

**COLLEGE OF LAKE COUNTY HAZARDOUS MATERIALS
MANAGEMENT PROCEDURES**

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CLC HAZARDOUS MATERIALS MANAGEMENT PROCEDURES

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CLC HAZARDOUS MATERIALS MANAGEMENT PROCEDURES

A. Objective

The Hazardous Materials Management Procedures are guidelines to ensure that all employees and students receive adequate information relevant to the possible hazards which may be associated with the various hazardous substances used at the College. The procedure covers the following topics: communication, inventory; handling; storage; and disposal of hazardous materials.

B. Scope

This program covers all potential workplace exposures involving hazardous substances as defined by Federal, State and local regulations. This includes all employees, students, visitors, and contractors of the College. This does not pertain to the Chemical Hygiene Plan for chemical and biological labs at the College.

C. References

Department of Labor, Occupational Health and Safety Administration (OSHA) 29 Code of Federal Regulations 1910.1200, Illinois Department of Labor 820 ILCS 225 Health and Safety Act.

In 2012, OSHA revised the Hazard Communication Standard to align with the UN system of classifying chemicals. Starting in 2015, chemical manufacturers and distributors will be required to comply with new labeling of chemicals and a new format to the Safety Data Sheet (SDS) standard. For this document, all former Material Safety Data Sheets (MSDS) will now be referred to as Safety Data Sheets (SDS).

D. Responsibilities

- Supervisors and department chairs must inform employees, students and visitors of hazardous materials used in the area.
- Supervisors and department chairs must make sure that Safety (SDS) are readily available for all hazardous chemicals used in the work area. An inventory of hazardous substances shall also be maintained for information on the amount and location of hazardous substances.
- Supervisors and department chairs must ensure containers of hazardous substances are always properly labeled, and that hazardous materials are inventoried, stored, handled, and disposed of properly.
- Employees working with hazardous materials must attend Hazard Communication training to ensure they understand the hazards and how to read a SDS.
- The Environmental Health and Safety Manager or Laboratory Chemical Hygiene Officer can provide training and assistance in Hazard Communications.

Section I. Hazard Communication Program

A. Hazardous Material Definition

A hazardous and/or toxic material is defined by OSHA as any chemical that is a **health hazard** or a **physical hazard**.

- **HEALTH HAZARD:** OSHA defines a health hazard as a chemical for which there is

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statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. Chemicals covered by this definition include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes.

- **PHYSICAL HAZARD:** OSHA defines a physical hazard as a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.
- **ADDITIONAL HAZARDOUS MATERIALS:** The broad definition OSHA uses to define hazardous chemicals includes not only generic chemicals, but also paints, cleaning compounds, inks, dyes, and many other common substances. Chemical manufacturers and importers are required to determine if the chemicals they produce or repackage meet the definition of a hazardous chemical. A chemical mixture may be considered as a whole or by its ingredients to determine its hazards. It may be considered as a whole if it has been tested as a whole and a MSDS/SDS has been issued accordingly. Otherwise the mixture must be evaluated by its components. If the mixture contains 1.0% or more of a hazardous chemical or 0.1% of an ingredient listed as a carcinogen or suspected carcinogen, the whole mixture is assumed to have the same health and/or carcinogenic hazards as its components.

B. Employee Information & Training

All employees that work with hazardous substances will attend an orientation meeting for information and training on the following items **prior** to starting work with hazardous substances; (Training CHECKLIST is to be completed and kept in employee file).

- An overview of the requirements of the Hazard Communication Standard, including their rights under this regulation.
- Information on where hazardous substances are present in their work areas.
- Information regarding the use of hazardous substances in their specific work areas.
- The location and availability of the written Hazard Communication Program. Subsequent to this, the program will be available from managers and also from the Manager of Environmental Health & Safety.
- The physical and health aspects of the substances in use.
- Methods and observation techniques used to determine the presence or release of hazardous substances in the work area.
- The controls, work practices and personal protective equipment, which are available for protection against possible exposure.
- Emergency and first aid procedures to follow if employees are exposed to hazardous substances and the signs and symptoms of overexposure to hazardous chemicals in the workplace.
- How to read labels and Safety Data Sheets (SDS) to obtain the appropriate hazard information.

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- Employees whose duties include handling or otherwise managing hazardous wastes will receive training specific to those tasks that involve waste handling in accordance with state and federal hazardous waste regulations.
- Training is required at the time of initial assignment and whenever a new chemical hazard is introduced into the work area that an employee has not previously received training on. Information and training may be designed to cover categories of hazards or specific chemicals.

It is most important that all of our employees understand the information given in the orientation meetings. Questions regarding this information should be directed to the Manager of Environmental Health & Safety.

When new substances are introduced into the workplace the Department manager will review the above items with you as they are related to the new materials.

The department manager will relay all the above information to new employees, who will be working with hazardous substances, prior to their starting work.

C. Safety Data Sheets (SDS)

- The 2012 Hazard Communications Revision require the following 16 sections, in this order:
 1. **Identification** includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
 2. **Hazard(s) identification** includes all hazards regarding the chemical; required label elements.
 3. **Composition/information on ingredients** includes information on chemical ingredients; trade secret claims.
 4. **First-aid measures** includes important symptoms/effects, acute, delayed; required treatment.
 5. **Fire-fighting measures** lists suitable extinguishing techniques, equipment; chemical hazards from fire.
 6. **Accidental release measures** lists emergency procedures; protective equipment; proper methods of containment and cleanup.
 7. **Handling and storage** lists precautions for safe handling and storage, including incompatibilities.
 8. **Exposure controls/personal protection** lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).
 9. **Physical and chemical properties** lists the chemical's characteristics.
 10. **Stability and reactivity** lists chemical stability and possibility of hazardous reactions.
 11. **Toxicological information** includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
 12. **Ecological information**
 13. **Disposal considerations**
 14. **Transport information**
 15. **Regulatory information**
 16. **Other information** includes the date of preparation or last revision.

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- The College Faculties Department will maintain a master SDS file. These sheets are available to all employees, at all times, upon request.
- Department's shall keep a binder with copies of the SDS used in the area.
- A Department Head or their designee will be responsible for reviewing all incoming SDS for new and significant health/safety information. The designee will ensure that any new information is passed on to the employees involved.
- The Department Head or their designee will review all incoming SDS for completeness. If any SDS is missing or obviously incomplete, a new SDS will be requested from the manufacturer or distributor. OSHA is to be notified if the manufacturer or distributor will not supply the SDS or if it is not received after 30 days from request. Any new information will be passed on to employees involved.
- New materials will not be introduced into the work area until a SDS has been received.
- The department that makes the purchase will make it an ongoing part of their function to obtain SDS for all new materials when they are first ordered.
- The Manager of Environmental Health & Safety shall coordinate with appropriate departments to make sure all SDS are obtained, distributed and communicated.

D. Container Labeling

- No container or hazardous substances can be released or used unless the container is correctly labeled and the label is legible.
- All chemicals/substances in bags, drums, barrels, bottles, boxes, cans, cylinders, reaction vessels, storage tanks, or the like will be checked by the receiving department to ensure the manufacturer's label is intact, is legible, and has not been damaged in any manner during shipment. Any containers found to have damaged labels will be quarantined until a new label has been installed.
- The label must contain:
 - **Name, Address, and Telephone Number** of the chemical manufacturer, importer or other responsible party.
 - **Product Identifier** – how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number.
 - **Signal Words** are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words- "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards, and "Warning" is used for the less severe hazards.
 - **Hazard Statements** describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability.
 - **Precautionary Statements** describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling. There are four types of precautionary statements: prevention (to minimize exposure); response (in case of accidental spillage or exposure emergency response and first-aid); storage; and disposal.
 - **Pictogram(s)** are graphic symbols used to communicate specific information about the hazard(s) of a chemical. There are nine pictograms; however, OSHA will not

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enforce the use of the "environment" pictogram. See Appendix A.

• All secondary containers shall be labeled. The information must include details of all chemicals/substances which are in the referenced container.

EXEMPTIONS TO LABELING: A portable chemical container filled from a labeled container by an employee who uses it immediately or during his or her work shift does not have to be labeled. However, if any of the material is left at the end of the work shift, it must be labeled or returned to a labeled container. Pipes and piping systems do not have to be labeled.

E. List of Hazardous Substances

Each department shall compile, annually review, and update as necessary a complete inventory of all substances present in that department. The name of those materials determined to be hazardous are defined in applicable Federal and State standards.

The College has a database to keep an inventory of hazardous substances on campus. Departments shall keep this database up to date with the name of the hazardous substance, location and approximate quantity. Contact the Environmental Health and Safety Manager for assistance or access to the database.

All department inventories will be subject to independent review and verification.

F. Non-Routine Tasks

Infrequently, employees may be required to perform non-routine tasks, which involve the use of hazardous substances. Prior to starting work on such projects, each involved employee will be given information by his/her supervisor about hazards to which they may be exposed during such an activity.

This information will include:

- The specific hazards.
- Protective/safety measures which must be utilized.
- The measures the college has taken to lessen the hazards, including special ventilation, temperature controls, respirators, the presence of another employee, air sample readings, and emergency procedures.
- Documentation of this information review and any training

G. Informing Contractors

To ensure that outside contractors work safely at the College, and to ensure the safety of the contractor's employees, it will be the responsibility of management to provide contractors the following information:

- The hazardous substance to which they may be exposed while working at the College.
- The precautions the contractor's employees must take to lessen the possibility of exposure by usage of the appropriate measures.
- Rules and regulations regarding the protection of employee safety relevant to fire and ignition sources around flammable materials will be followed. The rules regarding smoking, welding, grinding, will also be followed.

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Outside contractors shall supply the name of any hazardous substance the contractor's employees may be bringing into the facility for use in their work. The contractor should also supply a copy of the SDS relevant to these materials.

H. Laboratory Requirements

- Ensure that labels on incoming containers of hazardous chemicals are neither removed nor defaced.
- Maintain any SDS that are received with hazardous chemicals, and ensure that SDS for all hazardous chemicals in the work area are readily accessible to laboratory employees during the times they work in the laboratory and to emergency response personnel.
- Provide information and training to employees regarding the hazardous chemicals/substances in their work area at the time of their first work assignment and again whenever a new health or physical hazard is introduced into their work area. Laboratory employees are to receive the same training as discussed in section C, . Employee Information and Training. Additionally, laboratory employees must understand and follow the standard operating procedures for the correct handling of hazardous chemicals as covered in the *College of Lake County Laboratory Chemical Hygiene Plan*.

I. Plan Administration

The Manager of Environmental Health & Safety will monitor this Hazard Communication program.

Questions regarding this program should be directed to the Manager of Environmental Health & Safety.

J. Health Hazard Definitions

In order to determine the most up-to-date definitions for hazardous materials in the workplace, please reference Department of Labor, Occupational Health and Safety Administration (OSHA) 29 Code of Federal Regulations 1910.1200 (Hazard Communications).

Section II. Inventory, Handling, Storage, and Disposal of Hazardous Materials

A. General Laboratory Practices

- All staff is expected to follow these guidelines to ensure a safe working environment.
- Conduct yourself in a safe and responsible manner when working in the lab
- Plan ahead. Seek information about the hazards, plan protective measures to minimize exposure, and plan the safe positioning of laboratory equipment before using any hazardous materials.
- Be alert to unsafe work practices and conditions. Correct those that you can and report issues to the department chair.

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- Know the location and proper use of safety equipment.
- Always wear appropriate Personal Protective Equipment (PPE)
- Do not smoke, chew gum or tobacco, handle contact lenses or apply make-up while in the lab.
- Restrain long hair and loose clothing or jewelry while working in the laboratory.
- Never wear sandals or open-toed shoes in the laboratory.
- Eating and drinking are prohibited in the laboratories.

B. Chemical Inventory

- All work areas will keep a current and up-to-date chemical inventory of chemicals used or stored.
- Inventories will be updated annually, at a minimum, or more frequently if quantities or operational uses change significantly.
- The information will include: The name of the chemical (as it appears on the Safety Data Sheet (SDS); quantity on hand; and if the SDS is on file. Use the inventory form in Appendix B.
- A copy of the current inventory from each work area will be given to the CLC Environmental Health & Safety Manager for incorporation into the Campus-wide chemical inventory.

C. Handling Hazardous Materials

- Know the properties and or hazards of a material before handling it. This information can be found in the SDS for the chemical
- Wear ANSI compliant chemical splash goggles with indirect ventilation in place when working with hazardous materials.
- Wear gloves and lab coats when handling especially hazardous chemicals such as toxins, concentrated acids, or concentrated bases.
- Wash hands immediately after using materials to avoid inadvertent contact with eyes, mouth, nose, or other sensitive skin areas.
- Use laboratory equipment or apparatus only for its intended purpose.
- Inspect all equipment or apparatus for damage before using. Do not use if damaged.

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D. Storage of Hazardous Materials

- Store all materials/chemicals in closed, sturdy, and appropriately rated containers. Refer to the SDS for proper storage information. . If leakage is noted, the hazardous material shall be transferred immediately to a new container.
- All containers are kept tightly closed except when material is being actively transferred into and out of the container.
- Label all non-original containers with the appropriate identification and hazard information.
- Store materials that are not being used in proper cabinets or on shelves rather than on a lab bench. Specific location(s) will be designated for the storage of hazardous materials. Hazardous materials should be segregated into materials of similar chemical and/or physical attributes and hazards, so that incompatible materials are separated. All hazardous materials shall be returned to those locations after each use
- If a chemical is transferred from the original manufacturer container into a secondary container, the new container is to be appropriately labeled, including hazard information.
- Store chemicals based on their reactive nature, hazard level, flammability, and compatibility.
- Lock all storage areas when not in use.
- Display the classification system used for the storage of the materials/chemicals in the principle storage area.
- Store flammable and corrosive chemicals in OSHA/NFPA approved storage containers and/or storage cabinets.
- Store all cold-storage flammables in OSHA/NFPA approved flammables/explosion proof refrigerators.
- The storage of any hazardous material must not obstruct any exit.
- Cabinets used for chemical storage are of solid, sturdy construction, preferably hardwood or metal.
- The weight of containers of hazardous materials stored on shelving or cabinets must not exceed the load capacity of the shelf or cabinet. A clearance of at least 18 inches from the sprinkler heads or (if no sprinkler heads are present) 24 inches from the ceiling is maintained.
- Wall-mounted shelving is not recommended for chemical storage; if used, ensure that the shelving has heavy-duty brackets and standards. Shelving should possess a lip to prevent containers from sliding off.
- Do not store hazardous materials on top of high cabinets or location s that are hard to see or reach. Corrosive liquids shall not be stored above eye level.
- Do not store containers of hazardous chemicals near heat or in direct sunlight.
- Where practical, use corrosion resistant storage trays or secondary containers to collect incidental spillage that may collect along the side of containers (e.g., paint cans).

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- Do not store hazardous materials in refrigerators where food or drink is stored, and the food and drink are not stored in locations where hazardous materials are stored or used.

E. Storage of Flammable and Combustible Materials

The following general procedures will be utilized for storing and handling containers of flammable and combustible materials:

- Wherever practical, non-bulk flammable and combustible liquids will be stored either in a Underwriters Laboratory (UL) or Factory Mutual (FM) approved Safety Can or Flammables Cabinet.
- Consumer quantities of flammable and combustible products may be stored in the original containers they were purchased in. Otherwise, CLC must ensure that non-bulk flammable and combustible liquids are stored in accordance with the size limitations indicated in the following table:

MAXIMUM ALLOWABLE SIZE OF CONTAINERS AND METAL PORTABLE TANKS

Container Type	Flammable Liquid			Combustible Liquid	
	IA	IB	IC	II	III(A)
Glass or approved plastic	1 Pint	1 quart	1 gallon	1 gallon	1 gallon
Metal (other than DOT drums)	1 gallon	5 gallon	5 gallon	5 gallon	5 gallon
Safety Cans	2 gallon	5 gallon	5 gallon	5 gallon	5 gallon
Metal Drum – (meeting appropriate DOT spec.)	60 gallon	60 gallon	60 gallon	60 gallon	60 gallon
Approved Metal Portable Tanks	660 gallon	660 gallon	660 gallon	660 gallon	660 gallon

- The quantity of flammable and combustible liquids containers that are stored outside of a dedicated interior storage room and/or flammable liquid storage cabinets will not exceed:
 - 25 gallons of Class IA liquids in containers
 - 120 gallons of Class IB, IC, II or III liquids in containers
 - 660 gallons of Class IB, IC, II or III liquids in a single portable tank
- No more than 60 gallons of Class I or Class II liquid, and no more than 120 gallons of Class III liquids may be stored in a storage cabinet and that no more than three such cabinets may be located in a single fire area.

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- Flammable cabinets used for storage of flammable/combustible liquids meet applicable OSHA and NFPA standards.
- All containers (not just metal) used to store Class I liquids are bonded and grounded during dispensing activities. CLC also shall ensure that bonding and grounding is used when dispensing other flammable or combustible liquids, except for Class IIIB liquids. Note that it is not acceptable to merely hold the nozzle of the dispensing container in contact with the opening of the receiving container in lieu of attaching a bonding wire. Also, when grounding non-metallic containers, contact must be made directly to the liquid, rather than to the container.
- Containers of flammable / combustible materials are to be shielded from direct sunlight, away from heat sources and sources of ignition. Equipment with motors used in areas where flammables/combustible are stored must meet applicable National Electric Safety Code (US DOC, 1993) criteria for explosion resistance.
- The potential for the production of vapors and the associated risk of ignition by flashback will be assessed. Vapors from flammable liquids are denser than air and tend to sink to the floor level where they can spread over a large area.
- To the extent practical, flammable liquids in pressurized containers e.g., aerosol cans are stored in a flammable storage cabinet.

F. Storage of Corrosive Materials

The following general procedures will be utilized by CLC for storing and handling containers and bulk tanks of corrosives:

- All acids and bases are segregated for storage. Note organic acids will not be stored with mineral acids.
- Approved eye and face protection be worn when corrosive chemicals are handled.
- If corrosives and water are to be mixed (diluted), acids or bases must be added to water; DO NOT add water to an acid or base.
- Liquid corrosives should not be stored above eye level.

G. Storage of Compressed Gases

According to OSHA , **a compressed gas is defined as:**

- A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or
- A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg. C); or
- A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by ASTM D-323-72.

Compressed gases can be toxic, flammable, oxidizing, corrosive, or inert. In the event of a leak, inert gases can quickly displace air in a large area creating an oxygen-deficient atmosphere, toxic gases can create poison atmospheres, and flammable or reactive gases can result in fire and exploding cylinders. In addition, there are hazards from the pressure of the gas and the physical weight of the cylinder. All compressed gases are potentially hazardous because of the high pressure stored inside the cylinder. A

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sudden release of pressure can cause injuries and property damage by propelling a cylinder or whipping a line. A full size cylinder may weigh more than 130 pounds. The cylinder can itself become a missile if the cylinder valve is broken off.

The following procedures will be utilized by OTAY for cylinder inspection, handling, storage, set-up and use, and managing empty cylinders:

Inspection:

- Inspect cylinders to ensure that they are in a "safe condition".
- Inspect all cylinders upon receipt and accept only properly identified cylinders - do not rely on color codes.
- If a cylinder or valve is noticeably corroded, the vendor should be contacted for instructions.
- Most leaks occur at the valve in the top of the cylinder and may involve the valve threads valve stem, valve outlet, or pressure relief devices. CLC personnel should not attempt to repair leaking cylinders. Where action can be taken without serious exposure to personnel:
 - Move the cylinder to an isolated, well-ventilated area (away from combustible materials if the cylinder contains a flammable or oxidizing gas).
 - Contact the site supervisor and appropriate emergency response personnel (e.g., fire department).
 - Whenever a large or uncontrollable leak occurs, evacuate the area and immediately contact emergency response personnel (e.g., fire department).

Handling:

- Avoid dropping, dragging, sliding or rolling cylinders. Use a suitable hand truck or cart equipped with a chain or belt for securing the cylinder to the cart, even for short distances.
- Never transport with the regulator in place.
- Take precautions so that gas cylinders are not dropped or allowed to strike each other or other objects. Dropping or striking may damage the cylinder valve, which could turn the cylinder into a dangerous projectile with the potential to destroy property and/or injure personnel.
- Cylinders should not be used as rollers for moving material or other equipment.
- Cylinder caps should be left on each cylinder until it has been secured against a wall or bench or placed in a cylinder stand, and is ready for installation of the regulator.
- Cylinder caps protect the valve on top of the cylinder from damage if knocked.
- Never tamper with pressure relief devices in valves or cylinders.
- Use only wrenches or tools provided by the cylinder supplier to remove a cylinder cap or to open a valve. Never use a screwdriver or pliers.
- Keep the cylinder valve closed except when in use.
- Position cylinders so that the cylinder valve is accessible at all times.

Where more than one type of gas is in use, label gas lines. This is particularly important when the gas supply is not in the same room or area as the operation using the gases.

- Do not use the cylinder valve itself to control flow by adjusting the pressure.
- Appropriate lifting devices, such as cradles or nets, must be used when using a crane, hoist or derrick to transport gas cylinders. Do not use magnets or slings to lift gas cylinders. Do not use the valve protection cap for lifting a gas cylinder.

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Storage:

- All cylinders must be secured to a wall, bench, fixed support or cylinder stand using a chain or strap placed 2/3 of the way up. Cylinder stands are an alternative to straps.
- Cylinders should be strapped individually.
- Cylinders should not be stored with a regulator attached. Secure the proper gas cap to the threaded portion on the top of the cylinder to protect the valve.*
- Do not store full and empty cylinders together.
- Segregate cylinders by hazard classes while in storage. Oxidizers (e.g., oxygen) and flammable gases (e.g. acetylene) should be stored in areas separated by at least 20 feet or by a noncombustible wall.
- Cylinders should not be stored near radiators or other heat sources. If storage is outdoors, protect cylinders from weather extremes and damp ground to prevent corrosion.
- No part of a cylinder should be subjected to a temperature higher than 125oF. A flame should never be permitted to come in contact with any part of a compressed gas cylinder.
- Do not place cylinders where they may become part of an electric circuit.
- Keep the number of cylinders in a laboratory to a minimum to reduce the fire and toxicity hazards.
- Ensure that the cylinder is properly and prominently labeled as to its contents.
- All cylinders are be properly secured at all times to prevent tipping, falling or rolling. They can be secured with straps or chains connected to a
- The cylinders are stored in a cool, dry, well-ventilated, fire-resistant area that meets all applicable federal, state and local regulations.
- Store cylinders upright
- DO NOT store flammable gases next to an exit or near oxygen cylinders.
- Properly secure cylinders in a well ventilated and protected area away from heat, flames, and the sun.
- Leave cap on and valve closed when cylinder is not in use.
- When a cylinder is empty or not being used, ensure that the valve is closed, the regulator removed and that the valve protector cap is secured in place.
- DO NOT purchase more or larger cylinders than necessary.

Set-Up and Use:

- Before using cylinders, read all label information and material safety data sheets (MSDSs) for detailed information on the chemical contained in the gas cylinder. Specific chemical handling and storage precautions will be outlined in the MSDS. The MSDS will also have specifications for appropriate personal protective equipment for worker protection.
- The cylinder valve outlet connections are designed to prevent mixing of incompatible gases. The outlet threads vary in diameter; some are internal and some are external; some are right-handed and some are left-handed. Generally, right-handed threads are used for fuel gases.
- Use compressed gases only in a well-ventilated area. Toxic, flammable and corrosive gases should be carefully handled in a hood or gas cabinet. Proper containment systems should be used and minimum quantities of these products should be kept on-site.
- To set up and use the cylinder, follow these steps:
 - Attach the closed regulator to the cylinder. Never open the cylinder valve unless the regulator is completely closed.

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- Regulators are specific to the gas involved. A regulator should be attached to a cylinder without forcing the threads.
- Ensure the threads of both the regulator and main valve are clean. If the inlet of a regulator does not fit the cylinder outlet, no effort should be made to try to force the fitting. A poor fit may indicate that the regulator is not intended for use on the gas chosen.
- Turn the delivery pressure adjusting screw counter-clockwise until it turns freely. This prevents unintended gas flow into the regulator.
- Open the cylinder slowly until the inlet gauge on the regulator registers the cylinder pressure. If the cylinder pressure reading is lower than expected, the cylinder valve may be leaking.
- With the flow control valve at the regulator outlet closed, turn the delivery pressure adjusting screw clockwise until the required delivery pressure is reached.
- Check for leaks using Snoop or soap solution. At or below freezing temperatures, use a glycerin and water solution, such as Snoop, rather than soap. Never use an open flame to detect leaks.
- When finished with the gas, close the cylinder valve, release the regulator pressure and replace the gas cap if it will not be used in the near future.

To assemble equipment and piping:

- Do not force threads that do not fit exactly.
- Use Teflon tape or thread lubricant for assembly. Teflon tape should only be used for tapered pipe thread, not straight lines or metal-to-metal contacts.
- Avoid sharp bends of copper tubing. Copper tubing hardens and cracks with repeated bending.
- Inspect tubing frequently and replace when necessary.
- Tygon and plastic tubing are not appropriate for most pressure work. These materials can fail under pressure or thermal stress.
- Do not mix different brands and types of tube fittings. Construction parts are usually not interchangeable.
- Do not permit oil or grease to contact cylinders or their valves, especially cylinders containing oxidizing gases.
- Do not use oil or lubricants on equipment used with oxygen.
- Do not use copper piping for acetylene.
- Do not use cast iron piping for chlorine.
- Discontinue use of the cylinder when it has at least 25 psi remaining; close valve to prevent air and moisture from entering. Return unused and empty cylinders to the vendor for reuse or refill.

Empty Cylinders:

- Remove the regulator and replace the cylinder cap.
- Mark the cylinder as "empty" or "MT" and store in a designated area for return to the supplier.
- Do not store full and empty cylinders together.
- Do not have full and empty cylinders connected to the same manifold. Reverse flow can occur when an empty cylinder is attached to a pressurized system.
- Do not refill empty cylinders. Only the cylinder supplier should refill gases.
- Do not empty cylinders to a pressure below 25 psi (172 Kpa). The residual contents may become contaminated with air.

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H. Disposal of Hazardous Waste (list waste storage sites)

Disposal of hazardous materials must be according to federal and state regulations for each chemical.

- Waste container Management:
 - must be made of materials compatible with the waste being collected;
 - must be of the appropriate size for the amount of waste to be stored;
 - must be kept closed during storage, except when adding or removing waste;
 - must be maintained in good condition (e.g. to avoid leaks)

- Labeling Waste Containers:
 - All containers used for storing hazardous waste must have the words "hazardous waste" on them.
 - must have contents of container;
 - must have accumulation date (not required for satellite accumulation containers, only when the quantity in a given satellite accumulation area exceeds 55 gallons must they be labeled with an accumulation start date, then they have 3 days to be move the waste to the Waste Accumulation Room ;
 - must use the standard NFPA label determined for the material/chemical.

- Waste Accumulation Room:
 - Once a satellite accumulation waste container is full and moved to the cart in the Hazardous Waste Accumulation Room (C-205), it shall be labeled with the date. This will serve as the "Accumulation Start Date". This will ensure that waste is disposed of within the proper allowed time frame.
 - Weekly inspections of the waste accumulation room must be performed and documented.
 - Adequate communications devices must be present in the Waste Accumulation Room.
 - Adequate aisle space must be maintained between containers of hazardous waste.
 - Adequate spill response equipment must be available in the Waste Accumulation Room

- Waste Disposal/Removal:
 - The CLC Environmental Health and Safety Manager will be in charge of making sure that all hazardous materials are disposed of by a certified hazardous waste contractor, and according to OSHA and EPA guidelines.

CLC HAZARDOUS MATERIALS MANAGEMENT PROCEDURES

Appendix A

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

HCS Pictograms and Hazards

<p>Health Hazard</p>  <ul style="list-style-type: none"> ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ▪ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ▪ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ▪ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ▪ Acute Toxicity (fatal or toxic)

