoring should be conducted when ABS is initially used to ensure that

air contaminant levels are safe. It is recommended that printers using ABS media be used within a fume hood whenever possible.

- If there are two printers using ABS media in the same area, they cannot operate at the same time unless they are located in a fume hood or have direct exhaust provided to the printer.
- 3D printers using other types of media, including but not limited to thermoplastics, photopolymers, nylon, high impact polystyrene, high density polyethylene, powdered metals, biological media or other uncommon medias shall be reviewed by the Office of Human Resources & Compliance on a case-by-case basis with specific precautions required based on the hazards unique to the printing process.

## Training for 3D Printer Users

- All users working directly with a 3D printer and associated media are required to have hazard communication training covering any hazardous materials used in the process.
- All operators should be aware of the potential for the formation of UFPs from the process.
- All operators should be aware of PPE required.
- All operators should be aware of the printer's safety features, including interlock systems and emergency stops.

## Personal Protective Equipment (PPE) with 3D Printers

- If UV light is used in the curing process, PPE (ex., safety glasses with UV filters, gloves/lab coats to protect skin) and/or appropriate shielding must be used.
- Safety glasses should be worn whenever the potential for flying objects occurs. For example, cutting rough edges from a printed item where the pieces could become airborne.
- If any chemicals are used in addition to plastic filaments, appropriate PPE for the hazards must be used. For example, if an alkaline solution is used in the finishing process, gloves and goggles must be used and an emergency eyewash must be nearby.

# Section 30 – SCAFFOLDING USE POLICY

The purpose of this policy is to ensure the safe use of scaffolds at Messiah University. It applies to all University employees that perform any duties on scaffolding of various types greater than six feet above grade.

## General Requirements

- All scaffolds shall be designed by a Qualified Person (defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project) or manufacturer, and be erected, loaded and used in accordance with that design or manufacturer's specifications.
- All Messiah personnel (staff and student workers) who utilize the scaffold shall have read and agreed to the policy before use. Only authorized personnel may access the scaffolding.
- Each employee who performs work while on a scaffold shall be trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand procedures to control or minimize those hazards.
- Inspect the scaffold for visible defects or damage prior to accessing. Report any defects to the supervisor to be addressed.
- Never attempt to alter or repair any scaffold without training and authorization.

Scaffold Platform Construction

- Scaffold planking must be able to support, without failure, its own weight and at least four times the intended load.
- Each scaffold plank shall be installed so that the space between adjacent planks and the space between the platform and uprights is no more than one inch wide.
- The front edge of all platforms shall not be more than 14 inches from the face of the work, unless there is a guardrail or personal fall arrest system in place that meets regulations, with the exception or outrigger scaffolds (3 inches) and lathing operations (18 inches).

## Supported Scaffolds

- Supported scaffolds with a height to base width ratio of more than four to one (4:1) shall be restrained from tipping by guying, tying, bracing, or equivalent means.
- Support scaffold poles, legs, posts, frames, and uprights shall always bear on base plates and mud sills or other adequate firm foundations.

Suspension Scaffolds

- Before a scaffold is used, the Competent Person (defined as 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) shall evaluate all direct connections. The Competent Person will confirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads that will be imposed.

## Gaining Access to Scaffolds

- Portable, hook-on, and attachable ladders shall be positioned so as not to tip the scaffold.
- All stair rail systems and handrails shall be surfaced to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothes.
- Users may safely carry equipment up the first flight of stairs. However, at least two people are required to safely move equipment from the first landing to the second landing. Users should not attempt to climb the landing ladder with equipment in their hands.
- When moving from each landing, users should use the siderails on the stairs and keep both hands on the ladder.
- Cross-braces and tubular welded frame scaffolds shall *not* be used as a means of access or egress.

## Fall Protection

- Fall protection (personal fall-arrest system or guardrail system) shall be provided for any employee on a scaffold more than 10 feet above a lower level.
- Max capacity on top of scaffolding is 4 persons. Recommended not to exceed 3 at a time for Athletics use purposes.
- Use of scaffolding is limited to standing only. No sitting or leaning against the guardrails is allowed.

## Falling Object Protection

- All employees shall wear hardhats when working on, assembling, or dismantling scaffolds.
- To protect people from falling hand tools, debris, equipment, and other small objects, install toeboards, screens, guardrail systems, debris nets, catch platforms, canopy structures, or barricades.

## Inclement Weather

- When icy conditions exist, there is no access allowed to any scaffold level.
- When sustained winds or wind gusts range between 20-25 mph, a Competent Person should evaluate the safety of scaffolding use. No access allowed when wind exceeds 25 mph.

# Aerial & Scissor Lifts

***1. Purpose***

The purpose of this policy is to provide the minimum requirements for the use of aerial and scissor lifts. This work instruction applies to all aerial lifts, including extensible and articulating boom platforms, forklifts or similar equipment used with manufacturer-approved personnel lifting accessories, and scissor lifts.

***2. Scope***

This procedure applies to employees who utilize aerial lifts, employees whose duties require them to operate, service, repair, or maintain aerial lifts and scissor lifts, and supervisors of employees who use aerial lifts and scissor lifts while working on behalf of Messiah University.

Additional sections of this safety manual contain related policies and should be consulted for specific requirements and guidance:

- Scaffolding
- Powered Industrial Truck/Forklift
- Fall Protection
- Personal Protective Equipment
- Working at Heights

### *3. Minimum Requirements*

1. Only trained persons are permitted to operate an aerial lift.
2. The lift operator shall visually inspect the aerial or scissor lift prior to each day's use.
3. Before the aerial lift is used, the worksite must be surveyed for hazards.
4. Employees working in an aerial lift are required to utilize appropriate fall protection.

### *4. Definitions*

**Aerial Lift -** An entire device that is designed and manufactured to raise personnel to an elevated work position on a platform supported by masts or booms. Aerial lifts include vehicle-mounted elevating work platforms, self-propelled elevating work platforms, and boom-supported elevating work platforms.

**Aerial Work Platform -** The personnel-carrying component of an aerial lift, such as a bucket, basket, stand, or equivalent. The term "Aerial Work Platform" is used interchangeably with "Aerial Platform" in this policy.

**Articulating Boom -** An aerial lift with two or more hinged boom sections.

**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 the authorization to take prompt corrective measures to eliminate or mitigate the hazards.

**Contractors -** *Contractors* refer to all third-party groups performing work at Messiah University.

**Extensible Boom Platform -** An aerial lift (except ladders) with a telescopic or extensible boom.

**Fall Protection -** Equipment and methods to both guard against the injurious consequences of a fall and to prevent a fall where possible. There are several types of fall protection including fall arrest systems, fall restraint systems, and guardrails.

a. **Fall Arrest** - Any combination of an anchorage, connectors, body harness, lanyard, deceleration device or lifeline used to arrest a fall from any working level.

b. **Fall Restraint** - A combination of equipment to prevent a user from reaching a point where a fall could occur from an elevated surface.

**Insulated Aerial Lift -** An aerial lift with dielectric components designed and tested to meet the specific electrical insulating rating consistent with the manufacturer's identification plate.

**Scissor Lift -** A self-propelled elevating work platform (mobile scaffold) utilizing a scissor type framework for positioning the platform horizontally.

**Signal Person (Spotter) -** A person capable of giving direction to both the lift operator and 3rd parties while the lift is traveling to prevent contact, damage, and injury.

## *5. Roles and Responsibilities*

### 5.1 Lift Operator Oversight/Manager Responsibilities

A. Verify that aerial and scissor lifts are inspected prior to use by any trained employee, in addition to a thorough, documented annual inspection.
B. Ensure that any aerial or scissor lift identified as unsafe is not used.
C. Tag equipment out of service if an item is found deficient and cannot be fixed prior to use.
D. Verify that appropriate fall protection is properly worn and used.
E. Shall not modify aerial or scissor lifts without manufacturer’s prior written approval.
F. Test the lift controls each day prior to use to determine that such controls are in safe working condition.
G. Require employees using an aerial lift to work in pairs, such that one is the operator and one is the signal person.

### 5.2 Aerial or Scissor Lift Operator Employee Responsibilities

A. Complete the aerial lift-specific or scissor lift-specific operator orientation and training prior to operating.
B. Work in pairs so that one employee is the operator and one employee is the signal person.
C. Perform a visual inspection of the aerial or scissor lift prior to each use.
D. Consider the work area where the aerial or scissor lift will be used and identify any additional hazards and mitigations.
E. Wear all required PPE and fall prevention equipment.
F. Operate aerial lifts in accordance with training received and manufacturer’s recommendations.
G. Report defective or malfunctioning equipment and any incident involving the use of aerial or scissor lifts to their supervisor as soon as practical.
H. Obey the signals of the Signal Person and stop the task if contact with the Signal Person is broken.

### 5.3 Aerial or Scissor Lift Signal Person Responsibilities

A. Complete the aerial lift-specific or scissor lift-specific operator orientation and training prior to operating.
B. Work in pairs so that one employee is the operator and one employee is the signal person.

C. Function as the sole signaler at any given time (but anyone can give the stop signal).
D. Maintain a direct line of sight of equipment movement and make sure contact with anything at ground level or overhead is avoided.
E. Adhere to a clear, agree-upon, standard set of signals for communicating with the operator, or if out of the operator's direct line of sight use agreed-upon verbal commands by radio.
F. Control the job site access to prevent other personnel from walking under the elevated work platform.
G. Verify that overhead obstructions have been identified and mitigated.

## *6. Procedures*

### 6.1 General Requirements

A. Only trained persons are permitted to operate an aerial lift.
B. Employees are required to work in pairs while operating an aerial lift.
C. Before the aerial lift is used, the worksite must be surveyed for hazards.
D. Before and during each use, the Employee Operator and the Employee Signal Person shall:
    1. Check for overhead obstructions and electrical conductors.
    2. Ensure that the load on the platform and/or load lifting devices are in accordance with the manufacturer's rate capacity.
    3. Ensure that outriggers and stabilizers are used if the manufacturer's instructions require their use.
    4. Ensure that guardrails are properly installed and the gates are closed.
    5. Use outrigger pads when necessary to provide firm footing.
E. If a vehicle mounted aerial lift has a separate power source to operate the movement of the base (e.g. truck) versus the movement of the aerial platform:
    1. The vehicle engine is shut off.
    2. The wheels are chocked if outriggers are not used.
    3. The ignition key is removed and kept with equipment operator before using the aerial platform.
F. The aerial platform will not be operated in any manner on grades, side slopes or ramps exceeding those for which the aerial platform is rated by the manufacturer.
G. For aerial lifts, the brakes must be set, and when outriggers are used, they must be positioned on pads or a solid surface. Wheel chocks must be installed before using an aerial lift on an incline, provided they can be safely installed.
H. When so equipped, outriggers or stabilizers and extendable axles must be fully extended and placed on firm level surfaces or mats as required by the manufacturer. Stabilizer mats and pads must be:
    1. At least three times larger in surface area than the footprint the mats support.
    2. Level where the outrigger or stabilizer contacts the mat to prevent the outrigger from sliding off.
    3. Strong enough to withstand the loads imposed by the outrigger(s).
I. Floor protection is required whenever a lift is to be used inside buildings on finished floors or where there is potential to damage structure.

J. Lift controls will be operated in a smooth, controlled manner at all times. Avoidance of sudden starts, stops, or changes in direction is required. Never jam the controls from one travel direction to another.
K. All body parts and equipment must remain inside the platform while moving the equipment.
L. When boom lifts must be moved on an incline, the boom shall be positioned uphill of the wheels and the wheels chocked if it is parked on an incline.
M. Operators must maintain a firm footing on the aerial platform floor while working thereon. Operators may not sit or climb on the edge of the platform or use planks, ladders, or the railings of the platform to gain a work position or as a climbing device to access other work levels.
N. People must not be allowed under a lift. If aerial lifts are going to be used in an area near pedestrians, operators are required to isolate the work area by establishing a perimeter and safely diverting the traffic flow (walking & driving). Danger signs, caution tape, barriers, and a third employee directing others to stay away are all acceptable means of establishing a work area perimeter.

**6.2 Fall Protection**

A. Employees working in an aerial lift or scissor lift shall utilize appropriate fall arrest or fall restraint systems. Operators shall reference the equipment's requirements for the appropriate type of fall protection system to be utilized. The use of Fall Protection equipment must be compatible with the aerial or scissor lift and designed for the requirements set by the manufacturer.
B. Guardrails shall be in place and access gates properly closed per the manufacturer's instructions while the lift is in use.
C. Operators who work in a scissor lift where the guard rails are not in place are required to wear an approved fall arrest or fall restraint system.
D. Lanyards used for lifts should be as short as possible to restrain an employee from being thrown from the aerial platform.
E. Employees must remain tied-off until the work is finished and the platform has been safely lowered to the ground.
F. Tying off to an adjacent pole, structure or other equipment is prohibited while working from the platform.

**6.3 Moving and Traveling**

A. An aerial lift truck may not be moved when the boom is elevated in a working position with personnel in the platform except for equipment which is specifically designed for this type of operation.
B. Before moving an aerial lift for travel, the boom(s) must be inspected to confirm that it is properly cradled and that outriggers are in a stowed position.
C. When lowering elevated aerial platforms, the operator is required to inspect the area around the machine to ensure that no personnel, equipment, or obstructions are in the path of travel. If the area in the path of movement is not visible, the platform may not be lowered until it is determined to be clear at ground level.

**6.4 Use of Lifts Near Live Electrical Lines**

A. When working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:
    1. For voltages to ground 50kV or below – 10 feet.
    2. For voltages to ground over 50kV – 10 feet plus 4 inches for every 10kV over 50kV.
B. Any overhead wire shall be considered to be an energized line unless it has been disconnected and is visibly grounded in the work area. Exact voltage shall be determined prior to working near live electrical lines.

**6.5 Elevated Lift Egress and Access**

A. Exiting and accessing an elevated platform is permissible only when it is determined to be the safest means of access to an elevated work area and is allowed by the manufacturer.
B. The manufacturer's instructions and the following minimum procedures shall be used to access or exit an elevated platform:
    1. 100% fall protection must be maintained while exiting or entering an elevated aerial platform. The employee is required to secure a second lanyard to an anchorage point outside the platform before disconnecting their lanyard from the platform anchor point and exiting, maintaining one point of tie-off at all times.
    2. The floor of the platform should be at the same level as the structure to be accessed.
    3. At no time may an employee exit or enter over the lift controls.

**6.6 Fueling and Recharging Equipment**

A. The equipment must be lowered to grade, parked on a level surface, and shut down prior to refueling or battery charging.
B. Fueling and battery charging must be done in a well-ventilated area free from flame, sparks, or other hazards that may cause a fire or explosion because of the fuel or the hydrogen generated from battery charging.
C. Refueling is prohibited in any area where there is any primary source ignition work (i.e. capable of igniting flammable vapors) within 35 feet.

## *7. Aerial and Scissor Lift Inspections*

**7.1 Aerial and Scissor Lift Pre-Use Inspection**

A. The aerial or scissor lift operator and the signal person shall visually inspect the aerial or scissor lift prior to each day's use.
    1. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.
    2. Follow the manufacturer's inspection list for other items, or the suggested items listed in *Attachment 39*.
    3. Specific documentation of this visual inspection is not required.

4. Any suspected deficient items shall be carefully examined or tested and a determination made as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use. If left unattended, the lift shall be tagged out of service.

**7.2 Aerial and Scissor Lift Annual Inspection**

A. The aerial or scissor lift operator manager and the signal person are required to perform a complete inspection of each aerial and scissor lift.
    1. The inspection must be performed annually, and after any incident involving the lift.
    2. The inspection must be documented and maintained for five years.
    3. Any suspected deficient items shall be carefully examined or tested and a determination made as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use. If left unattended, the lift shall be tagged out of service.

***8. Maintenance***

A. Any problems or malfunctions that affect the safety or operation of an aerial or scissor lift must be repaired and functionally tested before continued use.
B. Maintenance must be performed on aerial and scissor lifts in accordance with the manufacturer's recommendations.

***9. Training***

Only employees who have received general instructions regarding the inspection, application and operation of aerial lifts, including recognition and avoidance of hazards associated with their operation, are permitted to operate an aerial lift. Such items covered in training include, but are not necessarily be limited to, the following issues and requirements:

1. The purpose and use of manuals. Operating manuals are an integral part of the aerial lift and must be properly stored on the vehicle when not in use.
2. The steps and elements for the pre-use inspection.
3. Responsibilities associated with problems or malfunctions affecting the operation of the aerial lift.
4. Factors affecting stability.
5. The purpose of placards and decals.
6. The steps and elements of a workplace inspection.
7. Applicable safety rules, regulations, and policies.
8. Operator warnings and instructions.
9. Proper use of personal fall protection equipment.
10. Actual operation of the aerial lift. Under the direction of the trainer, the trainee shall operate the aerial platform for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial platform.

***10. References***

1. BP aerial lift policy: www.bp.com

2. OSHA Regulations, 29 CFR 1926.453 Aerial Lifts.
3. OSHA Regulations, 29 CFR 1926.502 Fall Protection.
4. ANSI/SIA Standard A92.2-2001, “Vehicle-Mounted Elevating and Rotating Aerial Devices”.
5. Equipment Manufacturers Institute, Aerial Platform Safety Manual for Operators and Mechanics, Chicago, Illinois, Revised 1995.

# Aerial and Scissor Lift Pre-Use Inspection

## Aerial and Scissor Lift Pre-Use Inspection Checklist

**To be completed by the aerial lift operator prior to each day's use or work shift.**

| **Manager Name:** | | **Location:** | |
|---|---|---|---|
| **Operator Name:** | | **Date/Time:** | |
| **Type of Lift:** | | **Model #:** | |
| **Inspection Item** | **Yes** | **No** | **Comments** |
| Has the aerial lift had a complete component inspection by equipment owner in previous 12 months (obtain a copy of inspection report)? | | | |
| Aerial lift tie-off anchor points are free of visible corrosion, cracking or pitting. | | | |
| Safety decals are readable. | | | |
| Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.). | | | |
| All safety indicator lights work. **(Demonstrate at the site)** | | | |
| Motion alarms are functional. **(Demonstrate at the site)** | | | |
| All guardrails are sound and in place, including basket chains and gate door. | | | |
| All switch & mechanical guards are in good condition and properly installed. | | | |
| Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms. **(Demonstrate at the site)** | | | |
| Work platform & extension slides are clean & clear of debris. | | | |
| There is no visible damage (e.g. hydraulic leaks or cracks, loose fittings or hoses). | | | |
| Operating and emergency controls are in proper working condition, including EMO button or Emergency Stop. **(Demonstrate at the site)** | | | |
| Both upper and lower controls are adequately protected from inadvertent operation | | | |
| Drive controls function properly & are accurately labeled (up, down, right, left, forward, back). **(Demonstrate at the site)** | | | |
| Emergency lowering function operates properly. **(Demonstrate at the site)** | | | |
| Lower operating controls override the upper controls. **(Demonstrate at the site)** | | | |
| Upper drive controls interlock mechanism is functional (e.g. foot pedal, spring lock, or two hand controls). **(Demonstrate at the site)** | | | |
| Tires and wheels are evenly inflated and in good condition. | | | |
| Braking devices are operating properly. **(Demonstrate at the site)** | | | |
| Documentation of training for the operator on the equipment to be used can be produced. | | | |
| **Workplace Assessment** | | | **Comments** |
| Floor/ground conditions: drop offs, holes, uneven surfaces, sloped floors, unstable ground, etc. | | | |
| Housekeeping: debris, floor obstructions, cords, construction materials, supplies, etc. | | | |
| Hazardous energy: electrical power cables or panels, chemical/gas/drain lines, utilities, etc. | | | |

| | |
|---|---|
| Overhead obstructions: tight working conditions, adjacent structures, pipe racks, beams, ceiling heights and grids, etc. | |
| Weather conditions: high winds and severe weather | |
| Pedestrian and vehicle traffic | |

**THE EQUIPMENT AND/OR OPERATOR IS NOT TO BE USED IF ANY INSPECTION ITEM IS CHECKED "NO"**

# Aerial and Scissor Lift Work Area Considerations

The following list is an example of conditions to be considered at the work area:

1. Have the work areas been established and appropriate barriers (e.g. caution tape, concrete “Jersey” barriers, fencing) been used to create a perimeter in pedestrian or vehicle traffic areas if necessary?
2. Are overhead obstructions (e.g. tight working conditions, adjacent structures, pipe racks, ceiling grids, power lines) identified and mitigated?
3. Has the ground or floor surface been evaluated to determine (a) if it can support the lift weight, (b) that the slope doesn’t exceed the manufacturer’s rating, and (c) if outrigger pads are needed?
4. Have hazardous energy sources (e.g. electrical power cables or panels, chemical lines, gas lines, drain lines, utilities) been identified and mitigated?
5. Have sharp edges been identified and mitigated? This includes both on the equipment and in the work areas.
6. Has it been determined that the size of the aerial or scissor lift does not create any additional hazards.
7. Are wind and weather conditions safe for operation?
8. Does the aerial platform contain only the tools and other loose articles necessary to complete the job and are tools stored to prevent falling?
9. If it is necessary to exit the aerial platform while elevated, has the scenario been evaluated to determine if a Working at Heights permit is required?
10. Have two employees been assigned to the project so that one can operate the lift and the other can signal for hazards, etc.?
11. Has it been determined that the route of travel and use is free of ground obstructions that would interfere with the safe use of the lift, and has sufficient strength to support the load?
12. Is the intended path of the boom and platform a minimum of 10 feet from power lines or any other dangerous obstacles (e.g. mechanical devices, other aerial lifts, structures/beams)?

# Aerial and Scissor Lift Annual Inspection Report

| Aerial and Scissor Lift Annual Inspection | | | |
|---|---|---|---|
| **Manufacturer and Type of Lift:** | | | |
| **Model or Equipment Number:** | | | |
| **Date:** | | **Hours on machine:** | |
| **Inspector's Name Printed:** | | **Inspector's Signature:** | |

| **Inspection Item & Description**<br>**Pass (P), Fail (F), or Not Applicable (N/A) Status** | **P/F/ NA** | **Comments and / or Repairs Made:** |
|---|---|---|
| Operating controls and associated mechanisms operate properly, including all boom / platform movements? | | |
| Visual and audible safety devices functioning? | | |
| No deterioration or excessive leakage of hydraulic or pneumatic systems? | | |
| No visible damage or contamination to fiberglass and other insulating components? | | |
| Operational and instructional markings present and legible? | | |
| Electrical systems function properly and do not show signs of excessive deterioration, dirt, or moisture accumulation, including those not readily visible on a pre-use inspection? | | |
| Bolts, pins, and other fasteners are not loose, deformed, or missing? | | |
| Structural members, including welds, are not deformed, cracked or corroded? | | |
| Parts such as pins, bearings, shafts, dears, rollers, locking devices, chains, chain sprockets, wire and synthetic ropes do not show signs of excessive wear, cracks, or distortion? | | |
| Hydraulic and pneumatic relief valve settings are per the manufacturer? | | |
| Hydraulic system has proper oil level? | | |
| Hydraulic and pneumatic fittings, hoses, and tubing do not show signs of leakage, abnormal deformation, or excessive abrasion? | | |
| Compressors, pumps, motors, and generators do not have loose fasteners, leaks, unusual noises or vibrations, loss of operating speed, or excessive heating? | | |
| Hydraulic and pneumatic valves do not show signs of malfunction, cracks in the external valve housing, leaks, or sticking spools. | | |

| | | |
|---|---|---|
| Vacuum prevention systems on Category “A” aerial lifts function properly? | | |
| Hydraulic and pneumatic cylinders and holding valves function properly and are not visibly damaged? | | |
| Hydraulic and pneumatic filters are clean and do not show foreign material in the system indicating other component deterioration? | | |
| If the aerial lift is rated as an insulated lift, the electrical insulating components and system(s) are clean and do not show other conditions that compromise insulation? | | (Enter date of last test if lift is used for bare-hand electrical work) |

# REVIEW SCHEDULE

Each section of this manual will be reviewed either annually or biennially so that the review of this manual, in its entirety, is completed on a biennial basis. The frequency for review of each section and the individuals responsible for the reviews are documented below. In addition to individuals listed, a designee of the Office of Human Resources & Compliance will review each section. The Office of Human Resources & Compliance has the responsibility to ensure that these reviews are completed and to update the manual in a timely manner.

| Section/Title | Review Frequency | Individual(s) Responsible |
|---|---|---|
| Section 1 – Area Rules: | Biennial | |
| Break Room Safety Rules and Rules for Use of Appliances in Non-Residential Buildings | | J. Naccarato |
| Maintenance/Shop Areas | | B. Miller, J. Meyer, A. Erikson, B. Good, B. Menkis, T. Whitesel, M. Mendez |
| Office Area Safety Rules | | |
| School of Science, Engineering & Health | | |
| Visual Arts | | B. Good, B. Menkis |
| Section 2 – General Housekeeping and Storage | Biennial | |
| Section 3 – Hot Work: Welding, Cutting, Brazing | Annual | B. Markley |
| Section 4 – Noise Exposure/Hearing Conservation Program | Annual | |
| Section 5 – Lockout/Tag-out | Annual | B. Markley |
| Section 6 – Confined Space Program | Annual | B. Markley |
| Section 7 – Bioterrorism Readiness Plan | Biennial | K. Shafer, B. Markley, D. Magee |
| Section 8 – Respirator Program | Annual | B. Markley, B. Miller |
| Section 9 – Injuries and Illnesses | Biennial | |
| Section 10 – Environmental, Health and Safety Audit Program | Biennial | |
| Section 11 – Safety Suggestion Form | Biennial | |
| Section 12 – Eyewash Stations and Safety Showers | Biennial | |
| Section 13 – Portable Ladders | Biennial | B. Markley |
| Section 14 – Emergency Action Plan | Annual | B. Markley; B. Wickard |
| Section 15 – Employee Training and New Employee Orientation | Biennial | |
| Section 16 – Project/Activity Approval Procedure | Biennial | |
| Section 17 – Equipment Pre-Start Up Program | Biennial | |
| Section 18 – Lead Program | Annual | |
| Section 19 – Employee Safety Responsibilities | Biennial | A. Coffey |
| Section 20 – Workplace Safety Committee | Biennial | Workplace Safety Committee |

| | | |
|---|---|---|
| Section 21 – Electrical Safety Program | Annual | B. Markley |
| Section 22 – Laser Safety Program | Annual | A. Kryemadhi |
| Section 23 – Compressed Gas Cylinders | Biennial | |
| Section 24 – Radiation Safety Program | Annual | L. Norbeck |
| Section 25 – Personal Protective Equipment | Annual | |
| Section 26 – Lone Worker Policy | Annual | |
| Section 27 – Powered Industrial Truck Program | Biennial | S. Miller |
| Section 28 – Silica Program | Annual | |
| Section 29 – 3D Printers | Biennial | |
| Section 30 – Scaffolding Use Policy | Biennial | B.Markley; S. Gustin Hamrock |

# REVISION LOG

Any revisions made independent of reviews and all major revisions made as part of reviews will be documented below.

## Section 1 – Area Rules

| Revision | Date |
|---|---|
| Sections for Break Rooms, Maintenance/Shop Areas, Office Areas, the School of Science, Engineering & Health, and Visual Arts added to this manual. | August 2013 |
| Updated section for Break Rooms to include "Use of Appliances in Non-Residential Buildings." Reviewed section. | September 2014 |
| Added #10 and 11 to Maintenance Shops (and Other Areas Using Shop Equipment) Safety Rules. | March 2015 |
| Completed biennial review; no major changes. | September 2016 |
| Updated to reflect Winding Hill. | July 2017 |
| Biennial review; no major changes. | August 2017 |
| Biennial review; no major changes. | August 2019 |
| Updated to include note re COVID-19 requirements and changes to item 6 regarding personal coffee makers. | July 2020 |

## Section 2 – General Housekeeping and Storage

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Expanded #5 for clarification. | April 2014 |
| Added #18 on fire safety policies and Fire Safety Office website. | June 2015 |
| Biennial review completed; no changes required. | August 2015 |
| Biennial review completed; no changes required. | July 2017 |
| Biennial review completed; no changes required. | July 2019 |
| Biennial review completed; no changes required | October 2021 |

## Section 3 – Hot Work: Welding, Cutting, Brazing

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Annual review completed; made changes/clarifications to contractor use of permit. | March 2014 |
| Annual review completed; no major changes required. | March 2015 |
| Annual review completed; no changes required. | March 2016 |
| Annual review completed; no changes required. | March 2017 |
| Added statement on welding fumes and UV radiation from welding being carcinogens. | May 2017 |
| Annual review; no changes. | March 2018 |

| | |
|---|---|
| Completed annual review; no changes. | February 2019 |
| Completed annual review; no changes. | February 2020 |
| Completed annual review; no changes. | March 2021 |
| Completed annual review; no changes. | March 2022 |

## Section 4 – Noise Exposure/Hearing Conservation Program

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Annual review completed; no changes to content; added some sub-headings to aid in finding information within the policy. | May 2014 |
| Annual review completed; added section regarding equipment/areas requiring hearing protection. | May 2015 |
| Annual review completed; no changes to content. | May 2016 |
| Added entry on earbuds, headphones. | May 2016 |
| Annual review completed; add info on when a STS becomes an OSHA recordable. | May 2017 |
| Annual review completed; no changes. | May 2018 |
| Annual review completed; added additional explanation on when hearing loss is reportable on the OSHA 300 Log. | May 2019 |
| Annual review completed; no updates. | April 2020 |
| Annual review completed; changed name of contact from HR to Facilities Assistant and name of outside vendor contracted to perform audiograms. | September 2021 |

## Section 5 – Lockout/Tagout

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Annual review completed; no changes. | November 2013 |
| Annual review completed; removed training quiz; added template for written LOTO procedure. | November 2014 |
| Annual review completed; no major revisions. | November 2015 |
| Annual review completed; no major revisions. | November 2016 |
| Annual review completed; no revisions. | October 2017 |
| Annual review; no revisions | November 2018 |
| Annual review completed. | November 2019 |
| Annual review completed | November 2020 |
| Annual review completed; no revisions | December 2021 |

## Section 6 – Confined Space Program

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Added sunflower silo at Foreman residence to Attachment 8. | January 2014 |

| | |
|---|---|
| Annual review completed; no changes. | April 2014 |
| Annual review completed; no major changes. | April 2015 |
| Annual review completed; updated Attachment 8. | April 2016 |
| Annual review completed; no major changes. | April 2017 |
| Annual review; reduced number of pool surge pits to one as result of construction. | April 2018 |
| Annual review; updated Attachment 8, list of confined spaces on campus – removed Witmer 2000 gl tank and Engle Center electric boiler. | March 2019 |
| Annual review; updated Attachment 8 | March 2020 |
| Annual review completed; no major changes | August 2021 |
| Annual review completed; no changes | May 2022 |

## Section 7 – Bioterrorism Readiness Plan

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Biennial review completed; eliminated information on specific bioterrorism agents; updated protocol to reflect information provided during postal security audit. | August 2015 |
| Replaced Cindy Burger with Lynn Maynard as Director of Safety | April 2016 |
| Updated to include information for Winding Hill. | January 2017 |
| Biennial review – no changes. | August 2017 |
| Biennial review, no major changes. | August 2018 |
| Replaced Lynn Maynard with Cindy Burger as Director of Safety | June 2019 |
| Biennial review – no changes | July 2020 |
| Updated Director of Safety to Brad Neuenschwander | November 2024 |

## Section 8 – Respirator Program

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Annual review completed; no changes required. | February 2014 |
| Added section on Dust Masks. | June 2014 |
| Added additional information on filter cartridges. | July 2014 |
| Added Attachment 11, Appendix D from OSHA 1910.134 | August 2014 |
| Annual review completed; no changes required. | February 2015 |
| Annual review completed; no changes required. | February 2016 |
| Added table to outline requirements for training, medical approval & fit testing. | July 2016 |
| Annual review completed; no changes required. | February 2017 |
| Added infographic on correct use of dust mask. | January 2018 |
| Completed annual review; no major changes. | February 2018 |
| Completed annual review; no major changes. | February 2019 |

| | |
|---|---|
| Completed annual review; added mandatory use of N95 in conjunction with the Clorox 360 System in Campus Events. | January 2020 |
| Eliminated references to maintenance employees using full-face, APR for asbestos abatement as this work is only done by outside contractors and no maintenance employees are presently approved for respirator use. | October 2020 |
| Annual review completed; no changes required. | January 2022 |
| Section review completed; changed Campus Events to CBS | March 2024 |

## Section 9 – Injuries and Illnesses

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Added new location for the Incident Report form on MC-Square. | June 2014 |
| Updated with new OSHA reporting information effective January 1, 2015. | January 2015 |
| Completed biennial review; listed all documents sent to an employee injured in the workplace. | June 2015 |
| Reviewed and made minor update. | May 2016 |
| Added information on retaliation. | July 2016 |
| Added information on temporary agency employees. | August 2016 |
| Removed reference to Zen Works as a location for the online reporting form. | October 2016 |
| Annual review; updated section on insurance "Injury Kit" and changed information on MC-Square to University's Intranet. | May 2017 |
| Annual review; no changes. | May 2018 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Biennial review completed; minor changes. | May 2019 |
| Changed BrickStreet Insurance to Encova Insurance as our workers' compensation insurance provider. | August 2019 |
| Added info on reporting a serious injury or death to the U.S. Chemical Safety and Hazard Investigation Board (CSB) | June 2020 |
| Annual review; no changes | July 2021 |

## Section 10 – Environmental, Health and Safety Audit Program

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Added system for scoring audits and new audit report form. | August 2014 |
| Biennial review; no changes required. | August 2015 |
| Updated Attachment 13; added specific reference to Walking/Working Surfaces in Audit Form. | January 2017 |
| Biennial review completed; no changes required. | July 2017 |
| Updated list of audited areas and frequencies; included biennial review. | April 2019 |
| Biennial review completed; no changes required. | July 2019 |
| Updated frequency of audits for several areas. | March 2020 |
| Biennial review; no changes required. | September 2021 |

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| Removed Audit Form (now completed by CMS) | November 2024 |

## Section 11 – Safety Suggestion System

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Biennial review completed; no updates required. | September 2015 |
| Changed information on MC-Square to new University Intranet. | July 2017 |
| Completed biennial review; only minor changes. | August 2017 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Completed biennial review; no major changes. | August 2019 |
| Completed biennial review; no changes | October 2021 |

## Section 12 – Eyewash Stations and Safety Showers

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Added exception to monthly inspections of safety showers for academic areas; these will be required quarterly. Added information on proper use of showers and eyewash stations. | June 2014 |
| Completed biennial review; no updates required. | October 2015 |
| Updated to include specifics for Winding Hill. | January 2017 |
| Completed biennial review; no updates required. | September 2017 |
| Completed biennial review; no updates required. | September 2019 |
| Completed biennial review; no updates required. | October 2021 |

## Section 13 – Portable Ladders

| Revision | Date |
|---|---|
| Added to this manual. | August 2013 |
| Completed biennial review; no updates required. | October 2015 |
| Changed from Ladders to Portable Ladders as this does not include fixed ladders. Updated to reflect OSHA's new Walking/Working Surfaces regulations. | January 2017 |
| Completed biennial review; no updates required. | September 2017 |
| Completed biennial review; no updates required. | September 2019 |
| Completed biennial review; no updates required. | October 2021 |

## Section 14 – Emergency Action Plan

| Revision | Date |
|---|---|
| Added to this manual. | November 2013 |
| Added entry "Spills (Chemicals)". | December 2013 |

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| Added Bomb Procedure and Checklist (Attachment 10); changed "General Medical Emergency" to "Medical Emergency;" updated "Weather Event" to add section on Floods and additional information for tornados. | January 2014 |
| Added information on evacuation of a single campus building. | March 2014 |
| Annual review; updated several phone numbers | November 2014 |
| Updated information to include Emergency Evacuation Plan posted in classrooms, studios and labs | August 2015 |
| Removed Carlisle Propane and replaced with Heller's Gas & Propane (new vendor) | September 2015 |
| Updated section on "Gas Leak" | October 2015 |
| Annual review; added section on Fire Extinguisher Usage; no other major changes. | October 2015 |
| Updated to reflect the addition of emergency evacuation signage in conference rooms and to better define the steps and responsibilities during the evacuation of a single building. | January 2016 |
| Replaced Cindy Burger with Lynn Maynard as Director of Safety | April 2016 |
| Annual review; updated list of AEDs; added information on Eisenhower Campus Center under section on Power Failures; removed reference to "Safe Connect"; updated list of emergency phone numbers. | October 2016 |
| Updated to include specifics for Winding Hill. | January 2017 |
| Completed annual review; no changes. | October 2017 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Annual review; no changes | November 2018 |
| Updated contacts; added "fight" to section on reacting to an active shooter; replaced Lynn Maynard with Cindy Burger for Director of Safety. Updated several emergency phone numbers. | June 2019 |
| Added section on Mental Health Emergency. | September 2019 |
| Annual review completed; updated phone numbers for Norfolk Southern. | November 2019 |
| Annual review completed. | November 2020 |
| Annual review completed; replaced infographic for active shooter response; updated contact numbers for B.Wickard and B.Markley; removed Hoffman and added AWC to list of AED's on campus. | November 2021 |

## Section 15 – Employee Training and New Employee Orientation

| Revision | Date |
|---|---|
| Added to this manual. | January 2014 |
| Added "Crowd Control" to specialized orientation training checklist. | February 2014 |
| Updated Attachment 15 to add "Fire Extinguishers" to training checklist. Updated link to Bloodborne Pathogen Training in Attachment 15. | March 2014 |
| Updated Attachment 15 to add Qualtrics link for Confined Space training and Waste training. | April 2014 |
| Updated Attachment 15 to add 3 levels of Waste training, depending on the employee position. | June 2014 |
| Updated Attachment 15 to include Ladder Use and Dust Masks. | August 2014 |

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| Link to Crowd Control no longer available. | October 2014 |
| Changed name from Crowd Control to Crowd Management and added link to Qualtrics training program. | January 2015 |
| Updated links to several Qualtrics training programs on Attachment 15 and added Electrical Safety Program training requirements. | February 2015 |
| Updated link for Hazard Communication Training in Attachment 15 | September 2015 |
| Updated training for Noise and Personal Protective Equipment in Attachment 15 | September 2015 |
| Updated Attachment 15 to include new employee EHS orientation links (first table on form). Updated section in procedure that describes this form and its use. | October 2015 |
| Updated Attachment 15 to include new links for Fire Extinguisher Training and SPCC Training. Completed biennial review. | December 2015 |
| Replaced link to Bloodborne Pathogen Training. | April 2016 |
| Added Student Employee Orientation to Attachment 15 | April 2016 |
| Updated Attachment 15 to include Machine Guarding training. | July 2016 |
| Updated links to Waste trainings in Attachment 15 | August 2016 |
| Updated orientation requirements for graduate program faculty. | September 2016 |
| Update Attachment 15 to include Utility Safety for Grounds Personnel. | November 2016 |
| Updated Attachment 14. | December 2016 |
| Updated Attachment 15 to reflect new link for Asbestos training. | December 2016 |
| Updated Attachment 15 to reflect new link for fire extinguisher training. | January 2017 |
| Updated links to training programs in Attachment 15: EHS Orientation for New Faculty; Confined Space; Crowd Management; Electrical Safety; Gas Cylinder Safety; and Hazard Communication | February 2017 |
| Updated link to Bloodborne Pathogen Training | March 2017 |
| Changed information on MC-Square to new University Intranet. | May 2017 |
| Updated links to Waste Training in Attachment 15. | August 2017 |
| Updated instructions for Spill Procedure training in Attachment 15. | September 2017 |
| Updated Attachment 15 to include Safety Data Sheet training. | October 2017 |
| Biennial review; very minor changes. | November 2017 |
| Updated Attachment 15 for new Asbestos link. | December 2017 |
| Updated Attachment 15 – added Silica training. | February 2018 |
| Updated Attachment 15 – new link for Bloodborne Pathogen Training | April 2018 |
| Updated Attachment 15 – added Working on Roofs training. | June 2018 |
| Updated Attachment 15 – added Protection of Minors | July 2018 |
| Updated Attachment 15 – added waste training at Winding Hill | August 2018 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Updated Attachment 15 to add Carts, All Motorized | November 2018 |
| Updated Attachment 14 | December 2018 |
| Updated Attachment 15 with new link for fire extinguisher & asbestos training | January 2019 |
| Updated Attachment 15 with new link for Bloodborne Pathogen training | March 2019 |
| Updated Attachment 15 with Formaldehyde training | May 2019 |
| Updated Attachment 15 from Steven Funck to Lauri Norbeck | August 2019 |

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| Biennial review completed; added reference to EGaD system | November 2019 |
| Updated Attachment 15 with new link for SPCC Training | January 2020 |
| Updated Attachment 15 with new link for Fire Extinguisher Training | January 2020 |
| Updated Attachment 15 with new link for Asbestos Training | January 2020 |
| Updated Attachment 15 with Respirator Training | February 2020 |
| Updated Attachment 15 with new link for Bloodborne Pathogen Training | March 2020 |
| Updated Attachment 15 with final instructions on last page | August 2020 |
| Biennial review completed; updated Attachment 15 | December 2021 |
| Removed general EHS training links from Attachment 15 (they are distributed via email now) | July 2024 |
| Updated Attachment 15 with new links to Asbestos Training and Bloodborne Pathogen training that can be translated into different languages | October 2024 |

## Section 16 – Project/Activity Approval Procedure

| Revision | Date |
|---|---|
| Added to this manual. | April 2014 |
| Added to Attachment 17 questions regarding electrical work for items 8 & 9. | May 2014 |
| Added to Attachment 17 additional info re lead in buildings for item 10; updated co-chairs for Institutional Review Board. | July 2014 |
| Revised signature statement for faculty/advisor on Attachment 16 | October 2014 |
| Annual review; updated training links in Attachment 17 | April 2015 |
| Annual review; updated Attachment 16 to include the date that required contacts were made for each question; updated Attachment 17 to include information on radiation sources and lasers. | March 2016 |
| Annual review; update contact (Chair) for Institutional Animal Care & Use Committee | March 2017 |
| Changed information on MC-Square to new University Intranet. | May 2017 |
| Annual review; no major changes. | March 2018 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Changed to biennial review as this is not a federal or state requirement. | February 2019 |
| Updated references from Steven Funck to Lauri Norbeck | August 2019 |
| Biennial review – no changes. | March 2020 |
| Biennial review – no changes. | May 2022 |

## Section 17 – Equipment Pre-Start Up Program

| Revision | Date |
|---|---|
| Added to this manual. | July 2014 |
| Biennial review completed; no major changes. | July 2016 |
| Biennial review completed; no changes required. | July 2017 |
| Biennial review completed; no changes required. | July 2019 |
| Changed Steven Funck to Lauri Norbeck | August 2019 |
| Biennial review completed; removed reference to Matt Farrar on form | September 2021 |

## Section 18 – Lead Program

| Revision | Date |
|---|---|
| Added to this manual. | August 2014 |
| Annual review; no changes. | August 2015 |
| Updated Attachment 19, Year of Construction of Campus Buildings; Banks and Simpson Houses are no longer in use. | August 2015 |
| Annual review; updated Attachment 19 | August 2016 |
| Updated Attachment 19 to include Martin's Commons and addition to Fitness Center | March 2017 |
| Annual review completed; no changes required. | July 2017 |
| Updated EPA website reference and completed annual review. | July 2018 |
| Removed East Street Housing - University sold this property. Removed references to the Early Learning Center as this was closed on 5/31/19. | June 2019 |
| Annual review – no changes | June 2020 |
| Annual review; removed references to Hoffman and added Welcome Center to Attachment 19. | August 2021 |

## Section 19 – Employee Safety Responsibilities

| Revision | Date |
|---|---|
| Added to this manual. | August 2014 |
| Completed biennial review; no major changes. | August 2016 |
| Biennial review completed; no changes required. | July 2017 |
| Biennial review completed; no changes required. | July 2019 |
| Biennial review completed; minor change to last paragraph | July 2021 |

## Section 20 – Workplace Safety Committee

| Revision | Date |
|---|---|
| Added to this manual. | October 2014 |
| Biennial review completed by Workplace Safety Committee; added "core" team. | October 2016 |
| Changed information on MC-Square to new University Intranet. | May 2017 |
| Biennial review completed by Workplace Safety Committee; no changes. | October 2018 |
| Updated to reflect conversion from MC-Square to FalconLink. | October 2018 |
| Biennial review completed. Removed "co-chair" as Committee now has a Chair; updated Director of Disability Services to Director of Academic Success Center to reflect title change. | October 2020 |

## Section 21 – Electrical Safety Program

| Revision | Date |
|---|---|
| Added to this manual. | January 2015 |
| Annual review completed; no changes required. | January 2016 |
| Removed references to "prohibited approach boundary" and changed/clarified Hazard Risk Category to ARC Flash PPE Category. | May 2016 |
| Updated to better reflect NFPA 70E, 2015. | August 2017 |
| Annual review; no changes. | August 2018 |
| Annual review; no changes. | July 2019 |
| Annual review; no changes | July 2020 |
| Annual review; no changes. | August 2021 |
| Updated "Establishing an Electrically Safe Work Condition" | October 2021 |

## Section 22 – Laser Safety Program

| Revision | Date |
|---|---|
| Added to this manual. | March 2015 |
| Completed annual review; updated to include information on Class 3 and Class 4 Lasers, Laser Safety Officer, and Laser Training. | March 2016 |
| Added Laser Registration Form as Attachment 31 and updated program to reflect its use. | April 2016 |
| Completed annual review; no changes. | March 2017 |
| Annual review – no changes. | March 2018 |
| Added section on Laser Levels. | April 2018 |
| Completed annual review; no changes. | February 2019 |
| Completed annual review; no changes. | February 2020 |
| Updated name to Department of Computing, Mathematics & Physics | August 2020 |
| Completed annual review; no changes. | March 2021 |
| Changed LSO from Farrar to Kryemadhi | October 2021 |
| Completed annual review; no changes. | April 2022 |
| Completed review; no changes | March 2024 |

## Section 23 – Compressed Gas Cylinders

| Revision | Date |
|---|---|
| Added to this manual. | June 2015 |
| Completed biennial review; no changes. | June 2017 |
| Completed biennial review; no changes. | June 2019 |
| Completed biennial review; no changes. | August 2021 |

## Section 24 – Radiation Safety Program

| Revision | Date |
|---|---|

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|---|---|
| Added to this manual. | August 2015 |
| Annual review | August 2016 |
| Updated Attachment 32 and program content to include low-level isotopes maintained by the Department of Mathematics, Physics & Statistics. | April 2017 |
| Annual review; clarification added for isotopes in Dept. of Mathematics, Physics & Statistics. | August 2017 |
| Annual review; no changes. | August 2018 |
| Removed list of sources in Physics from Attachment 32. | May 2019 |
| Annual review; changed RSO from Steven Funck to Lauri Norbeck | August 2019 |
| Annual review; updated name to Department of Computing, Mathematics & Physics | August 2020 |
| Annual review; no changes | October 2021 |

## Section 25 – Personal Protective Equipment

| Revision | Date |
|---|---|
| Added to this manual. | September 2015 |
| Updated section on foot protection to reflect CustomFit program. | September 2016 |
| Completed annual review. | September 2016 |
| Added slip/trip/fall hazard to PPE Assessment, Attachment 36, and added section on Fall Protection. | January 2017 |
| Completed annual review. | September 2017 |
| Completed annual review. | September 2018 |
| Changed info for prescription safety glass vendor and completed annual review. | August 2019 |
| Updated attachment with instructions for ordering safety shoes | August 2020 |
| Completed annual review | September 2020 |
| Completed annual review | October 2021 |

## Section 26 – Lone Worker Policy

| Revision | Date |
|---|---|
| Added to this manual. | March 2016 |
| Annual review; no changes. | March 2017 |
| Annual review; no changes. | March 2018 |
| Annual review; no changes. | March 2019 |
| Annual review; no changes. | March 2020 |
| Annual review; no changes. | March 2021 |
| Annual review; no changes. | March 2022 |

## Section 27 – Powered Industrial Truck Program

| Revision | Date |
|---|---|
| Added to this manual. | September 2016 |

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| Completed biennial review. | September 2018 |
| Completed biennial review. | September 2020 |

## Section 28 – Silica Program

| Revision | Date |
|---|---|
| Added to this manual. | February 2018 |
| Annual review – no changes. | February 2019 |
| Clarified medical surveillance to be required if 30 days or more per year of exposure to dry clay in Arts and Design even if ventilation is present. | May 2019 |
| Annual review, no changes. | March 2021 |
| Annual review, noted transition to pre-mixed clay in Art & Design | May 2022 |

## Section 29 – 3D Printers

| Revision | Date |
|---|---|
| Added to this manual. | August 2018 |
| Biennial review – no changes. | August 2020 |

## Section 30 – Scaffolding Use Policy

| Revision | Date |
|---|---|
| Added to this manual. | November 2023 |

## Entire Manual

| Revision | Date |
|---|---|
| Updated entire contents to reflect change to University status and made changes to position responsibilities due to Voluntary Separation Program. | July 2020 |
| Entire manual was reviewed by CMI. | December 2023 |
| Manual saved as new document to allow for easier editing/additions. Attachments renamed from A, B, etc. for each section, to 1, 2, etc. running throughout the entire manual. | November 2024 |

# ATTACHMENT LIST