Loyola University New Orleans
Health and Safety Plan
# Table of Contents

## I. Policy Statement

1. Purpose .................................................................................................................. 1
2. General Policy ......................................................................................................... 1
3. Environmental Control ........................................................................................... 1
4. Administrative Positions Holding Environmental Permits .................................. 3
5. Chemical Use and Research Safety and Security .................................................... 3
6. Biological Research Safety and Security ................................................................ 3
7. Select Agents ........................................................................................................... 4

## II. GENERAL POLICIES and STANDARDS

1. Emergency Procedures ............................................................................................ 5
2. Operational Safety & Loss Prevention Plan .............................................................. 7
3. Safety and Environmental Responsibilities ............................................................. 10
4. University Safety Committee .................................................................................. 12
5. Fire Protection/Means of Egress ............................................................................. 13
6. Laboratory Emergency Equipment ......................................................................... 15

## III. ADMINISTRATIVE ELEMENTS

1. Workers' Compensation ......................................................................................... 16
2. Fire Alarm Response ............................................................................................... 17

## IV. SAFETY PROCEDURES

1. Fire Safety In Dormitories ..................................................................................... 18
2. Electrical Safety ...................................................................................................... 25
3. Stairs and Ladders .................................................................................................. 37
4. Scaffolds .................................................................................................................. 44
5. Material Handling ................................................................................................... 48
6. Confined Spaces ...................................................................................................... 52
7. Handling, Using and Storing of Compressed Gas Cylinders .................................. 54
8. Control of Hazardous Energy - Lockout/Tagout .................................................... 56
9. Safe Use of Hand Tools and Portable Power Tools ................................................. 60
10. Safety Rules for Woodworking Machines ............................................................. 63
11. Guide to Woodworking ......................................................................................... 64
12. Machine Guarding Requirements ........................................................................ 66
13. Vehicle Operation .................................................................................................. 68
14. Hazard Communication ......................................................................................... 69
15. Fire Protection Equipment Maintenance and Testing ............................................ 82
I. POLICY STATEMENT

A. Purpose

This Policy Statement outlines the Health and Safety Plan for Loyola University New Orleans. The document also provides a framework that facilitates the protection of life, property, and the environment. Lastly, this Policy Statement sets forth safety and environmental responsibilities, provides support for safety rules and procedures, and establishes activities/programs which are necessary for the successful implemental of the Loyola University New Orleans Health and Safety Plan. The Health and Safety Plan should be considered a “living document” and will be occasionally amended as needed.

B. General Policy

LOYOLA UNIVERSITY NEW ORLEANS has a strong commitment to the health and safety of all employees, students, and visitors at the institution. Recognizing that a healthy environment is critical to the quality of life of all living organisms, LOYOLA UNIVERSITY NEW ORLEANS is committed to protecting the environment from harm due to campus operations and activities. This includes protecting the air, both indoors and out, and grounds. In keeping with these commitments, the Chief Hygiene Officer (CHO) shall have the authority to enforce compliance with the requirements referenced in this policy, and other applicable environmental and safety regulations. Enforcement action will be taken only after consultation with senior administration, unless there is an immediate danger to the health and safety of personnel or an immediate danger to LOYOLA UNIVERSITY NEW ORLEANS property. In the event of immediate danger or major non-compliance, the CHO will be responsible for taking any actions, including facility closure, required for the protection of the health and safety of personnel or protection of LOYOLA UNIVERSITY NEW ORLEANS property. The CHO will notify central administration of any facility closures. Remedial actions will be required before a closed facility will be reopened. Recognizing that proper training is critical to employee safety, LOYOLA UNIVERSITY NEW ORLEANS will provide safety and skills training to achieve a skilled and safe workforce.

C. Environmental Control

It is LOYOLA UNIVERSITY NEW ORLEANS’S intent to provide a safe environment that is conducive to studying, learning, and working, and to minimize any recognized hazards. Any situation or deportment which disrupts the studying, learning, or working process, or introduces a hazard, is prohibited. Eating and drinking is prohibited in classrooms except for LOYOLA UNIVERSITY NEW ORLEANS approved events. The use of classrooms for activities other than schedule classes must first be approved by the responsible party. Smoking is prohibited in all LOYOLA UNIVERSITY NEW ORLEANS learning and working environments. All animals, except those specifically required for research or teaching purposes,
or those that are medically approved, are prohibited in all LOYOLA UNIVERSITY NEW ORLEANS facilities, including all learning and working environment. Deans, Directors, and Department Heads are responsible for enforcement to this policy within their units and faculty members are responsible for the enforcement of this policy in their classrooms.

Any person using outdoor areas of the LOYOLA UNIVERSITY NEW ORLEANS campus has the responsibility of maintaining control and cleaning up after their animal at all times.

NOTE: Learning and working environments include classrooms, studios, laboratories, offices, conference facilities, seminar rooms, practice rooms, libraries, and designated study areas.

1. Each and every employee shall be responsible for his/her own safety, for promoting the safety of co-workers, and for protecting the local environment. Employees must report and/or correct all safety and environmental concerns, including, but not limited to, those relating to facilities or procedures. Failure to follow appropriate safety standards may result in disciplinary action, up to and including termination of employment.

2. Vice Presidents, Deans, Directors, and Department Heads shall implement the Safety and Health Plan in their areas of administrative responsibility and shall be accountable through their respective administrative channels for the control of accidents and hazardous exposures in the work environment. They shall also set the example for environmental control by emphasizing and adopting good environmental practices in processes and procedures, including, but not limited to, prudent purchasing, use and disposal of chemicals and materials. LOYOLA UNIVERSITY NEW ORLEANS is subject to environmental regulations promulgated and enforced by the local, state and federal environmental agencies. Any individual or group found to be in violation of these regulations will be potentially responsible for fines levied by the enforcement authorities and will be subject to other appropriate corrective action.

3. The Chemical Hygiene Officer (CHO) is the principal provider/coordinator of all LOYOLA UNIVERSITY NEW ORLEANS safety and environmental requirements, including, but not limited to:
   a. Providing resources for the identification, evaluation, and control of hazardous situations,
   b. Providing safety, security criteria, and assessments for research and teaching labs working with potentially hazardous chemicals, biological or physical agents or processes,
   c. Developing and issuing rules and procedures,
   d. Consulting with employees and management, and
   e. Providing safety training, hazardous waste disposal, and occupation safety and health exposure evaluations.
   f. The CHO, jointly with environmental permit holders, will monitor laws and regulatory rules and procedures relating to the environment, act a contact point for interface with environmental regulatory agencies such as the Louisiana Department of Environmental Quality (LADEQ), us Environmental Protection agency (EPA) and the City of New Orleans on regulatory issues, an interface with legal representative for LOYOLA UNIVERSITY NEW ORLEANS in citations/disputes on environmental issues.

4. The LOYOLA UNIVERSITY NEW ORLEANS Safety Committee is an advisory committee reporting to the Director of Risk Management. The LOYOLA UNIVERSITY NEW ORLEANS Safety Committee shall provide recommendations to the admiration that will enhance the LOYOLA UNIVERSITY NEW ORLEANS Health and Safety Plan.
D. Administrative Positions Holding Environmental Permits

Administrative department heads shall assure that environmental permits are obtained where required under law. The permit holder shall:

1. Assure that permitted activities are conducted in strict compliance with the environmental permit through proper operation and maintenance of equipment, adequate procedures, recordkeeping, reporting and periodic inspection;
2. Jointly with CHO, monitor developments in regulations and laws affecting the permit;
3. Maintain permit in up-to-date status, with appropriate renewal, data submittals, reporting and other requirements;
4. Cooperate with and assist CHO in its role in monitoring permitted activities and investigation incidents; and
5. Jointly with CHO, obtain proper permits or permit modifications from permitting agencies for new or re-furbished processes or equipment.

NOTE: Where appropriate, refer to the Chemical Hygiene section of the LOYOLA UNIVERSITY NEW ORLEANS Health and Safety manual for guidance in administering this program.

E. Chemical Use and Research Safety and Security

The US Department of Homeland Security enforces the Chemical Facility Anti-Terrorism Standard (CFATS) which applies to possession, use and transfer of certain high hazard chemicals. The CHO assures that adequate compliance controls and procedures are in place, through consultation, training, inventory procedures, inspections and other compliance requirements under CFATS.

Principal investigators and unit heads assure safety and environmental compliance through activities such as inventory control and reporting as required by CHO; supervising and training laboratory and support workers to assure safety and security; cooperating with inspections and investigations; and correcting deficiencies identified in these activities.

F. Biological Research Safety and Security

To assure that activities involving biological research, diagnostics, instruction, and other activities involving biological material and toxins are conducted in a safe and secure manner, the Institutional Biological and Recombinant DNA Safety Committee (IBDRSC) has been delegated the authority for registration, approval and oversight of recombinant DNA (rDNA) and biological research activities.

1. All research activities involving the use of rDNA, pathogenic microorganisms infecting humans, animals or plants, and biological toxins must be registered with, and approved by, the IBRDSC. Principal investigators’ and unit heads’ responsibilities include, but are not limited to:
a. Registering research with the IBRDSC;
b. Supervising and directing laboratory and support personnel;
c. Ensuring that lab personnel have proper training; and
d. Providing access to labs for inspection and assuring that prompt corrective action is employed upon notice of a safety/security violation or concern.

I. The CHO supports the activities of the IBRDSC, and provides:
   a. Technical advice and training for committee members and principal investigators;
   b. Inspections of laboratories and other facilities
   c. Assure that proper safety equipment and practices are employed and research is being conducted as approved by the IDRDS
   d. Assure that federal/state regulations are being followed; and
   e. Provide an inspection report and follow-up inspections to assure corrective action is completed.

NOTE: Where significant or serious violations are found that may pose a danger to personnel, plants/animals or the community, the CHO is responsible for issuing instructions to halt activities and secure the agents and laboratory until a satisfactory resolution is found.

G. Select Agents

In addition to the requirements above on safety and security, special equipment exist for “Select Agents.” The Centers for Disease Control (CDC) and the Animal and Plant Health Service (APHIS) have issued rules that control research using “Select Agents and Toxins” which are identified as potentially harmful to public safety and the environment under federal law. The CHO will be responsible for:

1. Applying for CDC/APHIS registration and obtaining approval for labs and researchers prior to permitting handling, transporting or using select agents and toxins.
2. Assuring institutional compliance with all requirements contained in and associated with the CDC and APHIS regulation; and
3. Issuing guidelines/policies relating to safety and security in this research.

NOTE: No transfer, receipt or, or research with, select agents and toxins may occur prior to approval from CDC/APHIS. All such approvals must be obtained by and received through the Responsible Official. Guidelines for access to, use of or transfer of select agents and toxins are in the “Select Agent Program Biological Safety Plan” administered by and accessed through the Responsible Official. The Responsible Official can be contacted through the CHO. Select agents and toxins are listed on the websites of the CDC and APHIS and EH&S.

Questions or comments regarding this Policy Statement should be submitted to the office of Risk Management at (504) 865-3141 or via e-mail at johncain@Loyola University New Orleans.edu.
II. GENERAL POLICIES and STANDARDS

A. Emergency Procedures

1. Medical Emergencies
   For all campus medical emergencies, contact the Loyola University Police Department (LUPD) at x3434 from any campus phone. LUPD will communicate with New Orleans first responders (Local police, fire, or EMS).
   
   While speaking with LUPD, provide the following information:
   a. Give your name, location, and telephone number.
   b. Offer as much information as possible regarding the nature of the injury or illness, whether the victim is conscious and has a medical alert ID.
   c. Do not hang up until directed to do so by the emergency operator.

   Do not move a seriously injured person unless the situation is life-threatening. Return to the injured person and keep him/her as calm and comfortable as possible (as long as it is safe to do so). A first responder will arrive at the scene and will summon additional medical personnel as necessary. Render first aid at the scene for minor injuries. For more serious injuries requiring medical treatment, contact LUPD. Secure scene for accident investigation.

2. Emergency Plan for Gas Leaks
   Natural gas leaks are generally detected by the odor of the gas odorant. The odorant has an odor threshold of from one to three parts per billion, and provides an excellent means of detection. The following procedure should be used at any time a leak is suspected:
   
   a. Control ignition sources.
   b. Make sure that no one turns off or on an electrical appliance or light. Other sources of ignition should be moved out of the area if possible. Pilot lights should be turned off if possible.
   c. Contact Physical Plant (504) 864-7490 for gas personnel to assist in locating the leak
   d. Turn off gas if location of shutoff valve is known
   e. Evacuate area and keep people out if leak may be significant
   f. Evaluation and guidance is provided by Physical Plant

3. Fire Protection/Evacuation Plan
   Each building has an emergency evacuation plan that must be posted for employees and others to follow during evacuation of the building in case of emergency. This plan must be kept legible and up to date. New employees and others who are new to the building should be made aware of the emergency plans for the building as part of their orientation.

   Emergency signals and alarms as well as the proper response to an emergency must be explained to the persons involved. Whenever the system is changed or the plan modified, the occupants must be made aware of the changes that may affect them.
Fire protection equipment and systems must not be modified or disabled such that the plan is no longer valid. Covering smoke detectors, disabling alarms, or discharging fire extinguishers without good reason is strictly prohibited. Fire extinguishers must not be obstructed or moved such that they are not readily available in an emergency. Inspections and maintenance are conducted by Physical Plant, and they should be notified if an extinguisher is discharged or missing.

4. Chemical Emergency Response
In the event of a chemical spill, protection of workers and laboratory personnel should be the primary concern. Chemical spills and releases vary considerably in significance. Minor chemical spills can be controlled by or cleaned up by trained laboratory personnel. Some chemical spills are unable to be controlled and/or cleaned up and require assistance. Such may include accidents where large areas in the work area are impacted by chemicals. The Chemical Hygiene Officer will control activities with assistance from the LUPD, x3434. If the spill release is an immediate threat to the campus, such spill or release may require evacuation of buildings under the direction of the LUPD. LUPD will communicate with New Orleans first responders (Local police, fire, or EMS). If there is a hazardous materials release in an amount that exceeds the reportable quantity, the Louisiana State Police, Right-to-Know Unit and the New Orleans Hazmat Unit will be contacted. Also, a 24-hour emergency spill response contractor may be contacted to contain the spill and stabilize the site.

5. Security Threat
a. Verbal Threats:
   i. Ask Questions: “when, where, what, why”
   ii. If on the telephone, try to get someone to call LUPD on another line while you keep the person on the line.
   iii. Follow guidance of LUPD.

b. Suspicious Packages
   i. Notify LUPD Immediately
   ii. Notify department head, fellow workers, and supervisor
   iii. Remain Calm.

   **Note: Do Not Move or Touch Suspicious Packages**

c. Threatening Individuals
   i. Do not become confrontational
   ii. Observe the person closely and note clothing description, method of travel, any weapons displayed or implied
   iii. Note whether verbal threats or physical threats are made.
   iv. Notify LUPD immediately
   v. Notify department head, fellow workers, and supervisor. Remain calm

6. Storms
LOYOLA has an emergency plan for major storms that must be adhered to. The following general instructions should be followed. General instructions include:
   a. Monitor local radio/TV broadcasts
   b. Adhere to travel warnings
   c. Be aware to the threat to your residence, work area and the route in between
   d. Know the evacuation routes
   e. Be prepared to evacuate
f. Follow the advice presented in University announcements
g. Remain calm

B. Operational Safety & Loss Prevention Plan

1. Assignment of Safety Responsibility
   The assignment of safety responsibility is provided in policy and the LOYOLA Safety Manual. Safety responsibility is assigned to the Director of Construction/Safety and Chief Hygiene Officer who will implement safety programs throughout campus. The policy address accountability as well.

2. Inspection Program
   The inspection programs created by the university include:
   a. Fire Watch Inspections
   b. Fire Extinguishers
   c. Fire Alarms Systems
   d. Building Sprinkler Systems Lighting Surveys
   e. Laboratory Inspections
   f. Hood Inspections

   These Inspections are carried out by various university personnel responsible for implementing corrective action when needed. Inspection frequency ranges from quarterly to annually. Inspection records are kept by Physical Plant. LOYOLA Police patrol the campus on a 24-hour basis.

3. Job Safety Analysis
   Job Safety Analysis are performed for tasks/operations which show a higher than normal accident rate. The JSA is a “step-by-step” review of a job task for hazards and the method used to eliminate or minimize the Hazard Investigation Program

4. Investigation Program
   Accident investigations are the responsibility of the supervisor of the work unit involved. Incase of an injury, the employee or supervisor is to call the ORM (504) 865-3141 to speak to the Director of Risk Management. The Risk Manager can provide direction and initiate the first treatment. The injured employee will need to complete the “Occupational Accident or Illness Report” which is used to document accidents. Accidents involving serious injury (doctor’s care) or significant property damage are investigated by Risk Management in cooperation with the department involved. Accident records and trends analysis are compiled by Risk Management and reported on an annual basis.

5. Safety Meetings
   LOYOLA is classified as a Class B Agency. Therefore, safety meetings are required on a quarterly basis.

6. Laboratory Safety
   The University has several sets of written safety rules. The LOYOLA Safety Manual serves as the general resource for safety and environmental procedures and regulations. The Chemical Hygiene
Plan provides guidance to all laboratory employees regarding the safe handling, use, and storage of hazardous chemicals in compliance with all applicable environmental, health and safety laws, regulations and requirements. Laboratories engaged in the use of hazardous chemicals must maintain a lab-specific Chemical Hygiene Plan which conforms to the Occupational Safety and Health Administration (OSHA) Laboratory Standard, Occupational Exposures to Hazardous Chemicals in Laboratories (29 CFR 1910.1450).

The effectiveness of the Chemical Hygiene Plan, as with all safety programs, depends upon the active support and involvement of all personnel. Loyola University New Orleans has developed this Chemical Hygiene Plan to manage and mitigate risks and to aid faculty, staff, and students in maintaining a safe environment in which to teach and conduct research.

7. Safety Training

Loyola employees have access to safety training provided by the University. Training programs include the following:

a. Laboratory Safety – OSHA Hazardous Communication Standard (HCS) training
b. Asbestos Awareness
c. Driver Safety Training
d. First Aid / CPR / AED
e. Accident Reporting
f. Slip/Trips and Falls
g. Ladder Safety
h. Proper use of Portable Fire Extinguishers
i. Personal Protective Equipment (PPE)
j. Heat Stress
k. 10 Components of Workplace Safety
l. Spill Prevention/Containment
m. Basic Electrical Safety
n. Material Handling
o. Housekeeping

Employees also receive specific training on proper work procedures including safety procedures form departmental supervisors. This training takes place upon initial employment, after job reclassification, and when new a procedure or equipment is introduced.

8. Record Keeping

Document pertaining to safety related actions are kept by the departments. Those records kept include the following:

a. Accident Reports
b. Inspection Reports
c. Accident Investigation Reports
d. JSAs
e. Safety Training Documents
f. Safety Meeting Records

These documents are evaluated, analyzed, and reported on an annual basis.
9. First Aid
The two primary sources of first aid for university employees are Concentra and the LUPD. Concentra is an occupational health clinic and is staffed by several full time nurses and doctors. Injured employees may be treated there when injured on the job. To schedule an initial treatment at Concentra, complete the First Report of Injury and contact the ORM. All LOYOLA police officers are trained in first CPR and first aid techniques. LUPD is staffed on campus 24 hours.

10. Housekeeping Program
The university maintains a Building Services group which insures clean and uncluttered areas. Building Coordinators are responsible for inspecting the building on a quarterly basis to identify safety and fire hazards to allow for mitigation of those hazards.

11. Hazard Control Program
A critical element of an effective safety and health program is an ongoing process to identify or recognize hazards that are present in the workplace. It is the responsibility of the Principal Investigator and Chemical Hygiene Officer to ensure employees and students are aware of the hazards associated with chemicals in the laboratory. This can be accomplished by gathering and reviewing information about the hazards present or likely to be present in the workplace and conducting periodic inspections to identify new or recurring hazards to prevent injuries, illnesses and incidents, and ensure the safety and health of our employees. Hazard recognition is a fundamental component of chemical safety.

The principal sources of hazard communication (HazCom) for determining the health hazards of chemicals are the manufacturer’s or supplier’s SDSs and labels with particular attention given to the Global Harmonization System (GHS) warning and symbols. Any chemical produced in the laboratory, or produced as a by-product, will be assumed to be hazardous unless, or until, its identity can be determined and a specific hazard analysis is performed. Faculty, staff, and students are informed of the elements and function of the OSHA HazCom standard, the hazardous properties of chemicals with which they work, and safe handling procedures and measures to use to protect themselves from chemical hazards.

12. Boiler and Machinery Program
The Physical Plant Department is responsible for the Boiler and Machinery Program. Facility personnel are trained in the operation of the boilers on campus which provides steam for campus heat and power. The inspection of these boilers is completed by the State Fire Marshall’s Office and the insurance agency that provides our insurance policy. Physical Plant also has inspection programs for priority pieces of equipment. Such as fire alarm systems, sprinkler systems, and emergency power systems.

13. Driver Safety Program
The Driver Safety Program consists of Defensive Driver Training, Record keeping, Accident Investigations/Reporting, and Vehicle Inspections. All University employees who regularly drive campus vehicles or regularly drive for campus related business will be given the Defensive Driving Training Course. Driving records are checked by the LUPD and accident investigations are performed by LUPD.
14. Water Vessel Operator Safety Program
   All water vessels owned and/or operated by the University shall meet all Coast Guard and
   Louisiana Department of Wildlife and Fisheries requirements. Each vessel will have on board a
   Coast Guard approved life vest for each passenger, and a cell phone, radio or other
   communication device. Safety equipment including fire extinguisher and an ignition emergency
   shut off device will be required and will be in working order. Any operator of a vessel owned
   by or used by Loyola University students and/or faculty must complete the Louisiana
   Department of Wildlife and Fisheries Boater Safety Program

C. Safety and Environmental Responsibilities

LOYOLA UNIVERSITY NEW ORLEANS is committed to protecting the health and safety of its
students, faculty, staff, and visitors as well as the environment. This is achieved through appropriate
compliance with policies and applicable laws and regulations. Responsibility for the administration of
the University’s environmental, health, and safety program is delegated to the Chemical Hygiene
Officer. However, responsibility for safety resides at all levels within the University.

A brief outline of responsibilities for those persons involved will help in the overall program direction.
The following responsibilities are not all-inclusive, but are designed to give guidance in program
development. Since each laboratory or work area are different, those responsibilities may vary.

1. Senior Management

Management provides the leadership, vision, and resources needed to implement an
effective safety and health program. Management leadership means that senior
leadership:

   a. Make worker safety and health a core organizational value.
   b. Are fully committed to eliminating hazards, protecting workers, and
      continuously improving workplace safety and health.
   c. Provide sufficient resources to implement and maintain the safety and health
      program.
   d. Set an example through their own actions.

2. Deans and Department Chairs

Deans and Department Chairs are responsible for establishing, promoting, and maintaining a culture
of safety within the department/administrative units.

   a. Effectively communicate to students, faculty, staff, visitors, and guests
      the importance of a strong culture of safety and that everyone shares
      in the obligation to perform work in a safe, healthy, and
      environmentally protective manner.
   b. Ensure that environmental, health and safety obligations are carried
      out in the academic departments/administrative units under their
      control.
   c. Ensure that their academic department/administrative units are
      implementing required programs in all applicable subject areas
including hazard communication, chemical inventory, laboratory safety, chemical hygiene plan, and biosafety.

3. Chemical Hygiene Officer

The Chemical Hygiene Officer provides technical guidance and oversight to ensure adherence to federal, state, and local regulations as well as policies and procedures instituted to protect the health and safety of personnel when performing workplace and laboratory procedures involving the use of hazardous chemicals.

In addition, the Chemical Hygiene Officer shall:

a. Provide technical assistance/guidance to administrators, Principal Investigators/Laboratory Directors in developing and implementing chemical hygiene procedures and practices.

b. Elevate concerns to Senior Management.

c. Monitor the institution’s procurement, use and disposal of hazardous chemical materials.

d. Maintain an inventory of all hazardous chemicals in an up-to-date manner.

e. Assist Principal Investigators/Laboratory Managers to develop and implement the use of adequate procedures and use of personal protective equipment to safeguard employee health.

f. Know the current legal requirements with respect to the Chemical Hygiene Plan, regulated substances and disposal methods.

g. Prepare and present safety and environmental training.

h. Manage hazardous waste. Collect, transport, store, and coordinate the disposal of waste generated from research, teaching, art, and facilities support.

i. Investigate incidents with recommendations to enhance safety and environmental procedures.

j. Coordinate emergency procedure and fire department activities related to hazardous chemicals.

k. Conduct audits to determine the implementation and effectiveness of the Chemical Hygiene Plan and compliance with university policy and governing federal and state regulations.

4. Biological Safety

Biological Research at Loyola University New Orleans must be carried out in a way as to ensure the safe and proper use of all biologically hazardous materials and to maintain the safety and welfare of the University Community, the public and the environment. The Chemical Hygiene Officer assists in this effort by providing information, guidance, and training in Biosafety fundamentals and regulatory affairs at the federal, state and local levels. In addition, the Chemical Hygiene Officer works closely with various University committees that oversee research and safety such as the ad hoc Institutional Biosafety Committee (IBC) and Institutional Animal Care and Use Committee (IACUC).

5. Principle Investigator/Laboratory Managers
a. Ensure that all laboratory personnel understand and follow all protocols and
   guidelines covered in the Chemical Hygiene Plan.

b. Ensure that appropriate personal protective equipment is available and that it provides
   adequate protection from laboratory hazards, including chemical hazards.

c. Promote good housekeeping to avoid potential hazards and accidents.

d. Identify all jobs/procedures requiring the use of hazardous chemicals and list those
   chemicals.

e. Maintain an up-to-date chemical inventory in the University’s chemical inventory
   management system. Changes to the inventory should be made as they occur. A
   review of the entire inventory will be conducted at least annually.

f. Notify the Chemical Hygiene Officer of any operating changes affecting the hazardous
   chemicals being used or new chemical hazards being introduced into the laboratory.

g. Ensure that all laboratory personnel have received safety training and up-to-date
   records are maintained of all employees required to handle hazardous chemicals.

h. Report to the Chemical Hygiene Officer all workplace injuries, chemical exposures,
   incidents, or unsafe conditions.

i. Make routine surveys of the work area to ensure practices are being followed.

j. Ensure manufactures'/suppliers' labels have not been defaced or removed.

k. Ensure that a copy of the Safety Data Sheets (SDSs) are readily accessible to workers
   immediately upon request.

l. Enforce applicable safety and health rules.

D. University Safety Committee

1. Responsibilities

   The University Safety Committee is an advisory committee reporting to the Risk Manager.
   The Committee works in such a manner as to enlist cooperation of members of the University
   community in the safety and environmental program at every level of management within the
   University.

2. Duties of The University Safety Committee

   a. The University Safety Committee shall assist the Safety Officer in reviewing safety
      problems, developing means and methods for resolving the problems and in developing
      the necessary procedures for placing the acceptable means into effect. Specifically, the
      Safety Committee shall:

   b. Assist in developing safety education/training programs designed to create and maintain
      an interest in job safety.

   c. Review reports of serious accidents or fires.

   d. Provide suggestions and recommendations to correct hazardous conditions and/or unsafe
      work practices.

   e. Recommend those changes to existing practices or new practices to maximize
protection for campus safety and environment.

f. Recommend physical or structural alterations required to eliminate or control hazards.

E. Fire Protection/Means of Egress

LOYOLA is required to comply with regulations promulgated and enforced by such agencies as the Office of the State Fire Marshal and the Department of Environmental Quality (DEQ), and is subject to enforcement actions by these agencies.

In order to evaluate the state of an existing building, the Building Coordinator shall inspect, or have inspected the building on a quarterly basis using inspection report forms available from the Risk Management office. A copy of the inspection report shall be filed with Risk Management.

Areas of considerable concern include exits and means of egress, panic hardware, locking or obstructing exits and passageways, exit signs and exit ways, fire alarms, fire extinguishers, emergency lighting, sprinkler systems, house-keeping and evacuation diagrams.

1. Exit and Means of Egress

Exits shall be so located and exit access shall be so arranged that exits are readily accessible at all times. Where exits are not immediately accessible from an open floor area, safe and continuous passageway, aisles or corridors shall be maintained leading directly to every exit and shall be so arranged as to provide convenient access for each occupant to at least two exits by separate ways of travel.

In no case shall access to an exit be through kitchens, store-rooms, restrooms, closets, bedrooms, or similar spaces or other rooms subject to locking (above does not apply specifically to dormitories, one may contact Safety for clarification).

Ways of exit access and the doors to the exits to which they lead shall be clearly recognizable. Hangings or draperies shall not be placed over exit doors or otherwise located so as to conceal or obscure any exit. Mirrors shall not be placed on exit doors. Mirrors shall not be placed so as to confuse the direction of exit.

2. Panic Hardware for Required Exits

Panic hardware is required in some instances by code, and consists of a door latching assembly device which releases the latch upon the application of a force in the direction of exit travel. Only approved panic hard-ware shall be used.

Required panic hardware shall not be equipped with any locking or dogging device, setscrew, or other arrangement which can be used to prevent the release of the latch when pressure is applied to release bar (for special locking arrangement, contact Physical Plant).

3. Locking or Obstructing Exits and Passageways

A door shall be so arranged as to be readily opened by the occupant to provide egress at all times when the building is occupied. A latch or other fastening device on a door shall be provided with a knob, handle, panic bar, or other simple type of releasing device; the method of operation shall be obvious even in darkness.
All means of egress should be clear of obstructions.  
*It Is Strictly Prohibited to Chain an Exit Door Closed if a Building Is Occupied.*

4. Exit Signs

Every required sign designating an exit or way of exit access shall be so located and of such size, distinctive color, and design as to be readily visible and shall provide contrast with decorations, furnishings, or equipment which impair visibility of an exit sign. There shall not be any brightly illuminated sign, display, or objects in or near the line of vision to the required exit sign of such a character as to detract attention from the exit sign.

Every exit sign shall be suitably illuminated by a reliable light source. Externally and internally, illuminated signs shall be visible in the normal and emergency lighting mode.

A sign reading "EXIT" or similar designation with an arrow indicating the direction of the nearest approved exit shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

5. Emergency Lighting

Illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use. Artificial lighting shall be employed at such places and for such periods of time required to maintain illumination. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators and passageways leading to an exit.

6. Fire Alarms

a. Activation of the protective system shall occur by any or all of the following means but not limited thereto:
   i. Manual fire alarm initiation
   ii. Automatic heat detection
   iii. Automatic smoke detection
   iv. Extinguishing system operations
b. Each manual fire alarm station on a system shall be accessible, unobstructed, visible, and of the same general type.
c. The general evacuation alarm shall operate throughout the entire building.
d. Audible alarm indicating devices shall be of such character and so distributed as to be effectively heard above the ambient noise level obtained under normal conditions of occupancy.
e. The fire alarm and heat/smoke detection system shall be tested periodically and the results of the test recorded.

7. Portable Fire Extinguishers

a. Portable fire extinguishers shall be chosen for the class of fire expected. Class of fire refers to the nature of the fuel involved as follows:
   i. Class A Fires involving ordinary combustible materials such as wood, cloth, rubber, and many plastics.
   ii. Class B Fires involving flammable or combustible liquids, flammable gases,
and similar materials.

iii. Class C Fires involving electrical energy.

iv. Class D Fires involving certain combustible metals such as magnesium, titanium, sodium, potassium, etc.

**NOTE:** The fire class shall be designated on the extinguisher itself.

b. Extinguishers mounted in cabinets, wall recesses, or brackets shall be placed in such a manner that the operating instructions shall face outward. Extinguishers shall not be obstructed or obscured from view, and cabinets housing extinguishers shall not be locked.

c. Extinguishers shall be periodically checked and/or maintained, tagged, and dated.

d. In general fire extinguishers must be mounted such that travel distance to an extinguisher does not exceed 75 feet.

8. Storage of Flammables

Storage of flammable materials shall be made in fireproof containers. State buildings and public places of assembly shall be regularly policed to clean up and place in fireproof containers all flammable materials. All places of storage shall be arranged and maintained in such a manner that exit from said places and access to said places for the purpose of firefighting is not in any way impeded.

**NOTE:** Gasoline, paint, or other flammable liquids shall not be stored under stairwells or in halls, aisles, corridors, or passageways.

9. Evacuation Diagrams

Evacuation diagrams shall be placed on each floor or bulletin boards or areas where persons gather. Diagrams shall indicate where those individuals are and the safest and most direct route out of the building.

Periodic inspection of large assembly areas and unusual structures such as stadium, theater shall be completed.

F. Laboratory Emergency Equipment

Emergency safety showers and eyewash stations provide the first line of defense from chemical splashes and burns, or when foreign particles enter the eyes. The ANSI Standard Z358.1-2014 - Emergency Eyewash and Shower Equipment provides guidance by stating that emergency eyewash stations and/or emergency safety showers be readily accessible in areas where hazardous chemicals are used. All laboratories and areas where faculty, staff, students, or visitors are exposed to hazardous materials (hazardous chemicals or infectious biological material) must have access to emergency equipment. Everyone in the laboratory or work area must know where the emergency equipment is located, and how to use it.

Protective equipment (safety glasses or chemical splash goggles and lab coats) must be worn when working with hazardous chemicals as the first line of defense. Emergency safety showers and eyewash stations are not a substitute for proper primary protective devices.
Emergency Eyewash Station
The ANSI standard outlines specific requirements related to flow requirements, use of tepid water, and inspection and testing frequencies. ANSI defines tepid water as “A flushing fluid temperature conducive to promoting a minimum 15-minute irrigation period.”

In the event of eye contamination, the laboratory worker should immediately go to the nearest eyewash, hold eye open, and flush for a minimum of 15 minutes to get maximum irrigation of the eye. Personal eyewash bottles are not to be substituted for plumbed eyewash stations. These bottles do not provide enough water to flush contaminated eyes for 15 minutes. These bottles should be kept in the immediate vicinity of staff working in a potentially hazardous area to supply immediate flushing. After this initial flushing, the injured individual must then proceed to a plumbed eyewash and flush the eyes for the required 15-minute period.

Plumbed emergency eyewash stations must be activated weekly to verify that it is working properly. Weekly testing helps clear the supply lines of sediment and bacteria build-up that is caused by stagnant water. Eyewashes must be inspected for leaks, corrosion, and damage to plumbing.

The instructors and Prime Investigator perform and document weekly testing. Malfunctioning eyewashes are reported to Physical Plant.

Emergency Safety Shower
Emergency safety showers should be present in or near areas where there is a potential for significant quantities of a hazardous chemical to be splashed onto the body. ANSI requires that a safety shower be no farther than a 10 second travel time of being exposed to a hazard. In the event of an emergency, the safety shower must be used to flush off contaminants from skin and clothing providing a minimum water flow of 20 gallons per minute for at least 15 minutes without operator intervention. The safety shower water temperature should be tepid or lukewarm (i.e., between 15° and 38°C or 60° and 100°F). Seek medical attention after flushing. The Chief Hygiene Officer and Physical Plant performs annual testing of the emergency showers.

III. ADMINISTRATIVE ELEMENTS

A. Workers’ Compensation
What to do in the case you or one of your employees is hurt in a work-related injury:

Please remember that work-related injuries can occur on or off campus.

If this is a severe injury, seek medical treatment immediately. Otherwise, please review the following steps:

1. Contact Risk Management at (504) 865-3141 or (504) 723-7870.
2. The injured employee and supervisor each will complete an accident report. Both reports can be found at Worker's Compensation Forms | Worker's Compensation Forms (Loyola University New Orleans.edu).
3. Once submitted, the reports are sent to Risk Management so the claim can be set up and the initial medical treatment is coordinated. We prefer to use Concentra occupational medical clinic.
4. See the healthcare provider.
5. Follow up medical appointments, treatments and physical therapy appointments must be approved by your adjuster.
6. Follow up medical appointments, treatments and physical therapy appointments should be scheduled after normal business hours. If not, they should be scheduled at the beginning/end of your normal work day.
7. The employee will forward all paperwork from follow up appointments to me at claims@Loyola University New Orleans.edu including any bills that may be received.

For more questions regarding Workers' Compensation, call me or review our policy at Worker's Compensation | Loyola University New Orleans (Loyola University New Orleans.edu).

B. Fire Alarm Response
   1. Policy
      This Standard Operating Procedure (SOP) has been implemented in order to give direction to LUPD officer and Facilities personnel responding to an activated fire alarm on the campus of Loyola University New Orleans.
   2. Procedures
      a. When a fire alarm activation is reported, LUPD officers will respond to the location;
      b. Officers will determine the location of the activation, typically from the fire panel in the building;
      c. Officers will go to the area of activation to determine if there is an actual fire, signs of a fire and/or the cause of the activation;
      d. Depending of what is found, officers will respond accordingly;
         i. If there is a small fire, officers will attempt to extinguish
         ii. If the fire is not small enough for an office to deal with, officers will assist with evacuation of building and wait on the New Orleans Fire Department (NOFD)
         iii. The preservation of life will be the priority for responding officers
      e. If manpower allows, one officer should meet NOFD and direct them to the location of the alarm;
      f. If manpower allows, other officers will assist with any evacuation of the building as needed;
      g. If/when NOFD and police determine there is no danger, they will silence/reset the fire alarm system. If there is trouble with the alarm system or any of its components, Facilities staff will be contacted and should coordinate with NOFD and other personnel to resolve the issue as soon as possible.
      h. Once the issue is resolved, the all clear can be given and those who evacuated will be allowed back into the building;
      i. Officer will create a report to document the alarm activation and response
IV. SAFETY PROCEDURES

A. Fire Safety in Dormitories

Fire Hazards on Campus

1. Carelessness with cigarettes, matches, etc., account for the greatest number of residence hall fires. Loyola University is a smoke-free campus. Cigarettes, pipes, vaping devices, etc. are not allowed on campus.

2. Candles can be dangerous. Leaving them burning unattended or too close to combustible materials can lead to fires. Candles are prevented in the residence halls.

3. Some decorations ignite easily and allow a fire to spread rapidly. These include holiday decorations, large posters, filmy curtains, and flammables tacked to the ceiling.

4. Accumulations of trash and newspapers, especially in corridors and stairwells, are a fire hazard. Report such accumulations to a Resident Assistant.

5. Common materials like paint, paint removers, hair spray, duplicator fluid, and thinners can be fire hazards if they are handled or stored improperly. Certain materials are prevented from being stored in the residence halls.

6. Careless use of heat-producing appliances can start fires. Especially hazardous are:
   a. Hot plates left on and unattended or grease build up on coils. Residential Life limits the type of open coil devices that can be on campus.
   b. Electric blankets left on when resident is not in bed.
   c. Irons left on, lying down, unattended, or used on a bed.
   d. Toaster ovens left on, with accumulated grease, or unattended.
   e. Hair dryers laid down while they are on or used to dry clothes.
   f. Portable space heaters placed near combustibles like curtains or used to dry clothes.
   g. Portable space heaters are not allowed in the residence halls.

7. Setting fires on purpose is a leading cause of campus fires. Arson is a serious crime that can result in unnecessary deaths. Arsonists shall be prosecuted to the full extent of the law.

8. False alarms are also a hazard. They create a mood of apathy so you may not react quickly enough to save your life if there is a real fire. If fire fighters are out on a false alarm, they will not be available to fight a real fire. Individuals caught setting false alarms shall face disciplinary action and possible prosecution.

Fire Safety Features

1. Fire extinguishers are designed to fight small fires. Some important guidelines are:
   a. Find out where they are located and what kind of fires they are designed to fight.
   b. Learn in advance how to operate them properly.
   c. Do not block access to extinguishers.
   d. Report all extinguishers that are missing, damaged, or have been discharged.
   e. Do not empty fire extinguishers as a prank.

2. Fire Alarms
   a. Know where alarms are located.
b. Learn how to activate them.
c. If you hear a fire alarm, alert as many people in the building as possible and evacuate the building.

3. Fire Doors
   a. Prevent fire and smoke from spreading and provide a safe escape route.
   b. Keep fire doors closed at all times. Report any that need repair or have been propped open.
   c. Do not block access to fire doors.

Note: Doors with automatic closers should remain open—they will close by themselves in the event of fire.

4. Fire Exits
   a. Know how to find them, even if it is dark and smoky.
   b. Do not use them as porches or balconies.
   c. Keep them free of obstructions such as plants, bicycles, storage boxes, etc.

5. Emergency Numbers
   a. Emergency numbers shall be clearly posted next to phones or on bulletin boards, etc., for quick dialing.
   b. In the event of fire or other emergency, call Campus Police at 911. If injury is involved, tell the police; they will alert EMS and the Infirmary.

6. Smoke detectors alert while there is still time to escape. Remember, smoke is the greatest danger in a fire.
   a. Check their location near your room.
   b. Do not hang things over them or cover them up.
   c. Test regularly, if authorized to do so.

**Fire Prevention for Students**

Follow all campus rules and take the following precautions:

1. Smoking
   a. Smoking is not allowed on campus.

2. Housekeeping
   a. Do not pile books and magazines on radiators.
   b. Store combustibles away from ignition sources.
   c. Empty wastebaskets often.
   d. Keep exits clear of possessions and trash at all times.
   e. Store flammable liquids (including paint and paint remover) in proper metal containers.
   f. Store incompatible chemicals with adequate separation.
3. Appliance Use
   a. Use appliances according to manufacturer’s recommendations.
   b. Do not leave heat-producing appliances unattended. Unplug them when
      not in use, and let them cool before storing. Do not cover ventilation
      openings on TVs, stereos, and radios.
   c. Unplug all appliances before leaving on vacations.
   d. Check appliances for damaged cords and circuits. Have faulty appliances
      repaired or discard them.
   e. Do not overload circuits by plugging too many appliances into one outlet. Use
      heavy duty UL approved extension cords to increase cord length, not to plug
      in more appliances.
   f. Do not use hot plates, grills, or other appliances in your dormitory if they are
      prohibited. Open coil devices are limited to their use on campus.
   g. Halogen lamps shall not be used in dormitory rooms.

4. Other Precautions
   a. Decorate for holidays or parties with flame-retardant or noncombustible
      materials. Remove them before leaving for the holidays. Use artificial Christmas
      trees. Check lights for damaged wires and loose connections. Unplug lights
      before leaving the room.
   b. Never store motorcycles, mopeds, or gas cans indoors. Any spark—even from
      turning on a light—can ignite gas vapors.
   c. Use grills and hibachis only where permitted—never indoors, next to
      buildings, on fire escapes, or on stairways. Do not leave them unattended
      while fire is burning.
   d. Do not tamper with emergency equipment. Leave extinguishers and alarms
      alone except in a fire emergency. Never disconnect a smoke detector.
   e. Report damaged or missing extinguishers, alarms, smoke detectors, or
      exit signs to a Resident Assistant or to Facility Services.
   f. Make a plan:
      i. Think about how you would exit from different areas of your
         residence hall/classroom building.
      ii. Decide on at least two exits (primary and alternate) from your room,
         classroom, etc.
      iii. Count and remember the number of doors between the room
         and the exits.
      iv. Take special note of the location of safety equipment and of
         exits in other buildings.
      v. Have an outside meeting place to get a head count.

5. Fire Drills

Fire and smoke drills are very important, especially in residence halls. If you know what to do, you
are less likely to panic. (Some drills may be held at night to practice escaping in the dark.) Take fire
drills seriously; they may save your life. Follow directions of the person in charge.
6. In Case of Fire:
   a. Stay calm. Think out what you have to do. Then act because every second counts.
   b. Sound alarm to warn others. Pull the alarm box. If there is none, shout and pound on doors as you evacuate. Never ignore an alarm. (In buildings equipped with smoke detector systems, the alarm will sound automatically—if it doesn’t, pull the alarm!)
   c. Call 911.
   d. Give full address clearly.
   e. Describe extent of fire.
   f. Answer any questions before you hang up/
   g. If you are in your room when you hear an alarm, feel the door, from bottom to top (heat rises). If it is hot, don’t open it. Stay in your room.
   h. If it is cool, open it a crack—but be ready to slam it shut if you find smoke or flames. Leave if corridor seems safe.

   i. If you can exit:
      i. Take your key and walk to nearest exit if there is no smoke. If there is smoke or if it is dark, crawl to exit, counting doors so you don’t get lost.
      ii. Close all doors behind you.
      iii. Do not use elevators—they are deathtraps in a fire. Use the stairs; hold on to rail.
      iv. Turn back if you encounter heavy smoke (it is deadly) and look for another exit.
      v. Stand clear of the building and out of the way of the fighters when you get outside.
      vi. Never go back into a burning building for any reason. Report to your meeting place.

   j. If you are trapped in your room:
      i. Keep your door closed.
      ii. Seal cracks around door with tape, clothes, sheets, etc.
      iii. Open windows slightly, if there is no smoke outside. Open at top (to vent smoke) or at bottom (to let in fresh air).
      iv. Tie wet cloth over nose and mouth to aid breathing.
      v. Stay low, where air is fresher (smoke rises).
      vi. Signal rescuers by waving a sheet or clothing out the window, or telephone for help.
      vii. Do not jump if you are higher than two stories.

   k. If clothing catches fire—Stop, Drop, and Roll!
      i. Do not run—it will fan the flames. Drop to the floor and roll out fire.
      ii. Drop and roll someone else on the ground. Use a rug, coat or blanket to smother flames.
      iii. Cool the burn with cold water. Get prompt medical attention.
FIRE EXTINGUISHERS

1. Types of Fires:
   a. Class A—Ordinary combustibles such as wood, paper, cloth, some rubbers, and plastics.
   b. Class B—Flammable liquids such as gasoline, oils, grease, tars, lacquer, and oil-based paints.
   c. Class C—Energized electrical equipment such as fuse boxes, electrical outlets, circuit breakers, wiring, appliances, and other machinery.
   d. Class D—Combustible metals such as fires involving titanium, magnesium, lithium, potassium, or sodium.

2. Types of Fire Extinguishers:
   a. Fire extinguishers come in various shapes, sizes, colors, and types. They shall only be used on the type of fire they are rated for. Before an emergency arises, it is recommended that all employees/students read and understand the directions on the fire extinguisher(s) in their area.
   b. A water extinguisher is designated by an “A” inside a green triangle on the label and is easily recognized by its silver container. This extinguisher is only to be used on Class A type fires. CAUTION: Do not use on electrical fires.
   c. A CO2 extinguisher is designated by a “B” in a red square and a “C” in a blue circle on the label and is easily recognized by the large black discharge horn. This type of extinguisher is only to be used on Class B and/or C type fires. CAUTION: Do not use in a confined space.
   d. Multi-Purpose and Ordinary Dry Chemical extinguishers are designated by an “A” inside a green triangle, a “B” inside a red square, and a “C” inside a blue circle on the label respectively. It is easily recognized by its red container and/or piggy back cartridge. This type of extinguisher is only to be used on Class B and/or C type fires, while multi-purpose dry chemical can also be used on Class A type fires. CAUTION: Respiratory irritant, if inhaled.
   e. Halon 1211 extinguishers are labeled by the same designations as a multi-purpose dry chemical extinguisher, “ABC.” Halon is usually packaged in a red A B Container similar to a dry chemical extinguisher, but it is usually not recognizable until the label is read. This extinguisher is for use on Class A, B, and C type fires. CAUTION: Do not use in a confined space.

NOTE: A Halon 1211 or CO2 fire extinguisher is recommended for use in computer rooms or in areas where electronic equipment is located. Dry chemical and water extinguishers are not.

   f. A Combustible Metal fire extinguisher is designated D by a “D” inside a yellow star on the label. This extinguisher is only for use on Class D type fires.

3. How to Use a Fire Extinguisher:
   a. The method described below is a standard application for how to use a fire extinguisher; however, it is highly recommended that all employees/students read and understand the directions on the fire extinguisher(s) in their area. This method does not apply to all portable extinguishers.
   b. To use extinguisher, remember P A S S.
Pull the pin. (Some may require pressing a puncture lever or releasing a lock hatch.)

Aim the extinguisher nozzle or cone at the base of the fire.

Squeeze or press the handle.

Sweep from side to side at the base of the fire until it appears to be out. With a water extinguisher, place your finger over the nozzle to create a mist. Stop the extinguisher, check the fire area, and (if necessary) continue your extinguishment efforts. Always back away from a fire so you will not be caught off guard.

Fire Drills

1. For persons to respond properly when a fire occurs, they shall know there is a fire due to the alarm, they shall have adequate means of egress, and they shall have a plan of action. A fire drill is needed to test that plan of action.
2. The fire drill also helps to minimize panic and confusion among the occupants who sometimes may change rooms/dorms every semester.
3. Unannounced fire drills shall take place at three times a semester, with one fire drill occurring between the hours of 1am and 4am. Building Coordinators for each Residence Hall will fill out a Fire Drill form after the evacuation.
4. Community Directors and Professional Staff have responsibility for managing fire alarm procedures. LUPD will assist when available or in the case of an actual fire.
5. When a Fire alarm is notified, student staff members will notify the professional staff on call or the main office.
6. Student staff in the building should knock on door as the exit, telling residents to leave the building.
7. Student Staff and Professional staff will direct residents to the building evacuation meet up location.
   a. For Cabra and Founders Hall, they exit to the front of the Loyola University Law school
   b. For Biever, Buddig, and Francis Family Hall, students exit to the Peace Quad
8. Student Staff will gather their residents and take attendance of who is there.
9. Professional staff will stay at the entrance of the building, as long as it is safe, and provide guidance for students who are exiting.
10. After all students have exited, the professional staff will wait to receive the all clear from LUPD or the Fire department.
11. Once this is done, student staff will check rooms to ensure that no student stayed in the building during the fire drill.
12. Once this has been completed, the professional staff will allow the students to enter back into the residence hall and complete the Fire Drill report.

Guide for Fire-Safe Christmas Decorations in Student Rooms

1. Because Christmas decorations are an extreme fire hazard, the following limitations on decorations are necessary:
2. All decorations shall be fire resistant.
3. Natural Christmas trees are not permitted in Residence Halls. Because most Christmas trees must be cut well in advance of use, they dry out to a considerable degree and are too combustible for safe use.
4. The use of burning candles is very dangerous and is therefore prohibited.
5. Door decorations or foil shall be suspended from the edges of the door. Remember that tape and other adhesives may cause damage on the door surfaces. Keep electrical decorations away from the metal door frames; do not string lights so that the door could close on the wiring.
6. Check extension cords to insure that they do not have breaks in the insulation. Keep the use of extension cords to a minimum. Use them only for a limited number of small lights, not for appliances.
7. All decorations shall be removed prior to Christmas vacation to facilitate hall cleaning.
8. From a fire safety viewpoint, metal/plastic trees are desirable because they are not combustible. Illuminate metal trees with indirect lighting (remotely located spotlights or flood-lights). Defective lighting sets placed on the tree may energize the tree with enough voltage to injure someone touching it or cause a short circuit.
9. Artificial trees labeled as made of non-burning materials may be used. Only approved cool bulbs shall be used on lighting strings.
10. When decorating rooms and room doors, use only noncombustible material such as foil, glass, or metal. Do not use untreated cotton batting, flock, or paper as they ignite easily and burn continuously. Approved for the door decorations are: (1) all foil wrapping paper, and (2) small Christmas pictures applied to foil. Doors may be totally decorated if decoration or foil is suspended from the edges of the door.
11. No cut boughs shall be used in student rooms or on doors. Candles are permissible on dining room tables but must not be used in student rooms or public areas. Placing cut tree boughs around a burning candle is extremely dangerous. No exit from the individual floors or houses shall be blocked by Christmas decorations.

If a fire occurs:
1. clear everyone out of the building by pulling the evacuation (fire) alarm,
2. call Campus Police at 911, and
3. contact an advisor. Fight the fire only if you can do so safely, keeping an exit route open. Otherwise, close doors to confine the fire and exit out-of-doors.

Guide for Safe Christmas Decorations in Other Common Areas
1. Natural Trees
Due to their extreme fire hazard, natural trees are not allowed in residence halls.
2. Artificial Trees
   a. Choose only those labeled as made of non-burning materials.
   b. Use only approved cool bulbs in lighting strings.
   c. Tree decorations shall be fire resistant.
   d. Illuminate metal trees with indirect lighting. Lighting sets placed on the tree may “charge” the tree with enough voltage to burn or fatally injure someone touching it.
   e. Lights shall be turned on only for parties. Conserve energy—do not leave lights on.
3. Decorations
   a. Carefully inspect any electrical decorations for frayed cords or exposed
metal parts. Destroy any which have defects.
b. Do not use extension cords.
c. Do not use burning candles. Candles (enclosed in glass) are permissible on
dining room tables but shall not be used in student rooms or public areas.
d. Do not use cotton batting, flock, and paper unless you are sure they are fire-
resistance treated.
e. Do not use boughs cut from natural trees.
f. Do use decorations made of metal, glass, foil, etc.

4. If a fire occurs:
a. Clear everyone out of the building and sound the evacuation (fire) alarm;
b. Call Campus Police at 911; and
c. Fight the fire only if there is no risk to your life. Otherwise leave the area,
closing doors behind you.

B. Electrical Safety

1. Electric Codes and Safety Standards

The Occupational Safety and Health Administration (OSHA) standards form the
basis of our electrical safety rules. These standards apply to general industry and
construction. OSHA draws its standards from the National Electric Code (NEC),
National Electric Safety Code (NESC) and from consensus bodies such as ASTM and
ANSI. All employees should be familiar with these requirements as they apply to their
areas of work.

2. Medical Services and First Aid

The Loyola University Police Department and the City of New Orleans provides
emergency medical services and first aid on campus.

3. Employee Training

Employees in occupations listed in the following table are believed to face electrical
hazard risk and are required to be trained as shown.

Electrical Safety Training Requirements:

<table>
<thead>
<tr>
<th>Position</th>
<th>Electrical Safety (Awareness)</th>
<th>Electrical Safety (Basic)</th>
<th>Electrical Safety (Advanced)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Electricians</td>
<td></td>
<td>X</td>
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</tr>
<tr>
<td>Inside Electricians</td>
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<tr>
<td>Plumbers</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Carpenter and Painters</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

NOTE: Other employees who also may reasonably be expected to face comparable
risk of injury due to electric shock or other electrical hazards must also be trained. The training required shall be of the classroom or on-the-job type.

a. Employees shall be trained in and familiar with the electrical safety-related work practices covered in this manual that pertain to their respective job assignments. Training must be documented. Qualified persons (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in and familiar with the following:

   i. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.
   ii. The skills and techniques necessary to determine the nominal voltage of exposed live parts.
   iii. The clearance distances specified in the approach distances table and the corresponding voltages to which the qualified person will be exposed.
   iv. Qualified persons whose work on energized equipment involves either direct or indirect contact shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

Note: The supervisor shall determine, through regular supervision and through inspections conducted on at least an annual basis that each employee is complying with the safety-related work practices required by this manual. Employees must be retrained upon introduction of a new procedure or new equipment on which the employee has not been trained.

b. Employees who work in areas where they are not normally exposed to electrical hazards shall be trained or made familiar with the requirements for unqualified workers to protect them around electrical installations. For example, landscape personnel who maintain the grounds around an electrical substation should be familiar with the safe approach distances for unqualified employees.

4. General Electrical Safety Precautions

a. Existing conditions related to the safety of the work to be performed shall be determined before work on or near electric lines or equipment is started. Such conditions include, but are not limited to, the nominal voltages of lines and equipment, the presence of hazardous induced voltages, the presence and condition of protective grounds and equipment grounding conductors, the condition of poles, environmental conditions relative to safety, and the locations of circuits and equipment, including power and communication lines and fire protective signaling circuits. The employee in charge shall conduct a job briefing with the employees involved in an electrical job before they start each job. The briefing shall cover at least the following subjects: hazards associated with the job, work procedures involved, special precautions, energy source controls, and personal protective equipment requirements.
b. When an unqualified person is working on the ground or above ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given below. (An employee who is not trained to work near electrical circuits is considered to be unqualified):

   i. For voltages to ground 50kV or below – 10 feet (305 cm);
   ii. For voltages to ground over 50kV – 10 feet (305 cm) plus 4 inches (10 cm) for every 10kV over 50kV.

c. Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

   i. If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10 kV over that voltage.
   ii. If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not apart of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.
   iii. If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified (trained) person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in the approach distances table above.

d. Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:

   i. The employee is using protective equipment rated for the voltage; or
   ii. The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than the clearance distances permitted above.

   iii. Note: If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact.
Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

e. Work on electrical circuits and equipment should always be performed with the circuit or equipment de-energized and locked/tagged out. Only in special circumstances where the power cannot be reasonably turned off may work be performed on or near an exposed energized circuit. Safe procedures for de-energizing circuits and equipment shall be determined before circuits or equipment are de-energize using the following guidelines:

i. The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

ii. 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.

   I. Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

iii. Stored non-electrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

iv. Each disconnecting means used to de-energize circuits and equipment on which work is to be performed shall be locked/tagged. When a lock is used, it shall be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools. If a lock cannot be applied, or if the employee believes that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

v. Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

vi. A tag used without a lock, shall be supplemented by at least one additional safety measure (such as the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device) that provides a level of safety equivalent to that obtained by use of a lock.

vii. A lock may be placed without a tag only where only one circuit or piece of equipment is de-energize, and the lockout period
does not extend beyond the work shift.

viii. In order for equipment to be considered and worked as de-energize, a qualified person must operate the equipment operating controls or otherwise verify that the equipment cannot be restarted; and use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and 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 backfeed 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 after this test.

ix. To reenergize conductors or equipment, even momentarily, the qualified person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energize.

x. Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.

xi. Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision, unless the employee is absent from the workplace, in which case the lock or tag may be removed by a qualified person designated to perform this task after a visual determination that all employees are clear of the circuits and equipment. An employee whose lock or tag has been removed shall be informed before he or she resumes work at the worksite.

f. A trained (qualified) employee may not approach or take a conductive object without an approved insulating handle closer to energized electrical conductors than the distances in the chart below unless they are protected from harm by one of the following means:

   i. They are insulated from the conductor by wearing properly rated insulating gloves, or

   ii. The energized part is insulated both from all other conductive objects at a different potential and from the person, or

   iii. The person is insulated from all conductive objects at a potential different from that of the energized part (live line work).

g. Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform tasks near exposed energized parts. Employees shall not reach blindly into areas which may contain energized parts. The points of control shall be so located that persons are not likely to come in contact with any live part or moving part of the equipment while turning on the
An extension cord used with grounding type equipment shall contain an equipment grounding conductor. Attachment plugs and receptacles may not be connected or altered in a manner which would prevent proper continuity of the equipment grounding conductor at the point where plugs are attached to receptacles. Adapters which interrupt the continuity of the equipment grounding connection may not be used.

Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided. Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

Only a qualified (trained) person may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

Portable electrical equipment, including power tools and extension cords, shall be handled in a manner which will not cause damage. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment. Flexible cords may not be fastened with staples or otherwise hung in such a fashion as could damage the outer jacket or insulation.

Portable cord and plug connected equipment and extension cords shall be visually inspected before use for external defects (such as loose parts, deformed and missing pins, or damage to outer jacket or insulation) and for evidence of possible internal damage (such as pinched or crushed outer jacket). Cord and plug connected equipment and extension cords which remain connected once they are put in place and are not exposed to damage need not be visually inspected until they are relocated. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service, and no employee may use it until repairs and tests necessary to render the equipment safe have been made.
q. Portable electric equipment and flexible cords used in highly conductive work locations (such as those inundated with water or other conductive liquids), or in job locations where employees are likely to contact water or conductive liquids, shall be approved for those locations.

r. Employees’ hands may not be wet when plugging and unplugging flexible cords and cord and plug connected equipment, if energized equipment is involved. Plugs and receptacles shall be dry when being handled without protective gloves.

s. Locking type connectors shall be properly secured after connection.

t. Load rated switches, circuit breakers, or other devices shall be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors not of the loadbreak type, fuses, terminal lugs, and cable splice connections may not be used for such purposes, except in an emergency.

u. After a circuit is de-energized by a circuit protective device, the circuit may not be manually reenergized until it has been determined that the equipment and circuit can be safely energized. The repetitive manual reclosing of circuit breakers or reenergizing circuits through replaced fuses is prohibited. When it can be determined that the automatic operation of a device was caused by an overload rather than a fault condition, no examination of the circuit or connected equipment is needed before the circuit is reenergized.

v. Overcurrent protection of circuits and conductors may not be modified to increase the permissible current above the rating of the conductors/equipment.

w. Only qualified persons may perform testing work on electric circuits or equipment.

x. Test instruments and equipment and all associated leads shall be properly rated and visually inspected for external defects and damage before the equipment is used. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service, and no employee may use it until repairs and tests necessary to render the equipment safe have been made.

y. Where flammable materials are present only occasionally, electric equipment capable of igniting them shall not be used, unless measures are taken to prevent hazardous conditions from developing. Such materials include, but are not limited to: flammable gases, vapors, or liquids; combustible dust; and ignitable fibers or flyings.

Note: Electrical installation requirements for locations where flammable materials are present on a regular basis are contained in NFPA 70.

aa. Before employees work on power line voltage capacitors, the capacitors shall be disconnected from energized sources and, after a wait of at least 5 minutes from the time of disconnection, short-circuited.

bb. Before the capacitor units are handled, each unit in series-parallel capacitor banks shall be short-circuited between all terminals and the capacitor case or its rack. If the cases of capacitors are on ungrounded substation racks, the racks shall be bonded to ground.

cc. Any line to which capacitors are connected shall be short-circuited before it is considered de-energize.

dd. The secondary of a current transformer may not be opened while the transformer is energized. If the primary of the current transformer cannot be de-energize before work is performed on an instrument, a relay, or other section of a current transformer secondary circuit, the circuit shall be bridged so that the current transformer secondary will not be opened.

e. Before work is begun in the vicinity of vehicular or pedestrian traffic that may endanger employees, warning signs or flags and other traffic control devices shall
be placed in conspicuous locations to alert and channel approaching traffic. Where additional employee protection is necessary, barricades shall be used.

ff. If there is a possibility of voltage backfeed from sources of cogeneration or from the secondary system (for example, backfeed from more than one energized phase feeding a common load), de-energizing and grounding shall apply if the lines or equipment are to be worked as de-energize, and the energized work procedures apply if the lines or equipment are to be worked as energized.

gg. Hydraulic fluids used for the insulated sections of equipment shall provide insulation for the voltage involved.

5. Electrical Installations
a. Each disconnecting means for motors and appliances and each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be durably and legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

b. Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment. At least one entrance of sufficient area shall be provided to give access to the working space about electric equipment.

c. Working space around access to live parts operating at 600 volts or less and likely to require operation, examination, adjustment, servicing, or maintenance while energized may not be less than indicated in the following table:

<table>
<thead>
<tr>
<th>Nominal voltage to ground (volts)</th>
<th>Minimum clear distance for condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-150</td>
<td>3 ft.</td>
</tr>
<tr>
<td></td>
<td>3 ft. (exposed to contact one side only)</td>
</tr>
<tr>
<td>151-600</td>
<td>3.5 ft. (exposed to contact one side, grounded surface on other side)</td>
</tr>
<tr>
<td></td>
<td>4 ft. (exposed to contact both sides)</td>
</tr>
<tr>
<td>600–2500</td>
<td>3 ft. (exposed to contact one side only)</td>
</tr>
<tr>
<td></td>
<td>4 ft. (exposed to contact one side, grounded surface otherside)</td>
</tr>
<tr>
<td></td>
<td>4 ft. (exposed to contact both sides)</td>
</tr>
</tbody>
</table>

NOTE: 1. Working space may not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, shall be suitably guarded. The minimum headroom of working spaces about service equipment, switchboards, panel-boards, or motor control centers shall be 6 feet 3 inches for 600 volts or less, 6 feet 6 inches for over 600 volts.

NOTE: 2. Where energized parts are exposed, the minimum clear workspace may not be less than 3 feet wide (measured parallel to the equipment). Where
rear access is required to work on de-energize parts on the back of enclosed equipment, a minimum working space of 30 inches horizontally shall be provided.

d. A disconnecting means shall be located in sight from a motor controller location for equipment at 600 volts or less. If the motor controller is marked with a warning label giving the location and identification of the disconnecting means which can be locked in the open position, the disconnecting means does not have to be in sight on circuits over 600 volts.

i. If a motor and the driven machinery are not in sight from the controller location, the installation shall comply with one of the following conditions:
   1. The controller disconnecting means shall be capable of being locked in the open position.
   2. A manually operable switch that will disconnect the motor from its source of supply shall be placed in sight from the motor location.

ii. A disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position, shall be accessible, and shall disconnect the motor and controller from all ungrounded supply conductors.

iii. An individual disconnecting means shall be provided for each motor, but a single disconnecting means may be used for a group of motors under any one of the following conditions:
   1. If a number of motors drive special parts of a single machine or piece of apparatus, such as a metal or woodworking machine, crane, or hoist
   2. If a group of motors is under the protection of one set of branch-circuit protective devices; or
   3. If a group of motors is in a single room in sight from the location of the disconnecting means.

iv. Motors, motor-control apparatus, and motor branch-circuit conductors shall be protected against overheating due to motor overloads or failure to start, and against short-circuits or ground faults. These provisions shall not require overload protection that will stop a motor where a shutdown is likely to introduce additional or increased hazards, as in the case of fire pumps, or where continued operation of a motor is necessary for a safe shutdown of equipment or process and motor overload sensing devices are connected to a supervised alarm.

v. A disconnecting means shall be provided in the supply circuit for each motor-generator arc welder, and for each AC transformer and DC rectifier arc welder which is not equipped with a disconnect mounted as an integral part of the welder.

vi. A switch or circuit breaker shall be provided by which each resistance welder and its control equipment can be isolated from the supply circuit. The ampere rating of this disconnecting means may not be less than the supply conductor ampacity.

e. Except as required or permitted elsewhere in this manual, live parts of electric equipment operating at 50 to 600 volts or more shall be guarded against accidental contact by approved cabinets or other forms of approved enclosures, or by any of the following means:

i. By location in a room, vault, or similar enclosure that is accessible only
to qualified persons.

ii. By suitable permanent, substantial partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them.

iii. By location on a suitable balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons.

iv. By elevation of 8 feet or more above the floor or other working surface for 600 volts or less.

f. In locations where electric equipment would be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage.

g. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. In addition, the entrances to all buildings, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, shall be kept locked or shall be under the observation of a qualified person at all times. At voltages over 600 volts a wall, screen, or fence less than 8 feet in height is not considered to prevent access unless it has other features that provide a degree of isolation equivalent to an 8 foot fence. Ventilating or similar openings in metal-enclosed equipment shall be designed so that foreign objects inserted through these openings will be deflected from energized parts.

h. Electrical installations that are open to unqualified persons shall be marked with appropriate caution signs and be constructed as metal-enclosed equipment or enclosed in a vault or an area, access to which is controlled by a lock. If equipment is exposed to physical damage from vehicular traffic, suitable guards shall be provided to prevent such damage.

i. Unguarded live parts above working space at voltages 600 volts through 6000 volts shall be maintained at elevations not less than 8 feet 6 inches (8 feet if constructed before April 16, 1991).

j. At least one entrance not less than 24 inches wide and 6 feet 6 inches high shall be provided to give access to the working space about electric equipment. On switchboard and control panels exceeding 48 inches in width, there shall be one entrance at each end of such board where practicable. Where bare energized parts at any voltage or insulated energized parts above 600 volts are located adjacent to such entrance, they shall be suitably guarded.

k. Permanent ladders or stairways shall be provided to give safe access to the working space around electric equipment installed on platforms, balconies, mezzanine floors, or in attic or roof rooms or spaces.

l. Temporary electrical power and lighting wiring methods may be of a class less than would be required for a permanent installation. Temporary electrical power and lighting installations 600 volts, nominal, or less may be used only:

i. During and for remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, and similar activities;

ii. For experimental or development work, and

iii. For a period not to exceed 90 days for Christmas decorative lighting, carnivals, and similar purposes.
m. Temporary wiring over 600 volts, nominal, may be used only during periods of tests, experiments, or emergencies.

n. Temporary wiring feeders shall originate in an approved distribution center. The conductors shall be run as multi conductor cord or cable assemblies, or, where not subject to physical damage, they may be run as open conductors on insulators not more than 10 feet apart.

o. Temporary branch circuits shall originate in an approved power outlet or panel board. Conductors shall be run as multi conductor cord or cable assemblies. Branch-circuit conductors used outdoors must be protected against traffic damage and routed safely away from damage producing traffic or activities.

p. Temporary wiring receptacles shall be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit shall contain a separate equipment grounding conductor and all receptacles shall be electrically connected to the grounding conductor.

q. No bare conductors nor earth returns may be used for the wiring of any temporary circuit.

r. Suitable disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit.

s. Temporary lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 feet from normal working surface or by a suitable fixture or lamp holder with a guard.

t. Flexible cords and cables used in temporary wiring shall be protected from accidental damage. Sharp corners and projections shall be avoided. Where passing through doorways or other pinch points, flexible cords and cables shall be provided with protection to avoid damage.

6. Wiring in Wet Locations

The following rules apply to electric wiring for and equipment in or adjacent to all swimming, wading, therapeutic, and decorative pools and fountains, whether permanently installed or storable, and to metallic auxiliary equipment, such as pumps, filters, and similar equipment. Therapeutic pools in health care facilities are exempt from these provisions.

a. A single receptacle of the locking and grounding type that provides power for a permanently installed swimming pool recirculating pump motor may be located not less than 5 feet from the inside walls of a pool. All other receptacles on the property shall be located at least 10 feet from the inside walls of a pool. Receptacles which are located within 15 feet of the inside walls of the pool shall be protected by ground-fault circuit interrupters.

Note: In determining these dimensions, the distance to be measured is the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, or ceiling of a building or other effective permanent barrier.

b. Unless they are 12 feet above the maximum water level, lighting fixtures and lighting outlets may not be installed over a pool or over the area extending 5 feet horizontally from the inside walls of a pool. However, a lighting fixture or lighting outlet which has been installed before April 16, 1981, may be located less than 5 feet measured horizontally from the inside walls of a pool if it is at
least 5 feet above the surface of the maximum water level and shall be rigidly attached to the existing structure. It shall also be protected by a ground-fault circuit interrupter installed in the branch circuit supplying the fixture.

c. Unless installed 5 feet above the maximum water level and rigidly attached to the structure adjacent to or enclosing the pool, lighting fixtures and lighting outlets installed in the area extending between 5 feet and 10 feet horizontally from the inside walls of a pool shall be protected by a ground-fault circuit interrupter.

d. Flexible cords used with the following equipment may not exceed 3 feet in length and shall have a copper equipment grounding conductor with a grounding-type attachment plug:
   i. Cord- and plug-connected lighting fixtures installed within 16 feet of the water surface of permanently installed pools.
   ii. Other cord- and plug-connected, fixed or stationary equipment used with permanently installed pools.

e. A ground-fault circuit interrupter shall be installed in the branch circuit supplying underwater fixtures operating at more than 15 volts. Equipment installed underwater shall be approved for the purpose.

f. No underwater lighting fixtures may be installed for operation at over 150 volts between conductors.

g. All electric equipment operating at more than 15 volts, including power supply cords, used with fountains shall be protected by ground-fault circuit interrupters.

7. Use of Electrically Powered Equipment and Tools

a. All electrically powered equipment or hand tools, except double insulated hand tools, shall be grounded.

b. Portable hand tools and electrically powered equipment shall be used with a groundfault circuit interrupter (GFCI) or an assured equipment grounding program (AEGP) (see “Ground Fault Circuit Protection” this section) shall be in effect.

c. Electrical equipment shall be disconnected or the current otherwise interrupted while it is being adjusted or repaired.

d. Permanent wiring shall be put in conduits.

e. All breakers, motors, and appliance disconnects shall be labeled.

f. Framing of electrical motors shall grounded.

g. Outlets, switching, junction boxes, etc., shall be covered.

h. Exposed noncurrent-carrying metal parts of fixed equipment that may become energized under abnormal conditions shall be grounded when in wet or damp locations; if electrical contact with metal, if operated in excess of 150 volts to ground, or in a hazardous location.

**NOTE:** Consider all exposed wires “hot” until verified otherwise.

8. Ground Fault Circuit Protection

a. When using extension cords, portable electrically powered hand tools, appliances, or other electrically powered equipment outdoors or in an area under construction, they shall be of the 3-wire type (except double
insulated tools) and shall be connected to a GFCI or an Assured Equipment
Grounding Program (AEGP) shall be in effect.

b. The AEGP requires regular inspections of all tools, cords, and electric
devices. Appropriate documentation shall be maintained. Components of
an AEGP are:
   i. A written description of the program including specific procedures
   ii. Qualified employees appointed to run the program. More than
       one person shall be appointed.
   iii. All equipment, cords, etc., to be used shall be inspected
       for external defects each day. All defective equipment shall
       be tagged out until repairs are made. All defects, repairs, inspections, etc., shall be
documented.

9. Extension Cords

See the appendix for guidelines on extension cord use.

   a. Cords shall not be hung over nails, bolts, or sharp edges.
   b. Cords shall not be laid in aisles unless protected from damage; they shall be
      so placed so as to not create a tripping hazard.
   c. Cords shall not be used as a substitute for fixed wiring.
   d. Cords shall not be run through holes in walls, ceiling, floors, doors, windows,
      or hung from light fixtures or attached to building surfaces.

10. Hazardous Locations

   a. Standard electrical apparatus cannot be used in locations where flammable
gases, vapors, dusts, and other easily ignitable materials are present.
   b. Before electrical equipment and its associated wiring is selected for a
      hazardous location, the exact nature of the flammable materials present should be
determined.

C. Stairs and Ladders

1. General Requirements

   a. A stairway or ladder must be provided at all worker points of access where there is a
      break in elevation of 19 inches (48 cm) or more and no ramp, runway, embankment,
or personnel hoist is provided.
   b. When there is only one point of access between levels, it must be kept clear to
      permit free passage by workers. If free passage becomes restricted, a second point
      of access must be provided and used.
   c. Where there are more than two points of access between levels, at least one point of
      access must be kept clear.
   d. All stairway and ladder fall protection systems required by these rules must be
      installed and all duties required by the stairway and ladder rules must be performed
      before employees begin work that requires them to use stairways or ladders and
      their respective fall protection systems.

2. Stairways

   a. The following general requirements apply to all stairways used during the process of
      construction, as indicated:
i. Stairways that will not be a permanent part of the structure on which construction work is performed must have landings at least 30 inches deep and 22 inches wide (76 x 56 cm) at every 12 feet (3.7 m) or less of vertical rise.

ii. Stairways must be installed at least 30 degrees—no more than 50 degrees—from the horizontal.

iii. Variations in riser height or stair tread depth must not exceed 1/4 inch in any stairway system, including any foundation structure used as one or more treads of the stairs.

iv. Where doors or gates open directly onto a stairway, a platform must be provided that extends at least 20 inches (51 cm) beyond the swing of the door.

v. Metal pan landings and metal pan treads must be secured in place before filling.

vi. All stairway parts must be free of dangerous projections such as protruding nails.

vii. Slippery conditions on stairways must be corrected.

viii. Workers may not use spiral stairways that will not be a permanent part of the structure.

b. The following requirements apply to stairs in temporary service during construction

i. Except during construction of the actual stairway, stairways with metal pan landings and treads must not be used where the treads and/or landings have not been filled in with concrete or other materials, unless the pans of the stairs and/or landings are temporarily filled in with wood or other materials. All treads and landings must be replaced when worn below the top edge of the pan.

ii. Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings will be installed later) unless the stairs are fitted with secured temporary treads and landings.

iii. Temporary treads must be made of wood or other solid material and installed the full width and depth of the stair.

3. Stair rails and Handrails

The following general requirements apply to all stair rails and handrails:

a. Stairways having four or more risers, or rising more than 30 inches (76 cm) in height—whichever is less—must have at least one handrail. A stair rail also must be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge must be no more than 37 inches (94 cm) nor less than 36 inches (9.15 cm) from the upper surface of the stair rail to the surface of the tread.

b. Winding or spiral stairways must have a handrail to prevent using areas where the tread width is less than 6 inches (15 cm).

c. Stair rails installed after Mach 15.1991, must be not less than 36 inches (91.5 cm) in height.

d. Midrolls, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and stairway steps to the stair rail system.

e. Midrolls, when used, must be located midway between the top of the stair rail system and the stairway steps.

f. Screens or mesh, when used, must extend from the top rail to the stairway step.
along the opening between top rail supports.

4. Ladders
The following general requirements apply to all ladders, including job-made ladders:

a. A double-cleated ladder or two or more ladders must be provided when ladders are the only way to enter or exit a work area having 25 or more employees, or when a ladder serves simultaneous two-way traffic.

b. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when the ladder is in position for use.

c. Rungs, cleats, and steps of portable and fixed ladders (except as provided below) must not be spaced less than 10 inches (25 cm) apart, nor more than 14 inches (36 cm) apart, along the ladder’s side rails.

d. Rungs, cleats, and steps of step stools must not be less than 8 inches (20 cm) apart, nor more than 12 inches (31 cm) apart, between center lines of the rungs, cleats, and steps.

e. Rungs, cleats, and steps at the base section of extension trestle ladders must not be less than 8 inches (20 cm) nor more than 18 inches (46 cm) apart, between center lines of the rungs, cleats, and steps. The rung spacing on the extension section must not be less than 6 inches (15 cm) nor more than 12 inches (31 cm).

f. Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use.

g. A metal spreader or locking device must be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.

h. Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders, except when portable ladders are used to gain access to fixed ladders.

i. Ladder components must be surfaced to prevent injury from punctures or lacerations and prevent snagging of clothing.
j. Wood ladders must not be coated with any opaque covering, except for identification or warning labels which may be placed only on one face of a side rail.

5. Portable Ladders
   a. Non-self-supporting and self-supporting portable ladders must support at least four times the maximum intended load; extra heavy-duty type 1A metal or plastic ladders must sustain 3.3 times the maximum intended load. The ability of a self-supporting ladder to sustain loads must be determined by applying the load to the ladder in a downward vertical direction. The ability of a non-self-supporting ladder to sustain loads must be determined by applying the load in a downward vertical direction when the ladder is placed at a horizontal angle of 75.5 degrees.
   b. The minimum clear distance between side rails for all portable ladders must be 11.5 inches (29 cm).
   c. The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.

6. Fixed Ladders
   a. A fixed ladder must be able to support at least two loads of 250 pounds (114 kg) each, concentrated between any two consecutive attachments. Fixed ladders must support added anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from using ladder safety devices.
   b. Individual rung/step ladders must extend at least 42 inches (1.1 m) above an access level or landing platform either by the continuation of the rung spacing as horizontal grab bars or by providing vertical grab bars that must have the same lateral spacing as the vertical legs of the ladder rails.
   c. Each step or rung of a fixed ladder must be able to support a load of at least 250 pounds (114 kg) applied in the middle of the step or rung.
   d. The minimum clear distance between the sides of individual rung/step ladders and between the side rails of other fixed ladders must be 16 inches (41 cm).
   e. The rungs of individual rung/step ladders must be shaped to prevent slipping off the end of the rungs.
   f. The rungs and steps of fixed metal ladders manufactured after March 15, 1991, must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.
   g. The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps and any obstruction behind the ladder must be 7 inches (18 cm), except that the clearance for an elevator pit ladder must be 4.5 inches (11 cm).
   h. The minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, and steps, and any obstruction on the climbing side of the ladder must be 30 inches (76 cm). If obstructions are unavoidable, clearance may be reduced to 24 inches (61 cm), provided a deflection device is installed to guideworkers around the obstruction.
   i. The step-across distance between the center of the steps or rungs of fixed ladders and the nearest edge of a landing area must be no less than 7 inches (18 cm) and no more than 12 inches (30 cm). A landing platform must be provided if the step-across distance exceeds 12 inches (30 cm).
j. Fixed ladders without cages or wells must have at least a 15-inch (38 cm) clear width to the nearest permanent object on each side of the centerline of the ladder.

k. Fixed ladders must be provided with cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet (7.3 m) but the top of the ladder is at a distance greater than 24 feet (7.3 m) above lower levels.

l. If the total length of the climb on a fixed ladder equals or exceeds 24 feet (7.3 m), the following requirements must be met: fixed ladders must be equipped with either (a) ladder safety devices; (b) self-retracting lifelines and rest platforms at intervals not to exceed 150 feet (45.7 m); or (c) a cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet (15.2 m) in length. These ladder sections must be offset from adjacent sections, and landing platforms must be provided at maximum intervals of 50 feet (15.2 m).

m. The side rails of through or side-step fixed ladders must extend 42 inches (1.1 m) above the top level or landing platform served by the ladder. Parapet ladders must have an access level at the roof if the parapet is cut to permit passage through it; if the parapet is continuous, the access level is the top of the parapet.

n. Steps or rungs for through-fixed-ladder extensions must be omitted from the extension; and the extension of side rails must be flared to provide between 24 inches (61 cm) and 30 inches (76 cm) clearance between side rails.

o. When safety devices are provided, the maximum clearance distance between siderail extensions must not exceed 36 inches (91 cm).

7. Cages for fixed Ladders
   a. Horizontal bands must be fastened to the side rails of rail ladders or directly to the structure, building, or equipment for individual-rung ladders.
   b. Vertical bars must be on the inside of the horizontal bands and must be fastened to them.
   c. Cages must not extend less than 27 inches (68 cm), or more than 30 inches (76 cm) from the centerline of the step or rung, and must not be less than 27 inches (68 cm) wide.
   d. The inside of the cage must be clear of projections.
   e. Horizontal bands must be spaced at intervals not more than 4 feet (1.2 m) apart measured from centerline to centerline.
   f. Vertical bars must be spaced at intervals not more than 9.5 inches (24 cm), measured centerline to centerline.
   g. The bottom of the cage must be between 7 feet (2.1 m) and 8 feet (2.4 m) above the point of access to the bottom of the ladder.
   h. The bottom of the cage must be flared not less than 4 inches (10 cm) between the bottom horizontal band and the next higher band.
   i. The top of the cage must be a minimum of 42 inches (1.1 m) above the top of the platform or the point of access at the top of the ladder. Provisions must be made for access to the platform or other point of access.

8. Wells for Fixed Ladders
   a. Wells must completely encircle the ladder.
   b. Wells must be free of projections.
   c. The inside face of the well on the climbing side of the ladder must extend between 27 inches (68 cm) and 30 inches (76 cm) from the centerline of the step or rung.
   d. The inside width of the well must be at least 30 inches (76 cm).
   e. The bottom of the well above the point of access to the bottom of the ladder must be
between 7 feet (2.1 m) and 8 feet (2.4 m).

9. Ladder Safety Devices and Related Support Systems for Fixed Ladders
   a. All safety devices must be able to withstand, without failure, a drop test consisting of a 500-pound weight (226 kg) dropping 18 inches (41 cm).
   b. All safety devices must permit the worker to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing.
   c. All safety devices must be activated within 2 feet (.61 m) after a fall occurs, and limit the descending velocity of an employee to 7 feet/second (2.1 m/sec) or less.
   d. The connection between the carrier or lifeline and the point of attachment to the body belt or harness must not exceed 9 inches (23 cm) in length.

10. Mounting Ladder Safety Devices for Fixed Ladders
   a. All safety devices must be able to withstand, without failure, a drop test consisting of a 500-pound weight (226 kg) dropping 18 inches (41 cm).
   b. All safety devices must permit the worker to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing.
   c. All safety devices must be activated within 2 feet (.61 m) after a fall occurs, and limit the descending velocity of an employee to 7 feet/second (2.1 m/sec) or less.
   d. The connection between the carrier or lifeline and the point of attachment to the body belt or harness must not exceed 9 inches (23 cm) in length.

11. Use of all Ladders
   a. When portable ladders are used for access to an upper landing surface, the siderails must extend at least 3 feet (.9 m) above the upper landing surface. When such an extension is not possible, the ladder must be secured, and a grasping device such as a grab rail must be provided to assist workers in mounting and dismounting the ladder. A ladder extension must not deflect under a load that would cause the ladder to slip off its supports.
   b. Ladders must be maintained free of oil, grease, and other slipping hazards.
   c. Ladders must not be loaded beyond the maximum intended load for which they were built nor beyond their manufacturer’s rated capacity.
   d. Ladders must be used only for the purpose for which they were designed.
   e. Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder.
   f. Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the back side of the ladder.
   g. Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.
   h. Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not
be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

i. Ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic must be secured to prevent accidental movement or a barricade must be used to keep traffic or activities away from the ladder.

j. The area around the top and bottom of the ladders must be kept clear.

k. The top of a non-self-supporting ladder must be placed with two rails supported equally unless it is equipped with a single support attachment.

l. Ladders must not be moved, shifted, or extended while in use.

m. Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment. The top or top step of a stepladder must not be used as a step.

n. Cross bracing on the rear section of stepladders must not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

o. Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use.

p. Single-rail ladders must not be used.

q. When ascending or descending a ladder, the worker must face the ladder.

r. Each worker must use at least one hand to grasp the ladder when climbing.

s. A worker on a ladder must not carry any object or load that could cause him/her to lose balance and fall.

t. Structural Defects

i. Portable ladders with structural defects—such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components—must immediately be marked defective, or tagged with “Do Not Use” or similar language and withdrawn from service until repaired.

ii. Fixed ladders with structural defects—such as broken or missing rungs, cleats, or steps, broken or split rails, or corroded components—must be withdrawn from service until repaired.

iii. Defective fixed ladders are considered withdrawn from use when they are (a) immediately tagged with “Do Not Use” or similar language; (b) marked in a manner that identifies them as defective; or (c) blocked-such as with a plywood attachment that spans several rungs.

iv. Ladder repairs must restore the ladder to a condition meeting its original design criteria before the ladder is returned to use.

u. Glossary

Cleat – A ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

Double-Cleat Ladder – A ladder with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

Failure – Load refusal, breakage, or separation of components.
Fixed Ladder – A ladder that cannot be readily moved or carried because it is an integral part of a building or structure.

Handrail – A rail used to provide employees with a handhold for support.

Job-Made Ladder – A ladder that is fabricated by employees, typically at the construction site; noncommercial manufactured.

Load Refusal – The point where the structural members lose their ability to carry the load.

Point of Access – All areas used by employees for work-related passage from one area or level to another.

Portable Ladder – A ladder that can be readily moved or carried.

Riser Height – The vertical distance from the top of a tread or platform/landing to the top of the next higher tread or platform/landing.

Side-Step Fixed Ladder – A fixed ladder that requires a person to get off at the top to step to the side of the ladder side rails to reach the landing.

Single-Cleat Ladder – A ladder consisting of a pair of side rails connected together by cleats, rungs, or steps.

Stair rail System – A vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels.

Temporary Service Stairway – A stairway where permanent treads and/or landings are to be filled in at a later date.

Through Fixed Ladder – A fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

Tread Depth – The horizontal distance from front to back of a tread, excluding nosing, if any.

D. Scaffolds

1. General Requirements for All Scaffolds
   a. Scaffolds shall be furnished and erected in accordance with this standard for persons engaged in work that cannot be done safely from the ground or from solid construction, except that ladders used for such work shall conform to 1910.25 and 1910.26.
   b. The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds or planks.
   c. Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.
   d. Scaffolds and other devices mentioned or described in this section shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are in use or occupied.
   e. Any scaffold damaged or weakened from any cause shall be immediately repaired and
shall not be used until repairs have been completed.

f. Scaffolds shall not be loaded in excess of the working load for which they are intended.

g. All load-carrying timber members of scaffold framing shall be a minimum of 1,500lbs.-fin2. (Stress Grade) construction grade lumber. All dimensions are nominal sizes as provided in the American Lumber Standards, except that where rough sizes are noted, only rough and undressed lumber or the size specified will satisfy minimum requirements.

h. All planking shall be Scaffold Grade as recognized by grading rules for the species of wood used. The maximum permissible spans for 2- X 9-inch or wider planks are shown in the following table:

<table>
<thead>
<tr>
<th>Working load (p.s.f)</th>
<th>Full thickness undressed lumber</th>
<th>Nominal thickness lumber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Permissible span</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>(ft.)</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

i. The maximum permissible span for 1 1/4 x 9-inch or wider plank of full thickness is 4 feet with medium loading of 50 p.s.f.

j. Nails or bolts used in the construction of scaffolds shall be of adequate size and in sufficient numbers at each connection to develop the designed strength of the scaffold. Nails shall not be subjected to a straight pull and shall be driven full length.

k. All planking or platforms shall be overlapped (minimum 12 inches) or secured from movement.

l. An access ladder or equivalent safe access shall be provided.

m. Scaffold planks shall extend over their end supports not less than 6 inches nor more than 18 inches.

n. The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

o. Materials being hoisted onto a scaffold shall have a tag line.

p. Overhead protection shall be provided for men on a scaffold exposed to overhead hazards.

q. Scaffolds shall be provided with a screen between the toe board and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard Wireone-half-inch mesh or the equivalent, where persons are required to work or pass under the scaffolds.

r. Employees shall not work on scaffolds during storms or high winds.

s. Employees shall not work on scaffolds which are covered with ice or snow, unless all ice or snow is removed and planking sanded to prevent slipping.

t. Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

u. Only treated or protected fiber rope shall be used for or near any work involving the use of corrosive substances or chemicals.
v. Wire or fiber rope used for scaffold suspension shall be capable of supporting at least six times the intended load.

w. When acid solutions are used for cleaning buildings over 50 feet in height, wire rope supported scaffolds shall be used.

x. The use of shore scaffolds or lean-to scaffolds is prohibited.

y. Lumber sizes, when used in this section, refer to nominal sizes except where otherwise stated.

z. Scaffolds shall be secured to permanent structures, through use of anchor bolts, reveal bolts, or other equivalent means. Window cleaners’ anchor bolts shall not be used.

aa. Special precautions shall be taken to protect scaffold members, including any wire or fiber ropes, when using a heat-producing process.

2. Tube and Coupler Scaffolds

a. A light-duty tube and coupler scaffold shall have all posts, bearers, runners, and bracing of nominal 2-inch O.D. steel tubing. The posts shall be spaced no more than 6 feet apart by 10 feet along the length of the scaffold. Other structural metals when used must be designed to carry an equivalent load.

b. A medium-duty tube and coupler scaffold shall have all posts, runners, and bracing of nominal 2-inch O.D. steel tubing. Posts spaced not more than 6 feet apart by 8 feet along the length of the scaffold shall have bearers of nominal 2 ½-inch O.D. steel tubing. Posts spaced not more than 5 feet apart by 8 feet along the length of the scaffold shall have bearers of nominal 2-inch O.D. steel tubing. Other structural metals when used must be designed to carry an equivalent load.

c. A heavy-duty tube and coupler scaffold shall have all posts, runners, and bracing of nominal 2-inch O.D. steel tubing, with the posts spaced not more than 6 feet apart by 6 feet 6 inches along the length of the scaffold. Other structural metals when used must be designed to carry an equivalent load.

d. Tube and coupler scaffolds shall be limited in heights and working levels to those permitted by the manufacturer or a registered professional engineer. Drawings and specification of all tube and coupler scaffolds designed by a registered professional engineer must make copies available to the employer and for inspection purposes.

e. All tube and coupler scaffolds shall be constructed and erected to support four times the maximum intended loads by 29 CFR 1910.25 and .26, or as set forth in the specifications by a registered professional engineer, copies which shall be made available to the employer and for inspection purposes.

f. All tube and coupler scaffolds shall be erected by competent and experienced personnel.

g. Posts shall be accurately spaced, erected on suitable bases, and maintained plumb.

h. Runners shall be erected along the length of the scaffold located on both the inside and the outside posts at even height. Runners shall be interlocked to form continuous lengths and coupled to each post. The bottom runners shall be located as close to the base as possible. Runners shall be placed not more than 6 feet 6 inches on centers.

i. Bearers shall be installed transversely between posts and shall be securely coupled to the posts bearing on the runner coupler. When coupled directly to the runners, the coupler must be kept as close to the posts as possible.

j. Bearers shall be at least 4 inches but not more than 12 inches longer than the post.
spacing or runner spacing. Bearers may be cantilevered for use as brackets to carry not more than two planks.

k. Cross bracing shall be installed across the width of the scaffold at least every third set of posts horizontally and every fourth runner vertically. Such bracing shall extend diagonally from the inner and outer runners upward to the next outer and inner runners.

l. Longitudinal diagonal bracing shall be installed at approximately a 45-degree angle from near the base of the first outer post upward to the extreme top of the scaffold. Where the longitudinal length of the scaffold permits, such bracing shall be duplicated beginning at every fifth post. In a similar manner longitudinal diagonal bracing shall also be installed from the last post extending back and upward toward the first post. Where conditions preclude the attachment of this bracing to the posts, it may be attached to the runners.

m. The entire scaffold shall be tied to and securely braced against the building at intervals not to exceed 30 feet horizontally and 26 feet vertically.

n. Guardrails not less than 2 x 4 inches or the equivalent and not less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1 x 4-inch lumber or equivalent, and toeboards, shall be installed at all open sides on all scaffolds more than 10 feet above the ground or floor. Toeboards shall be a minimum of 4 inches in height. Wire mesh shall be installed in accordance with paragraph (a)(17) of this section.

3. Tubular Welded Frame Scaffolds
   a. Metal tubular frame scaffolds, including accessories such as braces, brackets, trusses, screw legs, ladders, etc., shall be designed and proved to safely support four times the maximum intended load.
   b. Spacing of panels or frames shall be consistent with the loads imposed.
   c. Scaffolds shall be properly braced by cross bracing or diagonal braces, or both, for securing vertical members together laterally, and the cross braces shall be of such length as will automatically square and align vertical members so that the erected scaffold is always plumb, square, and rigid. All brace connections shall be made secure.
   d. Scaffold legs shall be set on adjustable bases or plain bases placed on mud sills or other foundations adequate to support the maximum intended load.
   e. The frames shall be placed one on top of the other with coupling or stacking pins to provide proper vertical alinement of the legs.
   f. There uplift may occur, panels shall be locked together vertically by pins or other equivalent suitable means.
   g. Guardrails not less than 2 x 4 inches or the equivalent and not less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1 x 4-inch lumber or equivalent, and toeboards, shall be installed at all open sides on all scaffolds more than 10 feet above the ground or floor. Toeboards shall be a minimum of 4 inches in height. Wire mesh shall be installed in accordance with paragraph (a)(17) of this section.
   h. All tubular metal scaffolds shall be constructed and erected to support four times the maximum intended loads.
   i. To prevent movement, the scaffold shall be secured to the building or structure at intervals not to exceed 30 feet horizontally and 26 feet vertically.
   j. Maximum permissible spans of planking shall be in conformity with paragraph (a)(9) of this section.
k. Drawings and specifications for all frame scaffolds over 125 feet in height above the base plates shall be designed by a registered professional engineer and copies made available to the employer and for inspection purposes.

l. All tubular welded frame scaffolds shall be erected by competent and experienced personnel.

m. Frames and accessories for scaffolds shall be maintained in good repair and every defect, unsafe condition, or noncompliance with this section shall be immediately corrected before further use of the scaffold. Any broken, bent, excessively rusted, altered, or otherwise structurally damaged frames or accessories shall not be used.

n. Periodic inspections shall be made of all welded frames and accessories, and any maintenance, including painting, or minor corrections authorized by the manufacturer, shall be made before further use.

E. Material Handling

The following are general safety rules and requirements regarding material handling and material handling equipment regularly used on campus.

1. Lifting by Hand

Lifting and carrying can be done without injury by using the following criteria:

a. Personal Protection

i. Hand protection shall be used when lifting; however, gloves or loose clothing shall not be worn around rotating and reciprocating equipment

1) Leather gloves and aprons shall be worn when handling rough or sharp objects.

2) Chemical gloves, splash suits, and eye protection shall be worn when handling chemicals of any nature (corrosives, flammables, etc.).

b. Body Condition

How much should you lift? Lifting capacity depends on body condition; that is, flexibility and strength, and physical make-up. To help your condition, build up your strength by a regular exercise program and stretch your body before doing any lifting.

i. Sizing up the Load Questions to ask:

1) Is it too big for you to handle?

2) What about the shape? Is it irregular, square, rectangular, etc.?

3) Can you get a firm, comfortable grip?

4) How many loads are there and where are they going?

2. Lifting It Right

There are six steps to proper lifting:

a. Keep feet parted—one alongside the object and one behind the object. Comfortably spread feet give greater stability; the rear foot is in position for the upward thrust of the lift.

b. Keep back straight, nearly vertical. Use the sit-down position to do so, but remember
that “straight” does not mean absolutely “vertical”. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the guts that can cause hernia.

c. Tuck in chin so the neck and head continue the straight back line and keep spine straight and firm.

d. Grasp the object with the whole hand. The palm grip is one of the most important elements of correct lifting. The fingers and hand are extended around the object to be lifted. Use the full palm; fingers alone have very little power. Wearing gloves is recommended.

e. Tuck elbows and arms in and hold load close to body. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep body weight centered.

f. Keep body weight directly over feet. This provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot.

   i. When setting the load down, the same six proper lifting steps shall be used in reverse.

   ii. To change direction, the worker shall lift the object to the carrying position and turn the entire body including the feet. He/she shall avoid twisting the body. In repetitive work, the person and the material both shall be positioned to prevent twisting of the body when moving the material.

3. Team Lifting

   a. When two or more people carry one object, they shall adjust the load so that it rides level.

   b. When long sections of material (pipe, lumber) are carried, the load shall be carried on the same shoulder and both persons shall walk in step.

   c. When team lifting, one person shall be designated to give the signal when to lift.

4. Handling of Specific Shapes

   a. Barrels and drums

      i. It is recommended that a hand truck or other type of material handling equipment be used for lifting and transporting barrels and/or drums.

      ii. If it is necessary to roll a barrel or drum, the worker shall push against the sides with both hands. To change directions, the drum or barrel shall be stopped, the direction changed by grabbing the upper and lower rim seams, and movement started.

      iii. When up righting a full drum, the six steps to safe lifting shall be adhered to.

   b. Long Objects (Pipe, Lumber, Bar steel, etc.)

      There are two schools of thought on this. The method chosen shall be determined by the obstructions to be encountered.

      i. The item shall be carried on the shoulders with the front end held as high as possible to avoid striking other employees—especially when going around corners.

      ii. The item shall be carried on the shoulders with the front end low so it does not catch overhead objects.

5. Compressed gas cylinders
a. Compressed gas cylinders may be rolled on the bottom edge for short distances. They shall never be dragged.

b. Because of their shape, smooth surface, and weight, cylinders are difficult to carry by hand. Cylinders weighing more than 40 pounds total should be transported on a hand or motorized truck, suitably secured to keep them from falling.

   i. Items to remember when lifting by hand:
   ii. Avoid twisting while turning with a load.
   iii. Watch for narrow places when moving materials.
   iv. Avoid high reaching and lifting. A suitable ladder or platform shall be used to get up to load.
   v. Do not jump with a load.
   vi. Do not catch or throw loads.
   vii. Check the materials to be lifted for nails, splinters, rough strapping, or other things that might injure hands.
   viii. Ascertain good visibility—especially on stairs.

6. Hand trucks
   a. General
      i. Keep truck under control at all times.
      ii. Trucks shall be stored in designated areas—not in aisles.
      iii. Housekeeping—all aisles and loading areas shall be kept clear.
      iv. Always move the truck at a safe speed. Do not run.
      v. Loads shall be packed securely; avoid overhanging.
      vi. No riders or horseplay.
      vii. Hands shall be kept inside to protect them in narrow areas if the truck does not have knuckle guards or handles.

7. One Axle Handtrucks
   i. Keep the center of gravity of the load as low as possible. Place heavy objects below higher objects.
   ii. Place the load so it is carried by the axle, not the handles.
   iii. Load only to a height that will allow a clear view ahead.
   iv. When lifting from a horizontal position, have a straight back and lift with the legs. The load shall be put down the same way.
   v. Let the truck carry the load. The operator shall balance and push only.
   vi. Never walk backwards with a hand truck.
   vii. For extremely bulky or pressurized items, such as gas cylinders, strap or chain the item to the truck. Valve caps shall be on valves.
   viii. Always move the truck at a safe speed. Do not run.

8. Two Axle Trucks
   NOTE: Many one axle hand truck rules apply here also
   i. Load evenly to prevent tipping.
   ii. Push. Do not pull.
   iii. The truck shall not be loaded so high that the operator cannot see where in the direction of travel. If the load is high, two persons are needed; one to push
and one to guide.
iv. Truck contents shall be arranged so they will not fall if accidentally bumped.
v. When entering elevators or tight areas, enter with the load forward. Make sure load is bound to truck.

9. Fork Trucks

Fork trucks are used to carry, push, pull, lift, stack, and tier materials.

a. Only trained and authorized operators shall be permitted to operate a powered industrial truck. Training shall include:
   i. Lecture
   ii. Instructor led demonstration field activities
   iii. Workplace evaluation

b. Guarding
   i. Hazardous moving parts such as chain and sprocket drives and exposed gears shall be guarded to protect the operator in his normal operating position.
   ii. All fork trucks shall have an overhead guard in accordance with ANSI B 56.1.
   iii. Exposed tires shall have guards that will stop particles from being thrown at the operator.
   iv. Hydraulically-driven lifting systems shall have a relief valve installed and suitable stops shall be provided to prevent travel over of the carriage.
   v. A load backrest extension shall always be used when the type of load presents a hazard to the operator. The top of a load shall not exceed the height of the backrest.

c. Loading
   I. If the material being handled is obstructing the view, the operator is required to travel backwards. The operator shall face the direction of travel at all times.
   II. Only loads within the rated capacity of the truck shall be handled. No counter weights shall be allowed. A nameplate showing the weight of the truck and its rated capacity shall be located in plain view on the truck.
   III. Backwards tilt shall be used to stabilize the load.
   IV. Loads shall be checked for overloading and for loose material before making the lift.
   V. Extreme care shall be taken when handling long items, i.e., bar stock and lumber.
   VI. The load shall never be driven in an upward position, nor raised or lowered while moving.
   VII. Forks shall be locked to the carriage, and the fork extension designed so as to prevent unintentional lifting of the toe or displacement of the fork extension.
   VIII. Bridge plates and dock boards shall be strong enough to support the intended load. They shall also have side boards, anti-slip surfaces, and be secured to the dock.
   IX. Chocks shall be used on truck wheels when unloading.

d. Inspections

All fork trucks should be inspected before each use and formally on an annual basis.

e. Miscellaneous
   i. Powered industrial trucks shall be equipped with horns.
   ii. Steering wheel knobs are prohibited.
iii. All trucks shall be equipped with an ABC fire extinguisher.
iv. Fork trucks shall not be used on upper level floors unless the floors are designed for that load capacity.
v. Diesel or gasoline fork trucks shall be used in adequately vented areas only.
vi. Never give rides on a fork truck unless the truck is designed for it.

10. General Operating Requirements
   i. No excessive speed or reckless driving.
     a. When the operator will be farther than 25’ from the truck, the forks shall be down, motor cut off, and emergency brake applied
     b. No one shall be allowed to pass under the elevated portion of any truck– loaded or empty.
     c. The operator shall come to a stop at blind corners and before passing through doorways.
     d. Extreme caution shall be taken when operating on turns, ramps, grades, or inclines.
     e. Reverse control shall never be used for braking.
     f. Always drive with the load pointing upgrade unless a bulky load permits poor visibility.
     g. Trucks shall not be used for any purpose other than the one for which they never designed, i.e., bumping skids, pushing piles of material out of the way, using forks as a hoist, etc.
     h. Trucks shall ascend or descend grades slowly. When ascending or descending grades in excess of 10%, loaded trucks should be driven with the load upgrade. Unloaded trucks should be operated on all grades with the load-engaging means downgrade.
     i. When standard forks are used to pick up round objects such as rolls or drums, care shall be taken to see that the tips do not damage the load or push it against workers.
     j. Operators of lift trucks shall not move improperly loaded skids or pallets, broken pallets, or loads too heavy for the truck.

NOTE: Using a lift truck as an elevator for employees shall only be done if the work platform is securely seated on the forks, fastened to the vertical face, and provided with handrails and toeboards. The truck shall also have an overhead guard for the operator’s protection. The operator shall not leave the controls while the truck is being used as a man lift.

F. Confined Spaces
   1. Confined Space is intended to mean a relatively small or restricted space such as a tank, boiler, manhole, or any place where entry or exit is limited or ventilation is poor. A confined space is normally not intended for human occupancy or entry when the process/equipment is in operation. An “enclosed space” is a confined area that is suitable for human entry during operation, such as a manhole.

   2. A Permit Required Confined Space is one where there is an atmosphere, or the threat of an atmosphere, that is dangerous to life, or in which a hazard exists that may impede escape of an individual if an accident occurs. Exposed electrical hazards in a confined space will cause the space to become a permit required confined space. Fall hazards in the space can cause the space to be declared a permit required confined space.

IDENTIFY ANY CONFINED SPACES ON CAMPUS

3. Training
   All employees who enter confined spaces must be properly trained.

4. Hazards of Confined Spaces
   a. Lack of oxygen can cause a worker to collapse almost instantly.
b. Toxic gases or vapors can poison or suffocate workers.
c. Combustion, a buildup of flammable/combustible gases or vapors, can burn or explode.
d. Heat can cause heat exhaustion, cramps, etc. Noise intensifies in small spaces and can cause hearing loss, as well as interfere with communication.
e. Mechanical equipment can cause sparks to ignite flammable or combustible gases, or cause physical injury.
f. Falls can cause injury—falls from one level to another or by slips and trips.

5. Procedures
a. Review Guidelines
   i. Determine potential hazards.
   ii. Determine the classification, permit required or not.
   iii. Review safety equipment required.
   iv. Review emergency measures.
b. Get Proper Approval
   i. Obtain an entry permit from your supervisor.
   ii. Post it at worksite, if required.
c. Lockout/Tagout Sources of Danger (See “Lockout/Tagout”)
d. Test for Potential Hazards
   i. All confined spaces shall be tested for possible oxygen deficiency and flammable/combustible gas/vapor content by a qualified person.
   ii. If hazardous gases/vapors are detected, ventilate and clean the space, then test again.
e. Ventilate
   If inadequate ventilation is suspected, a blower shall be made available to assure sufficient air supply.
f. Assemble Proper Equipment and Post Observers
   i. Required respirators, lifelines, tools, etc., shall be gathered before entering.
   ii. An observer shall be posted near the entrance in case an emergency rescue is needed.
   iii. In a permit required space, rescue equipment must be at the worksite, and a life line must be used. Also, a log of entries must be kept, and unauthorized people must be prohibited from entering.
g. Miscellaneous
   i. Before welding, burning, cutting, or brazing work starts, a hot work permit shall be obtained.
   ii. If asbestos pipe insulation is to be removed in a confined space, it shall be done by employees trained in asbestos removal techniques using proper personal protective equipment.
h. Never
   i. Enter a confined space unless authorized.
ii. Enter a confined space unless an observer is posted near the entrance.
iii. Smoke in a confined space.

G. Handling, Using and Storing of Compressed Gas Cylinders

1. Handling Cylinders
   a. Only cylinders approved for use in interstate commerce for transportation of compress gasses shall be accepted.
   b. Numbers or marks stamped on cylinders shall not be removed or changed.
   c. Because of their shape, smooth surface, and weight, cylinders are difficult to carry by hand. Cylinders may be rolled on their bottom edge but never dragged. Cylinders weighing more than 40 pounds (18.2 kg total) shall be transported on a hand motorized truck and suitably secured to keep them from falling.
   d. Cylinders shall be protected from cuts or scratches.
   e. Compressed gas cylinders shall not be lifted with an electro-magnet. Where cylinders must be handled by a crane or derrick as on construction jobs, they shall be carried in a cradle or suitable platform and extreme care shall be taken to see that they are not dropped or bumped. Slings shall not be used.
   f. Cylinders shall not be dropped or be allowed to strike each other violently.
   g. Cylinders shall not be used for rollers, supports, or any purpose other than to contain gas.
   h. Safety devices in valves or on cylinders shall not be tampered with.
   i. When in doubt about the proper handling of a compressed gas cylinder or its contents, the supplier of the gas shall be consulted.
   j. When empty cylinders are to be returned to vendor, they shall be marked “Empty” or MT with chalk. Close the valves and replace the valve protection caps if the cylinders are designed to accept caps.
   k. Cylinders to be transported shall be loaded to allow as little movement as possible. Secure them to prevent violent contact or upsetting.
   l. Cylinders shall always be considered full and shall be handled carefully. Accidents have resulted when containers under partial pressure were thought to be empty.
   m. The fusible safety plugs on acetylene cylinders melt at about the boiling point of water. If an outlet becomes frozen or clogged with ice, it shall be thawed with warm (not boiling) water applied to the valve only. A flame shall never be used.

2. Using Cylinders
   a. Cylinders, particularly those containing liquefied gases and acetylene, shall be used in a secured upright position to prevent them from being accidentally knocked over.
   b. Unless the cylinder valve is protected by a recess in the head, the metal cap shall be kept in place to protect the valve when the cylinder is not connected for use. A blow on an unprotected valve might cause high pressure gas to escape.
   c. The threads on a regulator or union shall correspond to those on the cylinder valve outlet. Connections that do not fit shall not be forced.
   d. Cylinder valves shall be opened slowly. Cylinders without hand-wheel valves shall be opened with a spindle key, special wrench, or other tool provided or approved by the gas supplier.
e. Cylinders of compressed gas shall not be used without a pressure-reducing regulator attached to the cylinder valve except where cylinders are attached to a manifold—in which case the regulator shall be attached to the manifold header.

f. Before making connection to a cylinder valve outlet, the valve shall be “cracked” for an instant to clear the opening of particles of dust or dirt. The valve and opening shall always be pointed away from the body and not toward anyone else. Fuel gas cylinder valves shall not be cracked near other welding work, sparks, open flames, or other sources of ignition.

g. Regulators and pressure gauges shall be used only with gases for which they are designed and intended. Make no attempt to repair or alter cylinders, valves, or attachments. This shall be done by the manufacturer.

h. Unless the cylinder valve has first been closed tightly, no attempt shall be made to stop a leak between the cylinder and the regulator by tightening the union nut.

i. Fuel gas cylinders in which leaks occur shall be taken out of use immediately and handled as follows:
   i. The valve shall be closed and the cylinder taken outdoors well away from any ignition source. The cylinder shall be properly tagged and the supplier notified.
   ii. A regulator attached to the valve may be used temporarily to stop a leak through the valve seat.
   iii. If the leak occurs at a fuse plug or other safety device, the cylinder shall be taken outdoors well away from any ignition source, the cylinder valve opened slightly, and permit the fuel gas permitted to escape slowly. The cylinder shall be plainly tagged. “No Smoking” or “Ignition Source” signs shall be “Posted”. A responsible person shall stay in the area until the cylinder is depressurized to make sure that no fire occurs. The supplier shall be promptly notified and follow his instructions for returning the cylinder.

j. Sparks, molten metal, electric currents, excessive heat, or flames shall not be permitted to come in contact with the cylinder or attachments.

k. Oil or grease shall never be used as a lubricant on valves or attachments of oxygen cylinders. Oxygen cylinders and fittings shall be kept away from oil and grease such cylinders or apparatus shall not be handled with oily hands, gloves, or clothing.

l. Never use oxygen as a substitute for compressed air in pneumatic tools, in oil pre-heating burners, to start internal combustion engines, or to dust clothing. It shall be used only for the purpose for which it is intended.

m. Cylinders shall never be brought into tanks or unventilated rooms or other closed quarters.

n. Cylinders shall not be filled except with the consent of the owner and then only in accordance with DOT (or other applicable regulations). No attempt to mix gases in a compressed gas cylinder or to use it for purposes other than those intended by the supplier shall be made.

o. Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator.

3. Storing Cylinders

a. Cylinders shall be stored in a safe, dry, well-ventilated place prepared and reserved for the purpose.

b. Cylinders shall not be stored near elevators, gangways, stairwells, or other places where they can be knocked down or damaged.

c. Oxygen cylinders shall not be stored within 20’ (6m) of gas cylinders or highly combustible
materials. If closer, cylinders shall be separated by a fire-resistive partition at least 5′ (1.6 m) having a fire resistive rating of at least ½ hour.

d. Acetylene and liquefied fuel gas cylinders shall be stored with the valve end up. If storage areas are within 100′ (30.5 m) distance of each other and not protected by automatic sprinklers, the total capacity of acetylene cylinders stored and used inside the building shall be limited to 2000 ft³ (57 m³) of gas, exclusive of cylinders in use or connected for use. Quantities exceeding this total shall be stored in a special room built in accordance with the specifications of NFPA 51, “Oxygen-Fuel Gas Systems for Welding and Cutting,” either in a separate building or outdoors.

e. Acetylene storage rooms and buildings shall be well ventilated. Open flames shall be prohibited. Storage rooms shall have no other occupancy.

f. Cylinders shall be stored on a level, fire resistive floor.

g. To prevent rusting, cylinders stored in the open shall be protected from contact with the ground and against weather extremes such as ice and snow accumulations in winter and continuous direct rays of the sun in the summer.

h. Cylinders are not designed for temperatures in excess of 130°F (54°C). Accordingly, they shall not be stored near sources of heat such as radiators or furnaces, or near highly flammable substances like gasoline, oil or volatile liquids.

i. Cylinder storage shall be planned so that cylinders will be used in the order in which they are received from the supplier.

j. Empty and full cylinders shall be stored separately with empty cylinders plainly identified as such so as to avoid confusion. Cylinders having held the same contents shall be grouped together.

k. A flame or electric arc shall never be permitted to contact any part of a compressed gas cylinder.

l. Storage rooms for cylinders containing flammable gases shall be well ventilated to prevent the accumulation of explosive concentrations of gas; no source of ignition shall be permitted; smoking shall be prohibited; wiring shall be in conduit; electric lights shall be in fixed position, enclosed in glass or other transparent material to prevent gas from contacting lighted sockets or lamps, and they shall be equipped with guards to prevent breakage; electric switches shall be located outside the room.

H. Control of Hazardous Energy - Lockout/Tagout

1. Purpose

Control of Hazardous energy is the purpose of the Lockout-Tagout Program. This program establishes the requirements for isolation of both kinetic and potential electrical, chemical, thermal, hydraulic and pneumatic and gravitational energy prior to equipment repair, adjustment or removal. Reference: OSHA Standard 29 CFR 1910.147, the control of hazardous energy.

2. Definitions

Authorized (Qualified) Employees are the only ones certified to lock and tagout equipment or machinery. Whether an employee is considered to be qualified will depend upon various circumstances in the workplace. It is likely for an individual to be considered “qualified” with regard to certain equipment in the workplace, but “unqualified” as to other equipment. An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a
qualified person, is considered to be “qualified” for the performance of those duties.

Affected Employees are those employees who operate machinery or equipment upon which lockout or tagging out is required under this program. Training of these individuals will be less stringent in that it will include the purpose and use of the lockout procedures.

Other Employees are identified as those that do not fall into the authorized, affected or qualified employee category. Essentially, it will include all other employees. These employees will be provided instruction in what the program is and not to touch any machine or equipment when they see that it has been locked or tagged out.

3. Training
   a. Authorized Employees Training.
   b. All Maintenance Employees, Department Supervisors and Janitorial employees will be trained to use the Lock and Tag Out Procedures. The training will be conducted by the Maintenance Supervisor or Safety Coordinator. Retraining shall be held at least annually.
   c. Affected Employee Training
      i. Only trained and authorized Employees will repair, replace or adjust machinery, equipment or processes.
      ii. Affected Employees may not remove Locks, locking devices or tags from machinery, equipment or circuits.
   d. Other Employee Training
      i. Only trained and authorized Employees will repair, replace or adjust machinery or equipment.
      ii. Other Employees may not remove Locks, locking devices or tags from machinery, equipment or circuits.

4. Preparation for Lock and Tag Out Procedures
   a. A Lockout – Tagout survey has been conducted to locate and identify all energy sources to verify which switches or valves supply energy to machinery and equipment. Dual or redundant controls have been identified.
   b. A Tagout Schedule has been developed for each major piece of equipment and machinery. This schedule describes the energy sources, location of disconnects, type of disconnect, special hazards and special safety procedures. The schedule will be reviewed each time to ensure employees properly lock and tag out equipment and machinery. If a Tagout Schedule does not exist for a particular piece of equipment, machinery and process, one must be developed prior to conducting a Lockout – Tagout. As repairs and/or renovations of existing electrical systems are made, standardized controls will be used.

5. Routine Maintenance & Machine Adjustments

Lock and Tag Out procedures are not required if equipment must be operating for proper adjustment. This rare exception may be used only by trained and authorized Employees when specific procedures have been developed to safely avoid hazards with proper training. All consideration shall be made to prevent the need for an employee to break the plane of a normally guarded area of the equipment by use of tools and other devices.
6. Locks, Hasps, And Tags

All Qualified Maintenance Personnel will be assigned a lock with one key, hasp, and tag. All locks will be keyed differently, except when a specific individual is issues a series of locks for complex lockout-tagout tasks. In some cases, more than one lock, hasp and tag are needed to completely de-energize equipment and machinery. Additional locks may be checked out from the Department or Maintenance Supervisor on a shift-by-shift basis. All locks and hasps shall be uniquely identifiable to a specific employee.

7. Sop: General Lock and Tag Out Procedures – Shutdowns

a. Before working on, repairing, adjusting or replacing machinery and equipment, the following procedures will be utilized to place the machinery and equipment in a neutral or zero mechanical state.
b. Before authorized or affected employees turn off a machine or piece of equipment, the authorized employee will have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the means to control the energy.
c. Notify all affected Employees that the machinery, equipment or process will be out of service.
d. The machine or equipment will be turned or shut down using the specific procedures for that specific machine. An orderly shutdown will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization.
e. If the machinery, equipment or process is in operation, follow normal stopping procedures (depress stop button, open toggle switch, etc.).

8. Machine or Equipment Isolation

a. All energy control devices that are needed to control the energy to the machine or equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.
b. Move switch or panel arms to “Off” or “Open” positions and close all valves or other energy isolating devices so that the energy source(s) is disconnected or isolated from the machinery or equipment.

9. Lockout or Tagout Device Application

a. Lockout or tagout devices will be affixed to energy isolating devices by authorized employees.
b. Lockout devices will be affixed in a manner that will hold the energy isolating devices from the “safe” or “off” position.
c. Where tagout devices are used they will be affixed in such a manner that will clearly state that the operation or the movement of energy isolating devices from the “safe” or “off” positions is prohibited.
d. The tagout devices will be attached to the same point a lock would be attached. If the tag cannot be affixed at that point, the tag will be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.
e. Lock and tag out all energy devices by use of hasps, chains and valve covers with assigned individual locks.

10. Stored Energy
a. Following the application of the lockout or tagout devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise rendered safe.

b. Where the re-accumulation of stored energy to a hazardous energy level is possible, verification of isolation will be continued until the maintenance or servicing is complete.

c. Release stored energy (capacitors, springs, elevated members, rotating fly wheels, and hydraulic/air/gas/steam systems) must be relieved or restrained by grounding, repositioning, blocking and/or bleeding the system.

11. Verification of Isolation

a. Prior to starting work on machines or equipment that have been locked or tagged out, the authorized employees will verify that isolation or de-energization of the machine or equipment have been accomplished.

b. After assuring that no Employee will be placed in danger, test all lock and tag outs by following the normal start up procedures (depress start button, etc.).

c. Caution: After Test, place controls in neutral position.

d. Special Electrical Note: Check Voltage as part of testing procedures.

12. Extended Lockout – Tagout

Should the shift change before the machinery or equipment can be restored to service, the lock and tag out must remain. If the task is reassigned to the next shift, those Employees must lock and tag out before the previous shift may remove their lock and tag.

13. Release from Lockout/Tagout

Before lockout or tagout devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

a. The work area will be thoroughly inspected to ensure that nonessential items have been removed and that machine or equipment components are operational.

b. The work will be checked to ensure that all employees have been safely positioned or removed. Before the lockout or tagout devices are removed, the affected employees will be notified that the lockout or tagout devices are being removed.

c. Each lockout or tagout device will be removed from each energy isolating device by the employee who applied the device.

14. Lockout/Tagout Procedure for Electrical Plug-Type Equipment

This procedure covers all Electrical Plug-Type Equipment such as Battery Chargers, some Sump Pumps, Office Equipment, Powered Hand Tools, Powered Bench Tools, Lathes, Fans, etc. When working on, repairing, or adjusting the above equipment, the following procedures must be utilized to prevent accidental or sudden startup:

a. Unplug Electrical Equipment from wall socket or in-line socket.

b. Attach “Do Not Operate” Tag on Plug Box & Lock on end of power cord. An exception is granted to not lock & tag the plug is the cord & plug remain in the exclusive control of the Employee working on, adjusting or inspecting the equipment.

c. Test Equipment to assure power source has been removed by depressing the “Start” of On
Switch.
d. Perform required operations.
e. Replace all guards removed.
f. Remove Lock & Plug Box and Tag.
g. Inspect power cord and socket before plugging equipment into power source. Any defect must be repaired before placing the equipment back in service.

15. Lockout/Tagout Procedures Involving More Than One Employee

In the preceding SOPs, if more than one Employee is assigned to a task requiring a lock and tag out, each must also place his or her own lock and tag on the energy isolating device(s) unless crew/craft LOTO procedures are used.

16. Management’s Removal of Lock and Tag Out

Only the employee that locks and tags out machinery, equipment or processes may remove his/her lock and tag. However, should the employee leave the facility before removing his/her lock and tag, the maintenance manager/supervisor may remove the lock and tag. The maintenance manager/supervisor must be assured that all tools have been removed, all guards have been replaced and all employees are free from any hazard before the lock and tag are removed and the machinery, equipment or process are returned to service. Notification of the employee who placed the lock is required prior to lock removal.

17. Contractors

Contractors, working on University property and equipment must use a Lockout – Tagout procedure while servicing or maintaining equipment, machinery, or processes.

I. Safe Use of Hand Tools and Portable Power Tools

1. Screwdrivers

a. A screwdriver is the most commonly used and abused tool. The practice of using screwdrivers as punches, wedges, pinch bars, or pry bars shall be discouraged as this practice dulls blades and causes employee injury.
b. Screwdriver tips shall be selected to fit the screw. Sharp-edged bits will not slip as easily as ones that are dull. Redress tips to original shape and keep them clean.
c. Always hold work in a vise or lay it on a flat surface to lessen the chance of injury if the screwdriver should slip.
d. When working near electrical equipment, screwdrivers shall be equipped with insulated handles (some also come with insulated blades).

2. Hammers

Wooden handles shall be straight grained and free of slivers or splinters. Once split, handles shall be replaced. Make sure handles are tightly wedged.
a. Never strike a hammer with another hammer.
b. Discard any hammer that shows chips, dents, etc. Redressing is not recommended.
c. Safety glasses shall be worn while using a hammer or any other striking tool.
d. Never use a common nail hammer to strike other metal objects such as cold chisels.

3. Punches

Never use a punch with a mushroomed struck face or with a dull, chipped, or deformed point. Punches that are bent, cracked, or chipped shall be discarded. Safety glasses shall be worn while using a punch.

4. Chisels

Choose a chisel only large enough for the job so the blade is used, rather than only the point or corner. Never use chisels with dull blades—the sharper the tool, the better the performance. Chisels that are bent, cracked, or chipped shall be discarded. Re-dress cutting edge or struck end to original contour as needed. When chipping or shearing with a cold chisel, the tool shall be held at an angle that permits one level of the cutting edge to be flat against the shearing plane.

5. Hacksaws

a. Hacksaws shall be adjusted and tightened in the frame to prevent buckling and breaking, but shall not be tight enough to break off the pins that support the blade. Install blade with teeth pointing forward.

b. Pressure shall be applied on the forward stroke only. Lift the saw slightly, pulling back lightly in the cut to protect the teeth. Do not bend and twist the blade. Never continue an old cut with a new blade.

6. Files

a. Select the right file for the job, making sure that it has a secure handle.

b. Files shall be cleaned only with file-cleaning cards; never by striking. Never use a file as a pry or hammer, as chipping and breaking could result in user injury.

c. Grasp the file firmly in one hand and use the thumb and forefinger of the other to guide the point.

7. Axes and Hatchets

a. The cutting edges are designed for cutting wood and equally soft metal. Never strike against metal, stone, or concrete.

b. Never use an axe or hatchet as a wedge or maul, never strike with the sides, and never use them with loose or damaged handles.

c. Proper axe grip for a right-handed person is to have the left hand about 3" from the end of the handle and the right hand about ¾ of the way up. Reverse hands if left handed.

d. Sharp, well-honed axes and hatchets are much safer to use because “glancing” is minimized.

e. Safety glasses and safety shoes shall be worn and clear swinging checked before using axes and hatchets. Axes and hatchets shall be carried with the covers on.

8. Knives

a. Knives cause more disabling injuries than any other hand tool. The hazards are that the hands may slip from the handle onto the blade or that the knife may strike the body or the free hand. Use knives with handle guards if possible. Knives shall be kept sharp and in their holders.
cabinets, or sheaths when not in use; the cutting stroke shall be away from the body.

b. Do not wipe dirty or oily knives on clothing. To clean, the blade shall be wiped with a towel or cloth with the sharp edge turned away from the wiping hand. Horseplay of any kind (throwing, “fencing,” etc.) shall be prohibited.

9. Crowbars

Use the proper kind and size for the job. Never use makeshifts such as pieces of pipe, as they may slip and cause injury. Crowbars shall have a point or toe of such shape that it will grip the object to be moved and a heel to act as a pivot or fulcrum. A block of wood under the heel may prevent slippage and help reduce injuries.

10. Shovels

a. Shovel edges shall be kept trimmed and handles checked for splinters and cracks. Workers shall wear safety shoes with sturdy soles. They shall have feet well separated to get good balance and spring in the knees. The leg muscle will take much of the load. To reduce the chance of injury, the ball of the foot (not the arch) shall be used to press the shovel into the ground or other material.

b. Dipping the shovel in water or greasing or waxing the shovel will prevent some materials from sticking.

c. Gloves shall be worn while using shovels.

d. When not in use, hang up shovels, stand them against the wall, or keep them in racks or boxes.

11. Box and Socket Wrenches

a. The use of box and socket wrenches is indicated where a heavy pull is necessary and safety is a consideration. Box and socket wrenches completely encircle the nut, bolt or fitting and grip it at all corners as opposed to two corners gripped by an open-end wrench. They will not slip off laterally, and they eliminate the dangers of sprung jaws.

b. Avoid overloading the capacity of a wrench by using a pipe extension on the handle or strike the handle of a wrench with a hammer. Hammer abuse weakens the metal of a wrench and causes the tool to break. Special heavy duty wrenches are available with handles as long as 3′.

Where possible, special penetrating oil shall be used to first loose tight nuts.

12. Electric Saws

Electric saws shall be equipped with guards above and below the face plate. The lower guard shall be checked frequently to be sure it operates freely and encloses the teeth completely when not cutting. Circular saws shall not be crowded into the work. The motor shall be started and stopped outside the work. At the beginning and end of the stroke or when the teeth are exposed, the operator shall use extra care to keep the body out of the line-of-cut. Saws shall be equipped with “dead man” controls or a trigger switch that shuts off the power when pressure is released.

13. Portable Grinder

a. Grinding wheels shall be guarded as completely as possible. They shall never be used at greater than their rated speed. To do so may result in the wheel breaking apart due to excessive centrifugal force. Guards shall be adjustable so the operator will be inclined to make the
adjustments rather than remove the guard. However, the guard shall be easily removable to facilitate replacement of the wheel. In addition to mechanical guarding, the operator shall wear safety glasses at all times.

b. Care shall be exercised to protect the grinder from damage.

c. Since part of the wheel is exposed, it is important the employee hold the wheel so it does not touch his clothes or body.

14. Air Hoses

a. Workers shall be warned against disconnecting the air hose from the tool and using it to clean machines or remove dust from clothing. Air used for cleaning shall not exceed 30 p.s.i. and workers shall wear safety glasses at all times when using air hoses. Brushing or vacuuming equipment is recommended for removing dust from clothing.

b. Air shall be shut off before attempting to disconnect the air hose from the air line. Any air pressure inside the line shall be released before disconnecting.

J. Safety Rules for Woodworking Machines

1. General

a. All machines shall be constructed and maintained so that they are free of excessive noise and harmful vibration.

b. All machines, except portable or mobile ones, shall be level and shall be securely fastened to the floor or other suitable foundation.

c. Small units shall be secured to benches or stands of adequate strength and design.

d. Tools shall be used only on machines for which they were designed.

e. All safety devices shall be regularly checked for proper adjustment.

f. Machines shall be securely locked and tagged out before cleaning.

g. Loose clothing, long hair, jewelry, and gloves shall not be worn around rotating parts of machinery.

h. Adjustments shall not be made while machines are running.

i. All metal framework on electrically driven machines shall be grounded and shall comply with the National Electrical Code (NFPA-70) and applicable local codes.

j. All machines shall have a cutoff device within reach of the normal operating position.

k. Power controls and operating controls shall be located within easy reach and away from a hazardous area. They shall be positioned so the operator can remain at the regular work location.

l. Each operating control shall be protected against unexpected or accidental activation.

m. There shall be ample marked work space around each machine.

2. Housekeeping

a. Good housekeeping shall be maintained to prevent buildup of dust, chips, sawdust, and scraps.

b. The working surface of machines shall be kept clear of scrap and waste materials.

3. Guards

All belts, shafts, gears, and other moving parts shall be fully enclosed or be grounded in accordance with American National Standard B15.1, “Safety Standards for Mechanical Power Transmission Apparatus”.

63
4. Illumination
   a. The machines and the adjacent stock areas shall be adequately illuminated.
   b. General work areas – 50 foot-candles;
   c. Fine work – 100 or more foot-candles.
   d. There should be no shadows or reflected glare.

5. Inspection
   a. Machines shall be inspected before each use. Areas of inspection include operating controls,
      safety control, power drives and sharpness of cutting edges, and other parts to be used.
   b. Cutting edges and tools shall be kept sharp at all times. They shall also be properly
      adjusted and secured.
   c. All shops and machines shall be inspected on a regular basis. See “Inspection Schedules and
      Reports” for information on frequencies and inspection forms to use.

6. Personal Protective Equipment
   a. Individuals in the work area shall wear eye protection at all times.
   b. All workers shall wear close-fitting apparel and avoid loose clothing, neck ties, gloves, and
      jewelry.
   c. Hair nets or caps shall be worn over long hair to keep it away from moving parts. Beards shall
      be kept trimmed close to the face.
   d. Safety shoes shall be worn when handling heavy material or when there is potential for foot
      injury.

Note: See “Personal Protective Equipment” for more information.

7. Code References for Woodworking Machines
   a. OSHA 1910.213.
   b. American National Standard 01.1 and 0.1.a, “Safety Requirements for Woodworking
      Machinery”.

K. Guide to Woodworking

1. Table Saw
   a. Feed with body to side of stock.
   b. Adjust blade to appropriate height.
   c. Use guard with splitter and anti-kickback fingers.
   d. Keep stock firm against fence.
   e. When crosscutting, remove rip-fence.
   f. Make sure blade is guarded by approved guard.

2. Radial Arm Saw
   a. Rip saw against the direction of the blade and use anti-kick fingers.
   b. Use blade guards.
c. Make sure end plates are tight on track-arm.
d. Make sure all clamps are tight.
e. Make sure material is tight to fence.
f. Return cutter to rear of track.

3. Band Saw
   a. Feed with body to side of stock.
   b. Guard height shall allow ½” clearance of material.
   c. A band saw should have a tension control device to indicate proper blade tension.
   d. Back off of blade and release cuts before long curves.
   e. Stop machine to remove scrap or pull out incomplete cut.

4. Jointer/Planer
   a. Make sure knife projection which extend beyond this body of the head is not more than 1/3”.
   b. Use long length stock.
   c. Use sharp cutters.
   d. Do not pass hands over cutters.
   e. Use push stick for small stock.
   f. Guard should adjust itself to the moving stock (swinging guard).

6. Wood Shaper
   a. The stock should be clamped securely in place.
   b. Use correct guard.
   c. Feed into knives—do not back off.
   d. No feeding between fence and cutter.
   e. Collar and starting pin work for irregular work—stock of sufficient weight.
   f. Make sure fence opening is only enough to clear cutters.
   g. Use stock as guard by shaping the underside of stock.
   h. Make sure spindle nut is tight.
   i. Shape only pieces 10” or longer.

7. Sander
   a. Keep hand from abrasive surface.
   b. Adequate exhaust system available.
   c. Belt or disk in good condition.
   d. Sand on downward side of disk.

8. Lathe
   a. Stock without defects; glued joints dry. (When using V-Belt, power should be off when changing speeds.)
   b. Make sure tool rest is close to stock.
   c. Hold tools firmly in both hands.
   d. Remove tool rest when sanding or polishing.
9. Circular Saw Blades for Cutting Wood

“Hollow Ground Blades” are for precision cross cutting, mitering, and rip-ping on all woods, plywood, and laminates where the smoothest of cuts are desired.

“Master Combination Blades” are used for use on all woods, plywood, and wood base materials, such as fiberboard and chip-board. This type blade is better for cross cut and mitering than for ripping in solid woods. The teeth are set, and deep gullets are provided forcool and free sawing.

“Rip Blades” are primarily intended for rip cuts in solid woods. The teeth are set and deep gullets are provided for cool and free cutting.

“Plywood Blades” are fine tooth cross cut type blades intended for cross cutting of all woods, plywoods, veneers, and chip-board. It is especially recommended for cutting plywood where minimum of splintering is desired. The teeth are set and sharpened to give a smooth but free-cutting blade.

“Chisel Tooth Combination Blades” are all-purpose blades for fast cutting of all wood where the best of finish is not required. Ideal for use in cutting of heavy rough timbers, in framing of buildings, etc. It cross cuts, rips, and miters equally well.

“Cabinet Combination Blades” are for general cabinet and trim work in solid wood. It will cross cut, rip, and miter hard and soft wood to give good accurate cuts for moldings, trim, cabinet work.

“Standard Combination Blades” are used for all hard and soft wood for cross cut, rip, or mitercut. It is especially recommended for use on power miter boxes and for accurate molding and framing work.

Metal-Cutting Blades

“Nonferrous Metal Cutting Blades” are for cutting brass, aluminum, copper, zinc, lead, bronze, etc. Blades are taper-ground and need no set. Use wax or lubricant on the blades for best results.

“Steel Slicer Blades” are for cutting thin steel and sheet iron up to 3/32-inch (2.4 mm) thickness. Not for use on nonferrous metals, wood, or plastic. This blade will give off sparks when cutting steel because it cuts by friction. Always keep sawdust chips free of machine to prevent fires.

“Flooring Blades” are tungsten carbide-tipped blades especially designed for rough cutting where occasional nails, metal lathe, etc. will be cut. It is especially recommended for the professional carpenter or installer of air conditioning or heating ducts where it is necessary to cut through old walls and floors. Always wear safety goggles when cutting metal.

L. Machine Guarding Requirements

1. Flywheels
   a. All parts of flywheels which are 7’ or less above the floor or working platform shall be guarded.
   b. Screens shall be placed in front of all flywheel spokes to protect against accidental contact by pipe, bars, rods, and similar materials.
   c. Flywheel pits shall be surrounded with a standard railing and a toe-board not less than 6” high with standard railing, toe-board, and spoke guard showing.

2. Machine Guards
a. Where guard or enclosure is within 2″ of moving parts, openings through the guard shall not be >3/8″.
b. If guards are >4″ and less than <15″ from moving parts, then the largest opening shall not be >2″. Where slatted guards are used, the opening shall not be >1″.
c. Inclined belt guards shall be installed so that the vertical clearance between the lower run of the belt and the floor shall not be <7″ at any point outside of the guard.
d. Any panel in a guard exceeding 6 ft² or 42″ in either dimension shall be supported by an additional frame member.
e. A standard railing placed not <15″ nor >20″ from a flywheel, is acceptable; but a railing shall not be used where other types of guards are specifically required such as guards for gears, sprockets, and V-belts.
f. When frequent oiling must be done inside the guard, openings with hinged or sliding self-closing covers shall be provided. All points not readily accessible shall have oil fed tubes or grease gun connections outside the guard if lubricant is to be added while machinery is in motion.
g. Self-lubricating bearings are recommended.

3. Gears, Sprockets, Friction Drives
   a. All gears or sprockets shall be completely enclosed or shall be guarded with side flanges extending inward beyond the roots of the teeth.
   b. All spokes on open web gears, sprockets, or friction drives shall be guarded to prevent accidental contact.
   c. The contact points of all friction drives must be enclosed.

4. Belt, Chain or Rope Drives
   a. Single or multiple V-belts, located 7′ or less from the floor or working platform shall be completely enclosed.
   b. Belt, chain, or rope drives 7′ or less above the floor or platform shall be guarded. The guard shall extend to at least 15″ above the belt or to a height of 7′; however, where both runs of a horizontal belt are 42″ or less from the floor, the belt shall be fully enclosed.
   c. Overhead horizontal drives with a lower run of 7′ or less from the floor or platform shall be guarded on the bottom and sides to a height of not <7″, or 15″ above the lower run.
   d. Horizontal flat belts and chain or rope drives, regardless of height above the floor or platform, shall be guarded for the entire length if located over passageways or workplaces. The guards shall follow the line of the pulley to the ceiling or to the nearest wall, thus enclosing the belt effectively. Where this is impractical, the guard shall enclose the top and bottom runs of the belt and the faces of the pulleys. The guards shall be of sufficient strength to restrain broken belts or drives.

5. Shafting
   a. All horizontal shafting 7′ or less from the floor, working platforms, or runways shall be guarded.
   b. All vertical or inclined shafting 7′ or less from the floor, working platforms, or runways shall be guarded.
   c. Shafting under benches or tables shall (1) be completely enclosed, or (2) be guarded by a trough which shall extend at least 2″ above or below the shafting; open space is not to exceed 6″ below the table or above the floor, or (3) be protected with a rigid guard from the
underside of the bench to 2" below the bottom line of shafting.

d. Projecting shaft ends lower than 7" from the ceiling or story base shall either be cut off smooth within one-half the diameter of the shaft or shall be guarded by a non-rotating guard.

c. Unused keyways shall be filled, covered, or guarded.

6. Belt Conveyors

a. Means for stopping the motor or engine shall be provided at the operator's station and also at the motor or engine.

b. Conveyor systems shall be equipped with an audible warning system to be sounded immediately before starting up the conveyor.

c. Emergency stop switches shall be arranged so that the conveyor cannot be started again until the actuating loop switch has been reset to running or “ON” position.

d. All conveyors passing over occupied locations shall be guarded so as to prevent material from falling.

c. All belt conveyor head, tail, tension, and dip take-up pulleys shall be guarded to cover the entire sides of the pulleys and along the run of the belt a sufficient distance so that a person cannot reach behind the guard and become caught in the nip point between the belt and pulley.

M. Vehicle Operation

1. Inspection

a. Operators shall be responsible for visually checking the vehicle for safety prior to placing it in motion. Each vehicle’s safety feature should be checked before use each day.

b. Department supervisors shall be responsible for assuring that fluid levels are checked at least weekly for vehicles used on a routine basis.

c. It is the responsibility of each department to have its' vehicles brake tag inspection and registration renewed each year.

2. Training

a. No one is permitted to drive a University vehicle or any vehicle for University business without authorization. The authorization process can be found at Welcome to Risk Management | Finance + Administration | Loyola University New Orleans (Loyola University New Orleans.edu).

b. Operators of vehicles must be properly licensed for the vehicle being driven. For example, drivers of vans and buses which carry 16 or more passengers must have a commercial driver’s license (CDL) with passenger endorsement.

3. Accidents

a. On campus accidents must be reported to LUPD immediately and to Risk Management within 24 hours.

b. Off campus accidents must be reported to the police with the closest jurisdiction to the accident as soon as it occurs and to Risk Management within 24 hours.

c. The vehicle accident reporting form can be found online at ChurchMutualVehicleAccidentReportForm.pdf (Loyola University New Orleans.edu).

4. General Safety

a. Alcohol and Drug Use

No alcoholic beverages, illegal drugs, or controlled substances are to be used or consumed by the driver or any passenger at any time while in possession of University-owned, leased, or rented vehicles, including personal vehicles used on University business.
b. Seat Belt Use
The use of seat belts is required for all persons occupying the vehicle. It is the driver’s responsibility to ensure that all persons are properly secured before the vehicle is put in motion.

c. Smoking
Smoking is not permitted in University-owned, leased, or rented vehicles.

d. Hazardous Materials
Hazardous materials should not be transported in University-owned, leased, or rented vehicles unless approved by the Risk Management Office in advance.

e. Traffic Laws
The driver is required to obey all state and federal traffic laws pertaining to the safe operation of a vehicle. The driver is personally liable for any fines, traffic or parking violations received. All moving violations must be reported to Risk Management by the driver.

f. Driver Training
Drivers may be required to view a driver safety video and/or complete driver training before being permitted to drive.

5. Defensive Driver Training
a. Defensive driving training must be provided to employees who will drive University vehicles on a regular basis. This training is available on-line. Department heads are responsible for obtaining this training for new drivers, and for assuring that the training is repeated every three years. Safe driving training may be scheduled as part of follow-up action when a driver has a preventable accident, any moving violation conviction or when driving performance or history reveals a need for additional training.

6. Golf Carts
a. The University has a fleet of golf carts. Any employee that may be driving a golf cart must take the Golf Cart Safety course on-line and receive a passing grade on the exam.

b. The University has one golf cart that is street legal. Employees driving this golf cart must take extra precaution while driving on the city streets and obey all traffic laws.

c. Those golf carts which are not street legal must remain on campus.

N. Hazard Communication

1. Responsibilities
a. Deans, Directors, Department Chairs, Principal Investigators, Managers and Supervisors shall:
   i. Comply with the specific requirements of the program.
   ii. Maintain a current list of chemicals in the work place. Provide a list of chemicals to EHS. Update the list on an ongoing basis via the Internet.
   iii. Ensure that minimum amounts of chemicals are maintained in the workplace.
   iv. Ensure that Safety Data Sheets (SDSs) are readily available to employees.
   v. Ensure that necessary physical or toxic warning signs are posted in those areas where special notices are required.
   vi. Ensure that each work area requiring specific personal protective equipment is posted with appropriate warning signs. Department Heads/Supervisors shall make appropriate personal protective equipment available as needed.
vii. Inform any contractor working on campus in writing of chemicals used in their work areas, and contractors must notify campus personnel of chemicals used in their work. SDS information shall be exchanged.

viii. Train their employees regarding the chemicals in the workplace, the location and operation of controls, procedures used to protect themselves and other workers, emergency plans and location of SDS or information related to chemicals in the workplace. (Note: Much of the above can be handled in safety meetings.)

b. The Chemical Hygiene Officer is responsible for:

i. Assisting with periodic audits of the program.
ii. Establishment of an SDS library/access system via the Internet.
iii. Assisting with students and employee training.
iv. Reviewing chemical inventories provided by Loyola departments and assisting with SDS access via the Internet. Chemical Hygiene Officer will coordinate this activity.

c. University receiving shall:

i. Ensure employees are properly trained in spill response.
ii. Ensure received SDSs are properly distributed.

d. Employees shall:

i. Learn about the chemical and physical hazards of chemicals in their workplace and how to protect themselves.
ii. Comply with the chemical safety requirements of Loyola’s hazard communication program and the SDS sheet for specific substances.
iii. Immediately report spills or suspected spills of chemicals.
iv. Report any problems with storage or use of chemicals.
v. Use only those chemicals for which they have received training.
vi. Use chemicals only for the tasks designated and covered in and other employee from these hazards.
vii. Inform their supervisors of changes in operations that could affect the safety and health of the job site or work area.
viii. Use personal protective equipment as specified by SDS.

e. Contractors shall:

ii. Ensure Contractor employees are properly trained.
iii. Monitor and ensure proper storage and use of chemicals by Contractor employees.
iv. Arrange for proper disposal of Chemicals following project completion (chemicals shall not be left on campus).

2. General Program Information
This written Hazard Communication Plan (HAZCOM) has been developed based on OSHA Hazard Communication Standard and consists of the following elements:

a. Identification of Hazardous Materials  
b. Product Warning Labels  
c. Safety Data Sheets (SDS)  
d. Written Hazard Communication Program  
e. Effective Employee Training

3. Hazardous Chemical Inventory  
   a. Overview:  
      The hazard communication standard requires manufacturers of chemicals to identify all of the hazards associated with the use of their chemical products. Those employers using manufacturer's products must compile a list of chemicals known to be present in the workplace.
   
b. Inventory Basics  
      The first objective in the development of a chemical inventory is the completion of a list that includes every hazardous chemical in the workplace. The person in charge of the operation/task must determine in the case of each hazardous substance whether, under any circumstances, an employee might be exposed. Any hazardous chemical that an employee works with on a regular basis, or may be potentially exposed to in the case of an emergency, must be inventoried. EHS may be contacted to assist with this process.
   
c. What's on the inventory list?  
      There are many substances common to any workplace that you may not think of as "hazardous materials." For example: heating and cooling fluids, cleansers, soaps, paints, varnishes, lacquers, thinners, copying fluid, gasoline, antifreeze, or brake and hydraulic fluid could all be considered hazardous under the right conditions. A general rule of thumb to follow is if the manufacturer has determined that it is hazardous, or it is a pure (single, non-compounded) hazardous chemical, or if the material could burn, explode, corrode, or otherwise injure an employee under reasonable, foreseeable circumstances, it should be listed.
   
d. What to exclude  
      Some products found at the University that the OSHA hazard communication standard would not require to be on a chemical inventory list:
      
      i. Any hazardous waste as defined in the Resource Conservation Recovery Act (RCRA),  
      ii. Tobacco or tobacco products  
      iii. Wood or wood products  
      iv. Manufactured items (articles) – see below  
      v. Food, drugs or cosmetics intended for personal consumption by employees at the workplace  
      vi. Ionizing and non-ionizing radiation hazards  
      vii. Biological hazards
Note: The term “article” as used in the fourth exception raises an interesting point. Under the standard, “article” is defined as a manufactured item: a) which is formed to a specific shape of design during manufacture, b) which has an end use that is contingent upon its shape or form as manufactured, c) which does not release or in any way expose, an employee to a hazardous chemical during normal use. This is very important considering the importance that the Occupational Safety and Health Administration seems to place on the definition. For example, when wood burns it produces smoke which is potentially hazardous. Therefore, wood in a particular workplace could only be exempted if burning was not a part of its “normal” work application. Another factor to consider is the notion of chemical containment. Just because a substance cannot be contained, doesn’t mean that it shouldn’t be included on your hazardous chemical list. For example, consider welding fumes. Welding fumes are produced under normal working conditions and are considered a hazardous substance that qualifies for admission to your inventory list and SDS file.

4. Labeling
a. General requirements
OSHA requires that containers housing hazardous substances be labeled. The intent of the law is to ensure that employees are fully informed as to the identities of the materials they are exposed to and any inherent danger that handling said substances implies. Labels provide employees with an immediate source of information and should not under any circumstances be removed or defaced. It is the manufacturer’s responsibility to label all hazardous chemicals shipped out of the company’s facility. However, if a hazardous chemical is transferred from a large container to a smaller container, or a label falls off, you may find it necessary to produce or update a label. Louisiana State University, under the Federal Communication Standard’s definition of “employer,” is required to provide its employees with relevant information about the hazardous chemicals to which they are exposed. Words such as “danger,” “caution,” or “harmful if inhaled or ingested,” usually do not fulfill the hazard warning criteria prescribed by the federal standard. According to the standard’s definition of hazard warning, the label must specifically convey the hazard of the chemical. If the inhalation of a given substance causes lung damage, then that is what the label should read, not “harmful if inhaled.” Your label should list the constituents of the product and the hazard(s) of the substance. It is not necessary to list every hazard of the chemical when you create a label; however, acute, chronic and/or well-substantiated hazards should be listed. For example, if you are transferring acid from one container to another, you need only list the name, hazardous properties and a brief warning. If an employee is unfamiliar with the acid, he/she should have enough data from the new label to reference the SDS (which your unit should have on file) and find out any additional information.

b. In-house labeling exceptions
There are three exceptions to the labeling requirements:
   i. consumer products – Cans of spray paint, toilet bowl cleaner, turpentine; in short, anything available over the counter to the general public is exempt from labeling requirements, provided that the item has appropriate consumer warnings on the factory label.
   ii. stationary process containers – Such as tanks. The standard states that an employer may use signs, placards, process sheets, batch tickets or other such written
materials instead of actually affixing labels to process containers. If your unit is working with some sort of chemical process, for example electro-plating, it may not be practical to permanently label your stationary containers. In this case, a warning sign could be generated and stood or hung proximate to the work area. The sign or placard must convey the same information that a label would and be visible to employees in the area throughout the work shift.

iii. portable containers - The Hazard Communication Standard states, “the employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use.

iv. by the employee who performs the transfer.

“Immediate use” in this case means “that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.” If hazardous material is going to be in the container after the employee who filled it leaves work, or if another employee is going to use the material, it must be labeled. All this aside, it would be in everyone’s best interest if all containers, even portable ones, were labeled. When an employee fills a portable container, a simple piece of masking tape with the name of the material and its primary hazard will suffice as a temporary label.

c. Incoming container inspection

Containers of hazardous chemicals coming into the workplace must be inspected to ensure that proper labeling procedures have been observed by the manufacturer. If an improperly labeled container arrives, it must be re-labeled.

5. Safety Data Sheets

a. What Are They?

A Safety Data Sheet (SDS) is a written information sheet about a specific hazardous chemical. Since Loyola University is not a manufacturer of chemicals, we are not generally required to create original SDSs. We are, however, required to secure, maintain and update SDSs for all hazardous chemicals used at Loyola. Whenever your department receives a hazardous material that you do not have a current SDS for, check the hazardous chemical inventory and see if it has been included. Failing this, the department may contact the manufacturer to request one or contact EHS to see if one is available.

The Federal Hazard Communication Standard (FHCS) called for all chemical manufacturers to create new Safety Data Sheets. All SDSs, as a result of the FHCS, now must have a date, must list medical conditions that could arise or become aggravated by exposure to the chemical, must state whether the chemical is a carcinogen or contains any carcinogens and, must state the primary routes of entry into the body (for a detailed description of what information is required on an SDS, continue reading; for a summary, see Section 4, Quick Reference Questions and Answers, about SDSs in the appendices). If you receive a chemical with an SDS that does not have the required information, then it is your responsibility to obtain or access on line an accurate copy. One indication that an SDS might be obsolete is its date. If the data sheet is dated more than three years ago, then chances are there is a more current version. In the case of an outdated SDS, every attempt should be made to secure the most recent copy.
b. Employee Access to SDSs

Employees have the right to obtain copies of any SDS(s) and/or list(s) of hazardous chemicals used in their workplace. There are three ways to obtain a Safety Data Sheet:

i. Contact your supervisor or safety representative,
ii. Access the SDS databases on the Internet at the manufacturer’s website
iii. Contact the Chemical Hygiene Officer. If several SDS’s are required, please submit the request to the Chemical Hygiene Officer in writing and include the name of the product, the manufacturer’s name and address.

c. Understanding the SDS

Section 1 Identity – Self explanatory
Section 2 Hazardous Ingredients – Here the chemical and common names of all constituents should be listed. If the product’s hazard determination was made as a mixture or compound then the common name of the product or chemical name of the compound will suffice.

Section 3 Physical/Chemical Characteristics – This section will tell you what to expect from the chemical. This is particularly important to guarantee proper handling, fire and spill address procedures.

Boiling Point – The temperature at which the material boils. If the material is a mixture, a range might be given.

Vapor Pressure – Tells how much vapor the material may produce. A high vapor pressure indicates that the material will readily evaporate.

Vapor Density – Tells how heavy a vapor is relative to an equal amount of air. A high vapor density means that the vapor will tend to accumulate at the bottom of tanks.

Solubility In Water – Indicates the solubility of the substance in water. Solubility is generally indicated numerically in weight percent. Solubility might also be expressed as follows:

Water Solubility Table

Negligible........................less than 0.1 percent solubility
Slight........................................0.1 to1 percent solubility
Moderate..............................1 to 10 percent solubility
Appreciable........................more than 10 percent solubility
Complete ............................soluble in all proportions

Specific Gravity – Indicates how heavy the material is relative to water.

Specific Gravity Table

1.0...........................same as water
above 1.0................heavier than water
below 1.0................lighter than water

Evaporation Rate – You must exercise caution when interpreting evaporation rate data.
There are two commonly used bases from which to derive a figure. Ethyl ether is used as the basis for determining evaporation rates of highly volatile solvents. In this case, values higher than 1 indicate less rapid evaporation than ether. Butyl acetate is the standard used for less volatile solvents and values greater than 1 indicate evaporation rates greater than butyl acetate.

Melting Point – Temperature at which a solid material melts.

Appearance and Color – Self-explanatory.

Section 4 Fire and Explosion Hazard Data – This information is intended to help you in case of an emergency. Special attention should be taken to understand how to interpret the data in this section quickly and correctly.

Flash Point – This figure indicates the temperature at which a material will ignite. There are two general methods used to determine flash point (closed cup and open cup), so the method used in the determination should be specified.

Flammable Limits – This gives the range of concentrations of a gas or vapor (percent by volume of air) which will burn or explode if exposed to an ignition source. Upper explosive limit (UEL) and lower explosive limits (LEL) are given.

Extinguishing Media – Cites the appropriate fire extinguishing media for the material.

Special Fire Fighting Procedures – A list of special provisions including personal protective equipment and procedures.

Unusual Fire and Explosion Hazards – Lists any peculiarities the material may demonstrate during firefighting procedures. For example, this section could contain the following: “extremely flammable, water reactive, vapors heavier than air and could flow along floor to alternate ignition sources.”

Section 5 Reactivity Data -This information helps the user determine safe storage procedures. This section should provide information on material stability and reactivity and should state what other chemicals or substances to avoid when handling the material.

Stability – Tells how easily a material becomes self-reactive and under what conditions it is most likely to do so.

Incompatibility – Tells what chemicals that the material might come in contact with that should be avoided.

Hazardous Decomposition or Byproducts – Lists hazardous chemicals that are produced if the material is burned, oxidized or heated.

Hazardous Polymerization – Usually a yes or no response indicative of whether or not hazardous polymerization is likely to occur. If “yes” then conditions by which the reaction could take place should be listed.

Section 6 Health Hazard Data – This section gives pertinent health data and effects of exposure.
Routes of Entry – This information tells you how the chemical is most likely to enter the body. Also indicated should be any potential routes of entry in a foreseeable emergency situation. A foreseeable emergency is one that might be expected as a consequence of something going wrong during the normal course of an employee’s job, e.g. a tank explosion, burst pipe, accidental inhalation, ingestion, etc.

Health Hazards – Indicates what the potential health effects of exposure to the material are and whether the effects are acute or chronic. Acute effects are those that occur from a concentrated dose of the material over a relatively short period of time. Chronic conditions are usually associated with continuous, low-level exposures, and do not appear for days, months, or even years after the initial exposure.

Carcinogenicity – Tells if the material is carcinogenic or not. A material is considered carcinogenic if it is specified as such by the National Toxicology Program’s, Annual Report on Carcinogens, the International Agency for Research on Cancer, or OSHA.

Signs and Symptoms of Exposure – The most common symptoms of exposure are described in this section. Specific allergic reactions are rarely listed so there may be other danger signs not mentioned by the SDS.

Medical Conditions Generally Aggravated by Exposure – Those medical conditions generally recognized as aggravated or complicated by exposure to the material.

Emergency First Aid Procedures – Self-explanatory for the most part. It should be noted that these are first aid procedures only and a qualified medical person should be contacted and apprised of the situation as soon as possible.

Section 7 Control Measures – This section lists protective equipment to be used, types of ventilation and general precautions to consider.

Respiratory Protection – Type of respirator to use.

Ventilation – Type of ventilation suggested for work with the material.

Protective Gloves – Gives construction (type of material) of the glove recommended for work with the substance.

Eye Protection – Indicates type of eye protection.

Other Protective Clothing and/or Equipment – Tells when special suits or protective equipment of any kind should be used.

Work / Hygienic / Maintenance Practices – Indicates personal hygienic practices for working with the material, like washing hands, etc.

Glossary of Terms Used On an SDS

Acute – Short term period of action. Readily apparent.

Asphyxiant – A gas or vapor that can cause injury by reducing the amount of oxygen available for breathing.
Carcinogen – A substance which has been identified as causing cancer in humans.

Chronic – A long time period of action.

Combustible Liquid – A liquid having a flash point at or above 1000F but below 2000F. This definition does not include mixtures containing one or more constituents with flashpoints outside the parameters indicated.

Compressed Gas – Means 1) a gas or mixture of gases having in a container an absolute pressure exceeding 40 pounds per square inch at 700F, or 2) a gas or mixture of gases having in a container an absolute pressure exceeding 104 pounds per square inch at 1300F, regardless of the pressure at 700F, or 3) a flammable liquid having a vapor pressure exceeding 40 pounds per square inch absolute pressure at 1000F, as determined by the American National Standard Method of Test for Vapor Pressure of Petroleum Products.

Corrosive Material – A chemical capable of causing visible and irreversible damage to human skin tissue at the site of contact.

Explosive – A chemical that produces a sudden release of pressure, gas and/or heat when subjected to sudden shock, pressure or high temperature.

Exposure – Contact of an individual with a hazardous material during the course of employment through any route of entry.

Flammable Material – A substance that meets any of the following specifications: A flammable aerosol is a chemical substance or mixture, dispensed from a container as a mist, spray or foam by a propellant under pressure, which yields a flame of at least 18 inches at full valve opening, or a flashback (flame extending back through the valve) at any opening. A flammable gas is a gas which, at normal atmospheric pressure and temperature and at a concentration of 13 percent or less, forms a flammable mixture, or that forms a range of flammable mixtures with air greater than 12 percent regardless of the lower limit. A flammable liquid for our purposes, is defined as having a flash point below 1000F except that this does not include any mixture where any one constituent has a flash point at or above 1000F and makes up 99 percent or more of the total volume of the mixture. A flammable solid is a material (other than an explosive) that causes fire through friction, absorption of moisture, spontaneous chemical change, retained heat from manufacturing or processing, or that can be readily ignited and can remain so even after the ignition source is removed.

Flash Point – The minimum temperature at which a substance produces enough vapor to be ignited.

Foreseeable Emergency – Any potential occurrence that could result in the uncontrolled release of a hazardous material into the workplace.

Hazardous Chemical Substance or Mixture – Is a substance considered as one or more of the following: a toxic material, a carcinogen, a corrosive material, an irritant, a strong sensitizer, a dangerously reactive material, a flammable material, a combustible liquid, a pyrophoric material, a strong oxidizer, an explosive material, or a compressed gas.

Health Hazard – A relative term generally referring to any substance that has been shown by at least one established scientific study to produce acute or chronic detrimental health effects to exposed personnel.
Irritant – A chemical substance or mixture, other than a corrosive, that when contacted with the skin produces an inflammatory reaction to the affected area and/or surrounding areas.

Median Lethal Concentration LC50 – The concentration in air of gas, vapor, mist, fume or dust for a given period of time that will kill 50 percent of the test animals using a specified test procedure. Inhalation is the primary route of entry.

Median Lethal Dose LD50 – The dosage of a substance that will kill 50 percent of the test animals to which the substance is administered using a specified test procedure. Various routes of entry can be used for testing purposes.

LEL (Lower Exposure Limit) – The lowest concentration of a gas or vapor in air that will ignite or explode if an ignition source is provided.

Safety Data Sheet (SDS) – An information document that contains relevant information about a specific chemical or mixture. Also lists the hazards of the chemical, appropriate emergency response procedures, protective equipment that should be worn, etc.

Mutagen – A material that affects organisms at the genetic level and whose effects may be seen in subsequent generations.

Oxidizer – A chemical that promotes combustion in other materials. The definition does not include explosives.

Physical Hazard – A chemical that is either a combustible liquid, a compressed gas, an explosive, is flammable, an organic peroxide, an oxidizer, is pyrophoric, is reactive or water-reactive.

Pyrophoric Material – A chemical substance or mixture that will ignite spontaneously in dry or moist air at below 1300F.

Reactive Material – A chemical substance or mixture that may vigorously polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure or temperature. Includes chemical substances that can be classified as explosive, an organic peroxide, and a pressure generating material or a water reactive material.

Sensitizer – A chemical substance or mixture known to cause some form of hyper-sensitive reaction to normal tissue when said tissue is exposed to it.

Teratogen – A chemical that causes physical defects in a developing embryo.

Threshold Limit Values (TLV) – These are the upper exposure limits of airborne concentrations of chemicals that are accepted as safe for employees to be exposed to on a day-in, day-out basis. There are three types of threshold limit values. The Time Weighted Average (TWA) is the maximum concentration that employees working eight hours per day, 40 hours per week can be exposed to with no adverse physical effects. The Short Term Exposure Limit (STEL) is the maximum concentration to which workers can be exposed for a period of up to 15 minutes with no detrimental effects. Finally, the Ceiling (C) is the concentration that should never be exceeded, not even instantaneously.

Toxic – Refers to any chemical or substance that falls into any of the following categories:

1) A chemical that has a median lethal dose of more than 50 milligrams per kilogram but not
more than 1000 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each;

2) a chemical that has a median lethal dose of more than 200 milligrams per kilogram but not more than 1000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours or less with the bare skin of albino rabbits weighing between 2 and 3 kilograms each; or,

3) a chemical that has a median lethal concentration in air of more than 200 ppm but not more than 2000 ppm by volume of gas vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for one hour or less to albino rats weighing between 200 and 300 grams each.

Unstable – A chemical or substance in a pure state (nothing added) that will readily polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure or temperature.
Abbreviations commonly found on an SDS:

AQTX................Aquatic Toxicity
RDS ..................Primary irritation dose
atm..................Atmosphere
IRR...................Irritant effects (systemic)
bp....................Boiling point
kg ...................Kilogram
ca....................(circa) about
l......................Liter
CAR....................Carcinogenic effects
LEL ..................Lower explosive limit
cc ...................Cubic centimeter
LFM ..................Linear feet per minute
CC ......................Closed Cup
LC50 ..................Median lethal concentration
CFR ..................Code of Federal Regulations
LD50 ..................Median lethal dose
CNS ..................Central Nervous System
m3 ....................Cubic meter
COC ..................Cleveland Open Cup
mp ....................Melting point
conc ..................concentration
MESA ..................Mineral Enforcement and Safety Admin.
decomp ..............decompose
mg ...................Milligram
G.I. or GI ...........Gastrointestinal
ml .....................Milliliters
m Hg ..................Milliliters of Mercury
HW ...................Hazardous waste
MLD ..................Mild irritation effects
I ......................Intermittent
SDS ..................Safety Data Sheets
Inhl ..................Inhalation
MW ..................Molecular weight
Insol ..................Insoluble
NEO ..................Neoplastic effects
NOx ..................Oxides of Nitrogen
PMCC .................Pensky-Martens Closed Cup
Ox ..................Oxides of Phosphorous
ppb ..................Parts per billion
TLV ..................Threshold limit value
UEL ..................Upper exposure limit
6. Training

Hazard Communication—Teaching Outline

1. Objectives:

a. To assure that the employee is made aware of the danger of hazardous materials/chemicals in the workplace.
b. To assure that the employee is made aware of how such materials/chemicals affect his/her body.
c. To assure that the employee learns how to recognize through labeling the hazard categories of materials/chemicals.
d. To assure that the employee learns to interpret the Safety Data Sheet (SDS).
e. To assure that the employee learns how to protect himself/herself from hazardous materials/chemicals.

2. Modes of Entry into The Body:

a. Inhalation—Breathing
b. Ingestion—Entering through the mouth
c. Absorption—Contact with exposed body areas
d. Contact—As above (Corrosives)
   i. Once in the body, many materials/chemicals attack vital organs
   ii. Attack can be long or short term, but the results can be the same

3. Effects:

a. Carcinogenic—Cancer
b. Toxic—Poison the organs
c. Flammable—Burns
d. Reactive—Explosion, burns, or toxic fumes leading to injury or death
e. Cryogenic—Freezing or frostbite of body parts
f. Corrosive— Destruction of human tissue
g. Mutagenic—Damage to reproductive processes and fetus

4. Recognizing The Hazard:

a. The NFPA Hazard Identification System
   i. Health—Blue
   ii. Flammability—Red
   iii. Reactivity—Yellow
   iv. Others—Colorless
   v. The numerical rating system
b. Product labeling by manufacturer
   i. Display of labels
ii. Display of signs

5. Safety Data Sheets: (OSHA standard format)

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms effects, acute, delayed, required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment, chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment, proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

Section 8, Exposure controls/personal protection lists OSHA’s Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical’s characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information

Section 13, Disposal considerations

Section 14, Transport information

Section 15, Regulatory information

Section 16, Other information, includes the date of preparation or last revision

O. Fire Protection Equipment Maintenance and Testing

1. PURPOSE

To establish a guideline to be used Loyola University personnel and contractors retained by the university for the inspection and testing of fire protection equipment and systems as required by local authorities or government regulation.
2. SCOPE

This procedure provides the minimum requirements for inspection and testing of fire protection equipment and systems. The following equipment/systems are covered in this procedure:

- Automatic sprinkler systems
- Combustible gas analyzers
- Fire doors and shutters
- Fire & emergency alarm systems
- Fire hose
- Fire hydrants and monitors
- Fire water control valves
- Foam-water systems
- Portable fire extinguishers
- Self-contained breathing apparatus
- Smoke & heat detection systems
- Special extinguishing systems

3. RESPONSIBILITY

Loyola Physical Plant shall be responsible to administer and implement this program.

Tests and inspections may be completed by others, but the site is responsible for making sure all tests/inspections are done, all equipment is included and detailed records are maintained.

4. DEFINITIONS

Inspect: Visual examination to verify that the device is in place, is not obviously damaged or obstructed and appears to be in normal operating condition.

Maintenance: Work performed to keep equipment operable or to make repairs.


Recordkeeping: Written records of all inspections and tests must be kept for compliance and auditing purposes. These records should contain the information required in the following sections. Records should be retained per the City of Coral Gables Construction Recordkeeping and Retention Schedule.

Test: Operation of device or system to verify that it will perform in accordance with its intended operation or function.

6. PROCEDURES

a. Water Extinguishing Systems

   1. Automatic Sprinkler Systems - Wet Pipe
      i. Quarterly Tests
Water flow alarm - Test the operation of the water flow alarm by opening the inspector’s test pipe, a 1/2-inch valved outlet usually located at the most hydraulically remote point on the system.

Drain test - Conduct a main (2") drain test, weather permitting. Completely open the main drain and note the residual (flowing) pressure and the static (non-flowing) pressure. The difference indicates the strength of the water supply and should be relatively constant from month to month. A variation in pressure drop greater than 10% from the previous quarter should be investigated.

ii. Annual Inspection

Check to see that all exposed sprinkler heads, piping, and hangers are free from damage, corrosion, grease, dust or paint.

2. Automatic Sprinkler Systems - Dry Pipe

i. Monthly Inspection

Check the air or nitrogen pressure and restore to 35 lbs. if necessary. If the pressure leakage exceeds 10 lbs. per month, the cause of leakage shall be determined and repaired.

Note: Where the sprinkler is automatically refilled by an air/nitrogen supply, inspect monthly during cold weather, verify the dry pipe valve house temperature is at least 40°F.

ii. Quarterly tests

Drain test - Conduct a drain test, weather permitting. (Same as for wet pipe system, see above).

Water flow alarm - Test the operation of the water flow alarm by opening the inspector’s test connection, a ½ inch valved outlet located at the main riser. Check the automatic drip outlet from the intermediate chamber of the dry pipe valve to determine that the ball check or its equivalent will move freely from its seat. If water leaks continuously from the drip outlet, the valve should be reset to properly seat the water clapper.

Check the air bleed off valve to verify that there is no excess priming water above the dry pipe valveclapper. Bleed off all excess water.

During cold weather, check all low point drains and remove any accumulation of water.

iii. Annual Inspection - same as for wet pipe system, see above.

iv. Annual Test

Trip test - Conduct a trip test. It is essential that each dry pipe valve be trip tested
annually. The dry pipe valve manufacturers supply instruction and/or posters giving complete instructions for trip testing and resetting their valves. Instructions shall be conspicuously and permanently mounted near each dry pipe valve or kept in an accessible location. The manufacturing instructions shall be followed in conducting the trip test. During the trip test, the low pressure alarm should be checked for proper operation.

Quick opening device - If the dry pipe system is equipped with an accelerator or an exhauster, it shall be trip tested in conjunction with the dry pipe valve in accordance with the manufacturer’s instructions. It is desirable to limit the amount of water admitted to the system piping during annual trip tests. The system shut-off valve shall be throttled before the test, so the flow from an open 2-inch drain provides a residual pressure of 5 lbs. at the riser. Close the shut-off valve and open the main drain promptly when the valve trips.

v. Three-year test - Each dry pipe valve should be trip tested with control valve wide open once every three years or when the system is altered. The test should be conducted by opening the inspector’s test connection. Test should be terminated when the dry pipe valve has tripped and clean water is flowing at the inspector’s test pipe. Water must reach the test pipe within 60 seconds from the time the valve is opened. The inspector shall note the trip pressure (for air and water) and the time for water to reach the inspector’s test connection.

3. Automatic Sprinkler Systems - Antifreeze

i. Annual Test

Test the solution at the start of the cold weather season. Measure the specific gravity of the solution using a hydrometer or refractometer. The solution should provide freeze protection up to 5°F below the expected minimum temperature. Use Tables in the most recent edition of NFPA 13 to determine propert solutions.

b. Special Extinguishing Systems

1. Halon 1301, FM 200, Dry Chemical and Carbon Dioxide Systems

i. Monthly Inspection

Conduct a visual inspection. Verify that the equipment has not been physically damaged. If the cylinder has been physically damaged, remove it from service and have it hydrostatically tested according to Section B.1.c. Check that the gauges on stored pressure cylinders are in the safe operating range. Verify that the seals on cylinders are intact and that the cylinders and discharge piping are securely mounted.

ii. Kitchen Fire Protection Systems

iii. Nitrogen Purge Systems

b) Annual Inspections and Tests
Test alarms, shutdowns manual pull stations and other associated equipment such as automatic door closers, dampers, air conditioning fans, etc.

Test weight and pressure of all pressurized cylinders containing expellant and extinguishing agent. Replace charge in carbon dioxide cylinders if loss of net contents is greater than 10% of weight when full. Replace the charge in Halon 1301 or FM 200 cylinders if weight loss exceeds 5% or pressure loss exceeds 10%. Replace the charge in dry chemical cylinders if pressure is below the safe operating range. Weight of full cylinders is recorded on a tag attached to the neck of the cylinders.

Inspect the condition of dry chemical inside cartridge operated containers for evidence of lumping or caking and replace the charge, if necessary.

On dry chemical systems, fixed temperature sensing elements of the fusible alloy type should be replaced.

c) Hydrostatic Pressure Testing

All testing should be done in strict accordance with Chapter 5 of the National Fire Protection Association Code No. 10 entitled "Standard For Portable Fire Extinguishers." Hydrostatic testing should be done by a competent local fire equipment service company.

Carbon dioxide cylinders continuously in service without discharging should be tested every 12 years. At the end of 12 years they should be discharged, tested, refilled, and returned to service. High pressure cylinders should not be recharged without hydrostatic test if more than 5 years have elapsed from the date of last test.

Halon 1301 cylinders continuously in service without discharging may be retained in service for a maximum of 20 years from the date of the last test. At the end of 20 years, they should be emptied, retested, refilled and returned to service. Under no circumstances should the agent be expelled into the atmosphere prior to servicing. Only companies equipped with listed Halon 1301 recovery and recycling equipment should be used. Cylinders should not be recharged without a hydrostatic test if more than 5 years have elapsed since the last test. Dry chemical systems should be hydrostatically tested at an interval not to exceed 12 years.

c. Portable Fire Extinguishers

1. Fire Extinguishers - All Types

i. Monthly Inspection

- Check that the extinguisher is securely mounted in a suitable location. Verify that access to or view of the unit is unrestricted.
- Ensure that the operating instructions on the name plate are legible and facing outward.
- Check for obvious physical damage, corrosion, or leakage.
• Determine that the nozzle is unobstructed and the discharge hose is in good condition.
• Verify that the pressure gage reading or indicator is in the operable range. Examine the seal and the locking pin to verify the seal is intact and to determine that the pin cannot be removed or the valve opened without breaking the seal.

ii. Hydrostatic Pressure Testing

All fire extinguishers should be hydrostatically pressure tested at intervals not exceeding those specified in the table below. All testing should be done in strict accordance with Chapter 5 of the National Fire Protection Code No. 10 entitled, "Standard for Portable Fire Extinguishers." Hydrostatic testing is best done by a competent local fire equipment service company.

### HYDROSTATIC TEST INTERVAL FOR EXTINGUISHERS

<table>
<thead>
<tr>
<th>Extinguisher Type</th>
<th>Interval (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soda-Acid</td>
<td>*</td>
</tr>
<tr>
<td>Cartridge-Operated Water and/or Antifreeze</td>
<td>*</td>
</tr>
<tr>
<td>Stored Pressure Water, Loaded Stream, and/or Antifreeze</td>
<td>5</td>
</tr>
<tr>
<td>Wetting Agent</td>
<td>5</td>
</tr>
<tr>
<td>Foam</td>
<td>Note 1</td>
</tr>
<tr>
<td>AFFF (Aqueous Film Forming Foam)</td>
<td>5</td>
</tr>
<tr>
<td>FFFP (Film Forming Fluoroprotein Foam)</td>
<td>5</td>
</tr>
<tr>
<td>Dry Chemical with Stainless Steel Shells</td>
<td>5</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>5</td>
</tr>
<tr>
<td>Dry Chemical, Stored Pressure, with Mild Steel Shells,</td>
<td>12</td>
</tr>
<tr>
<td>Brazed Brass Shells, or Aluminum Shells</td>
<td></td>
</tr>
<tr>
<td>Halogenated Agents</td>
<td>12</td>
</tr>
<tr>
<td>Dry Powder, Stored Pressure, Cartridge- Cylinder-</td>
<td>12</td>
</tr>
<tr>
<td>Operated, with Mild Steel Shells</td>
<td></td>
</tr>
</tbody>
</table>

* All extinguishers of this type must be removed from service. Extinguishers with copper or brass shells joined by soft solder were prohibited from further hydrostatic testing effective May 18, 1978. Extinguishers with stainless steel or...
brazed brass shells that were permitted to remain in service had a five-year hydrostatic test interval. Effective December 22, 1987, when the hydrostatic test date arrives, all types of inverting extinguishers should not be tested but removed from service.

2. Carbon Dioxide
   i. Annual Test

   Weigh the entire extinguisher on an accurate scale and recharge if the loss exceeds 10% of the net or charge weight; i.e., 8 oz. for 5 lb. unit and 1 lb.- 8 oz. for 15 lb. unit.

   A conductivity test should be conducted on all carbon dioxide hose assemblies. Hose assemblies found to be nonconductive should be replaced.

3. Dry Chemical (Stored Pressure Type)
   i. Six Year Inspection

   The extinguisher should be depressurized, emptied and the dry chemical examined for caking, packing, or contamination. The interior of the shell should be checked for corrosion. If the dry chemical is in good condition, it may be re-used to recharge the extinguisher.

4. Dry Chemical (Cartridge Operated Type)
   b) Annual Inspection

   The extinguisher should be emptied and the dry chemical examined for caking, packing, or contamination. The interior of the shell shall be checked for corrosion. If the dry chemical is in good condition, it may be re-used to recharge the extinguisher. Remove and weigh the gas cartridge on a balance accurate to 1/8 ounce. Replace with a fully charged cartridge if the loss of net weight exceeds 1/2 ounce.

5. AFFF (Stored Pressure Type)
   i. Five Year Maintenance

   Replace the extinguishing agent.

d. Fire Water Control Valves

1. General

   Fire water control valves are shut off valves on the firewater system which are locked and frequently inspected because of their importance to fire protection. All valves in the following categories should be locked:
i. Valves which shut off fire protection water supply sources, such as gravity tanks, fire pumps, well pumps, suction tanks, ground reservoirs and connections to public mains.

ii. Valves which shut off the water supply to automatic sprinkler or water spray systems.

iii. Valves in automatic sprinkler systems which shut off a portion of the system, such as shut-in-winter valves or nonfreezing system control valves.

iv. Valves in the underground distribution systems which serve as divisional valves controlling loops on major branches of the system. Valves controlling individual fire hydrants are not included in this category.

2. Valve Locking Procedures

All firewater control valves shall be locked in accordance with the following instructions to limit unauthorized operation.

Valves shall be locked open with non-breakable or breakable locks, as specified by your local fire department. Locks and chains should be sturdy. Where they are exposed to weather, they should be weather resistant. Locks having bronze bodies and case-hardened steel are suitable for this purpose.

Valves shall be locked in accordance with the following general methods.

i. Indicator post gate valves shall have the handle locked into the post by inserting a padlock in the loop on the side of the post. If no loop exists, an eye bolt should be welded on.

ii. Outside screw and yoke valves shall have a chain threaded through the hand wheel and yoke (for as small valve, a cable may be used). The chain must be secured with a padlock.

iii. Underground valves all have their special wrench kept in a locked enclosure or locked on a rack.

Access to the keys for these locks should be limited to the plant manager, the site emergency response coordinator or other specialty designated individuals.

3. Post and Wall Indicator Gate Valves.

i. Quarterly Inspection

Check that the target reads "open" and that it is clearly legible and centered in the target window.

Examine the padlock or seal carefully to determine it has not been broken or tampered with. Check any protective barriers to be sure they are undamaged.
ii. Semi-Annual Test

Using the valve wrench, completely open the valve and attempt to turn it beyond the full open position. The inspector should feel a slight spring or tension in the stem. This is the best assurance the valve is fully open and the gate is in position.

Turn the valve about 1/2 to 3/4 of a turn closed to observe that it operates freely. Leave the valve turned 1/4 turn closed. The padlock or seal must be removed during this test.

iii. Annual Test and Maintenance

Lubricate the target mechanism, the padlock, and the upper portion of the stem. Most posts have alubrication hole in the cap.

Completely close and re-open the valve to test its operation and distribute the lubricant.

4. Outside Screw and Yoke Gate Valves

i. Quarterly Inspection

Examine the lock carefully to determine it has not been broken or tampered with. Check the exposed portion of the stem for cleanliness.

ii. Annual Test and Maintenance

Clean and lubricate the exposed portion of the stem. Also lubricate the packing to minimize friction. Completely close and reopen the valve to test its operation and distribute the lubricant.

5. Underground Valves With Valve Boxes

i. Quarterly Inspection

Visually inspect the valve handle to verify that it is accessible.

ii. Semi-Annual Test

Use the tee handled wrench to completely open the valve and attempt to turn it beyond the full open position. The inspector should feel a slight spring or tension in the stem.

Turn the valve about 1/2 to 3/4 of a turn closed to observe that it operates freely. Leave the valve 1/4 turn closed.

iii. Annual Inspection

Completely close and reopen the valve to test its operation.
e. Fire Hydrants/Monitors

1) Quarterly Inspection

Make a visual inspection of the hydrant and monitor (if applicable) to determine it has not been physically damaged.

Examine the area around the hydrant to assure that storage or vegetation has not obscured view of the hydrant or blocked its use.

Check that the hydrant hand wheel is in place. If none is provided, and the hydrant may be used by site personnel, be sure hydrant wrenches are in the hose house.

Check that the monitor is in the down position for drainage.

2) Annual Test

Open the hydrant or monitor completely and flow water through one hydrant hose connection and any monitor. Observe that the flow is normal and the hydrant or monitor is operating properly. It may be necessary to flow water through hose in some areas to prevent water damage.

Verify that the monitor moves freely in both the vertical and horizontal planes, through its full range of travel.

Conduct a thorough operating test on all remotely controlled monitors.

Shut off the hydrant or monitor and check for proper drainage. Cover the open hose nipple with the palm of your hand. If the hydrant or monitor is draining properly, you will detect a strong suction on your palm. An alternate method is to lower a weighted string into the barrel and check for wetting.

3) Annual Maintenance

Oil the valve stem through the oil screw hole usually located near the nut on the weather cap. Oil the moving parts of monitors.

Examine the hydrant caps and check the condition of the threads, washers and chains. Coat the threads of cast iron caps with a light film of oil to prevent rusting. Replace the caps hand tight.

f. Fire Hose

1. Annual Inspection

All fire hose should be visually examined to see that it has not been vandalized, that the couplings and nozzle are attached, that there is no evidence of mildew, rot, damage by chemicals, vermin, and abrasion. If hose is in doubtful condition, it should be hydrostatically pressure tested. Verify the nozzle and hose are free of debris. Be careful to change the position of the folds for racked hose.
2. **Hydrostatic Pressure Testing**

Hydrostatic tests should be done in strict accordance with Chapter 5 of the National Fire Protection Association Code No. 1962 entitled "The Care, Use and Service Testing of Fire Hose Including Couplings and Nozzles." Hydrostatic testing is best done by a competent local fire equipment service company. After testing, clean and dry hose as detailed above.

Rack or reel hose (hose designed for fighting only incipient fires) should be hydrostatically pressure tested at intervals not exceeding 5 years after purchase and every three years thereafter.

Attack hose (hose designed to fight fires beyond the incipient stage by trained firefighters and brigade members) should be hydrostatically pressure tested at least annually.

3. **After Use Maintenance**

All dirt should be removed by thorough dry brushing or scrubbing with plain water. Oil, gasoline, tar and grease should be removed by scrubbing with warm soapy water followed by a thorough rinsing with plain water. Acid should be removed by scrubbing with a baking soda solution and rinsing. Cotton jacket hose should be thoroughly dried to prevent the formation of mildew, mold or other forms of rot which will weaken the cotton fibers. One hundred percent synthetic jacketed hose need not necessarily be dried.

Couplings should be cleaned in a pail of warm soapy water and rinsed in plain water. Never apply grease or oil to the threads.

g. **Fire Doors and Dampers**

1. **Quarterly Inspection**

   The entire fire door assembly should be examined for physical damage. If any is noted, repairs should be made promptly and a full operational test should follow.

   Verify that fire door openings are clear of everything that would be likely to obstruct or interfere with the free operation of the door.

   Fusible links or other heat actuated devices should be inspected to see if they are painted, corroded, etc. If so, they should be replaced.

2. **Annual Inspection Test and Maintenance**

   Lubricate all guides, bearings, etc. to facilitate proper operation.

   Conduct a full operational test on all doors normally held in the open position and equipped with automatic closing devices. Use manufacturer’s instructions.
Note: Overhead, rolling steel doors close very quickly. Precautions should be taken to prevent injury to personnel.

h. Fire and Emergency Alarm Systems

This section covers the main components of the fire and emergency alarm systems. Section A covers water flow devices and Sections I and J cover manual and automatic fire alarms, respectively. Main components include the indicating devices such as horns, bells, strobes, etc.; annunciator panels; control panels and wiring circuitry.

1. Semi-Annual Test

Operate one evacuation or emergency alarm station for each alarm annunciator panel. Verify that all indicating devices operate properly. Verify that the alarm is transmitted to the local, proprietary, or central alarm panel, where applicable.

Test any site wide emergency or evacuation alarm.

2. Semi Annual Test

Test all supervisory alarms such as firewater valve supervision, tank water supervisory devices, and other sprinkler system supervisory devices.

3. Annual Test

A complete test of annunciators and alarm panels shall be conducted in accordance with the manufacturer’s instructions. Operation of alarms under emergency power should be verified.

4. Miscellaneous

During periodic tests of other equipment such as sprinkler systems, Halon 1301 and FM 200 systems, firepumps, fire water control valves, etc., verify that the alarms are transmitted to the local, proprietary, remote, or central alarm panel, as applicable.

i. Manual Fire Alarms

1. Annual Test

All manual fire alarm pull stations should be operated. Verify that each alarm is received and all indicating devices (bells, horns, sirens, etc.) operate properly.

j. Smoke and Heat Detection Systems

1. Smoke Detectors

   i. Semi Annual Inspection

       Visually inspect all detectors for signs of physical damage, misplacement or other problems.
ii. Annual tests

Test the sensitivity of all detectors using either a calibrated test method or the manufacturer’s calibrated sensitivity test instrument. Detectors found to be outside the approved range of sensitivity shall be replaced or adjusted if it is listed as field adjustable.

For air duct detectors, verify that the device will measure/detect smoke in the airstream (i.e., measuring pressure drop for devices using sampling tubes is acceptable).

Perform a full functional test of duct detectors using smoke (or a substitute) or a calibrated test method. Put the detector into alarm, and determine that proper operation occurs. This can be done by directly injecting the smoke or a substitute into the detection chamber or sampling means.

2. Heat Detectors

i. Annual Test

1. Restorable Heat Detectors (except pneumatic line type)

   One or more detectors on each signal-initiating circuit shall be tested in accordance with the manufacturer’s instructions. Different detectors shall be selected for each test. Within 5 years, every detector shall have been tested. A schedule must be prepared to insure that this specification is satisfied.

2. Pneumatic Line-Type Detectors

   All systems shall be tested for leaks and proper operation.

ii. 15 Year Test-No restorable Spot-Type Detectors

   After the 15th year from original installation, at least two detectors out of every hundred shall be removed every 5 years and sent to a testing laboratory for tests. The detectors that have been removed shall be replaced with new detectors. If a failure occurs with any of the detectors removed, additional units shall be removed and tested as a further check on the installation until there is proven to exist either a general problem involving faulty detectors or a localized problem involving only one or two defective detectors.

3. Infrared and Ultraviolet Detection Systems

i. Quarterly Inspection

   All IR and UV detectors should be cleaned to ensure that dust or dirt does not impair the detector visibility. If the local ambient conditions require more frequent cleaning, a cleaning program should be developed at the discretion of the site.

   ii. Semiannual Test
Test the sensitivity of all IR and UV detectors in accordance with the manufacturer's instructions. This test should confirm that the detector is operative.

Detector sensitivity should be determined by using one of the following:

- A calibrated test method.
- A manufacturer’s calibrated sensitivity test instrument.
- Listed control panel arranged for this purpose.

These methods should be directly proportional to the input signal from a fire consistent with the detector listing or approval.

Detectors outside the approved range or sensitivity should be replaced or field adjusted by qualified personnel to return to the acceptable range.

iii. Fire Exposure Test

All detectors suspected of exposure to a fire condition should be tested immediately in accordance with the manufacturer's instructions.

k. Fire Pumps

1. Weekly Test - Diesel Driven Pumps

i. Pre-system checkout

Before the diesel driven pumps are started, the following should be checked:

- Tank fuel level
- Driver oil level
- Driver coolant level
- Battery voltage
- Hours on driver
- Battery electrolyte level and specific gravity

ii. Test Start

Start the pump automatically by opening the test cock with the controller selector switch in the automatic position.

Record on the inspection form the pressure at which the driver starts.

iii. Manual Start

Two manual positions are provided for starting diesel engines. Turn the control switch to Manual No. 1 and press the manual push button firmly. If the engine fails to start within 30 seconds, release the starting switch and allow the starting motor to cool a few minutes before trying again. Check cranking voltage.

NOTE: To prevent serious damage to the starter, if the engine does not start, do not press the start button again while the starter motor is turning!
Repeat the above in the Manual 2 position and for any remote pump starting devices.

iv. While Running

- Immediately observe the oil pressure gauge. If there is no pressure indicated on the oil pressure gauge within 15 seconds, stop the engine and check the lubricating oil system.
- Immediately observe the cooling water discharge from the diesel driver to make certain that cooling water is being supplied.
- Check to make sure that adequate combustion air is available. If automatic combustion air louvers are provided, make certain that the louvers have opened. This may require that the access door to the pump house be closed.
- Make certain that the main relief valve is functioning. A small amount of water should be flowing.
- The following should be checked after the engine has warmed up (generally approximately 30 minutes):
  - Driver RPM from engine tachometer (adjust speed if necessary)
  - Driver oil pressure per manufacturer’s recommendation
  - Driver water temperature (normal operating temperature 160-185°F)
  - Discharge pressure - compare to previous tests
  - Suction pressure - compare to previous tests

2. Weekly Test - Electric Driven Pumps

i. Test Start

Bleed down the system pressure and allow the electric pump to start automatically. Record on the inspection form the pressure at which the driver starts. Run for 10 minutes before shutting down pump.

Operate the manual start push button and any remote pump start locations to make sure that they operate.

ii. While Running

- Record the discharge pressure - compare to previous tests
- Record the suction pressure - compare to previous tests
- Check that the circulation relief valve is in operation

3. Annual Test and Maintenance - All Pumps

i. An annual performance test of the fire pumps must be conducted.
ii. The diesel engine drivers require oil changes, engine tune-ups, etc. These should be accomplished as per the manufacturer’s recommendations.
iii. Inspect and repack seals on pumps, as needed.
iv. All control panel functions and alarms must be functionally tested on an annual basis.
v. The pump bearings should be greased as per the manufacturer’s specifications.

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