Lab Safety Training

University of New Haven

TRIUMVIRATE ENVIRONMENTAL

Introduction

This training is designed to meet the University of New Haven's obligations under the following regulatory standards.

- Occupational Safety and Health Administration (OSHA) Standards:
  - Hazard Communication Standard (29 CFR 1910.1200);
  - Laboratory Standard (29 CFR 1910.1450);
  - Bloodborne Pathogens Standard (29 CFR 1910.1030);
- EPA/CTDEEP Hazardous Waste Standard.

Topics for Discussion

This training program is designed to familiarize you with safe work practices when working in laboratories. Topics covered in this training include:

- Part 1: Program Goal
- Part 2: Health Hazards and Toxicity
- Part 3: Physical Hazards
- Part 4: Hazard Information Sources
- Part 5: Protective Measures and Exposure Control
- Part 6: Hazardous Waste Management
- Part 7: Biological Waste Management
- Part 8: Spills and Personal Contamination

Part 1: Program Goal

Main goal: Minimize risk of injury or illness by ensuring that researchers and students have the training, information, equipment and support needed to work safely.

- Chemical Hygiene Plan
- Hazard Communication Program

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Hazard Communication Manual

- It is important to learn safe work practices **BEFORE** you start work in the laboratory.
- Federal and State Regulations require initial and annual safety training.
  - The Federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard states that:
    - **"It is everyone's right to know about all of the hazards in their workplace."**
    - Workers must be made aware and properly trained on all hazards encountered in the workplace.
  - Hazardous Chemical Information Act
    - Requires the employer to provide workers with access to chemical inventories, safety data sheets, and to provide chemical safety training.

Chemical Hygiene Plan (CHP)

- **The OSHA Laboratory Standard**, 29 CFR 1910.1450, requires the creation of the Chemical Hygiene Plan (CHP). The CHP must cover the following items:

  - Safe work practices for all research facilities and operations.
  - Procedures and controls to maintain exposures below the established exposure limits.
  - Must have provisions for training, medical consultation, hazard identification, respirator use (if needed) and record keeping.
  - There is also a requirement for researchers to receive task and chemical specific training. This training only provides an overview. Your Lab Manager will provide additional training as needed.

Activities Requiring Prior Approval

- The Safety Committee and department Lab Managers must be notified when certain operations or projects occur. The notification is required in order for the Committee to help employees/students safely perform the task or process.
  - Explosive laboratory reactions or use of high explosives
  - Use of highly toxic chemicals, radioactive materials, carcinogenic materials, reproductive toxins or materials of unknown toxicity
  - Purchasing, moving or installing a chemical fume hood, laboratory exhaust ventilation or laminar flow equipment
  - Experiment or process that impacts building or laboratory design, i.e. a large piece of equipment or apparatus that blocks sprinkler heads
  - Purchase or use of a respirator
  - Operations using greater than 22 liters of hazardous waste
  - After hours lab work, or operations/reactions that occur overnight
  - Unattended operations or reactions
  - Operations that use high or low pressure

Unattended Experiments

UNATTENDED EXPERIMENT

Biology Research Student- Safety Information Card

Date/time (begin): _____ Date/time (end):_____

Research Student: _____ Contact cell#:_____

Contact e-mail: _____

Faculty Advisor: _____ Contact cell#:_____

Contact e-mail: _____

Alternate contact info: _____

Resource(s) in use, check all that apply

- ☐ Electricity ☐ Vacuum ☐ Temperature - _____
- ☐ Water ☐ Gas - _____ ☐ Pressure - _____

Hazards, check all that apply (NFPA>2)

- ☐ Flammable ☐ Carcinogen/Toxin
- ☐ Corrosive ☐ Pyrophoric
- ☐ Oxidizer ☐ Inhalation hazard
- ☐ Biological Hazard (types)- _____
- ☐ Other:_____

University of New Haven; Department of Biology Lab Manager – Sandra Hartman-Neumann, Charger Plaza 02, 203-479-4557

- Contact your department lab manager to obtain form.
- Fill out form with all necessary information.
- Post this form right outside the fume hood or near the bench where experiment is taking place to notify others.

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Part 2: Health Hazards and Toxicity

- “Health Hazard” refers to chemical, physical or biological factors in the environmental that can have negative impacts on either short term or long term health if exposed to them.
- It is important to understand how to identify the health hazards you may use, how these materials may make you sick and how you may be exposed to the material.
- Detailed information is found in the Laboratory Safety Manual and the Chemical Hygiene Plan.

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Introduction to Toxicity

- Ability of a substance to produce adverse health effects.
- Possible adverse health effects include cancer, cell toxicity or functional deficiencies.

- **Toxicity hazard:** Probability that injury will occur depending on the manner in which the substance is being used.

    - Probability of having an adverse health effect is greatly reduced if you utilize a fume hood when working with materials with hazardous vapors or fumes.

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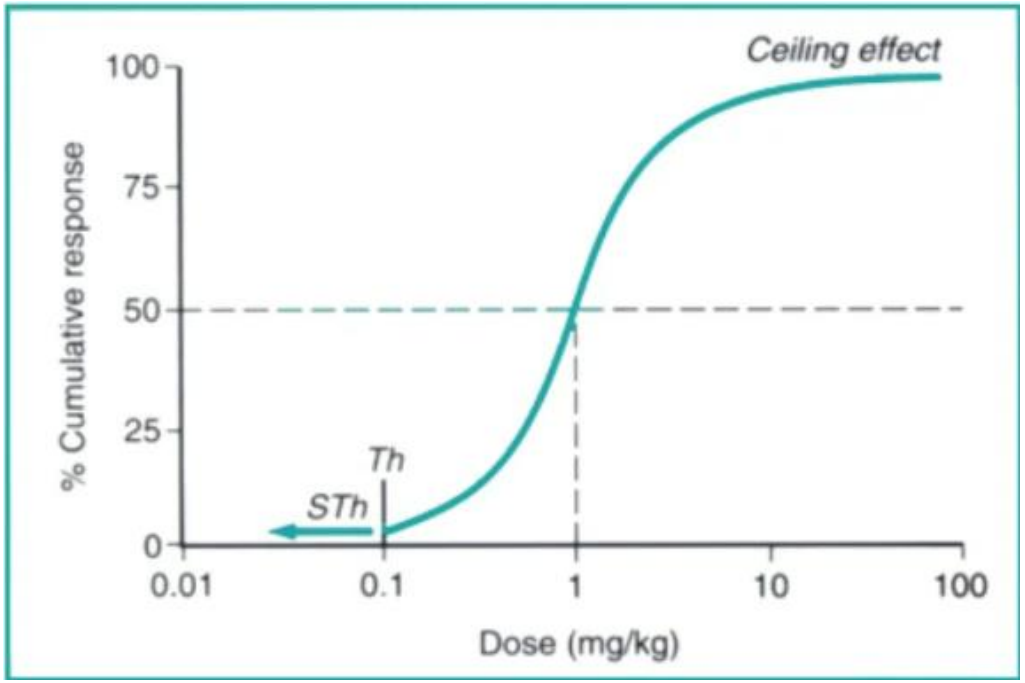
Dose-Response Model

- **Dose response:** Correlation between amount you are exposed to and the resulting effects.
- Toxicity risk increases as:
  - Relative toxicity increases
  - Concentration increases
  - Length of exposure increases



Pathology environmental & nutritional disease (slideshare.net)

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Factors Influencing Toxicity:

Can increase or decrease the toxicity depending upon circumstances

- **The rate of substance entry and the route that it travels.**
  - Greater chance of a toxic effect if working with chemicals in high heat/humidity or if performing physical activity.
- **Age, gender, and genetic predisposition**
  - Younger or older individuals, or those with pre-existing conditions may be more susceptible.
- **Health state, physical conditions, and lifestyle**
  - An individual who smokes cigarettes may be more susceptible to inhalation hazards than someone who does not smoke.
- **Whether or not a previous exposure has occurred**
  - Repeated exposures to organophosphates and metals such as lead, arsenic and mercury will increase the toxic effects.

Carcinogens

Known carcinogens:

- Significant amounts of research data exists that confirms these materials cause cancer in humans

Examples:

- Cadmium – lung cancer
- Benzene – leukemia, lymphoma
- Ethylene oxide – stomach cancer
- Vinyl chloride – liver cancer

Vertical Uses Chemicals Known To Cause Cancer Sign - OSHA NOTICE (compliancesigns.com)

Carcinogens

Suspected carcinogens:

- Known to cause cancer in animals, but limited human data exists

Examples:

- Formaldehyde – Nasopharyngeal and squamous cell cancer
- Carbon Tetrachloride – Liver cancer
- Lead and Lead Compounds – Lung, stomach and bladder cancer
- Multiwall Carbon Nanotubes—Lung cancer

ISO Carcinogen Label, SKU: LB-2622 (mysafetylabels.com)

Reproductive Toxins:

Chemicals which affect the reproductive capabilities of individuals.

- **Mutagens or Mutation**
  - Cause inheritable change in chemical structure of chromosomes in a cell
  - Changes to the structure of sex cells can be passed to future generations
- **Teratogens or Teratogenesis**
  - Produce malformations of an unborn child which can affect their growth
  - Birth defects or functional deficiencies in offspring
- Examples:
  - Lead
  - Vinyl Chloride
  - Methyl Tert Butyl Ether
  - Chloroform
  - Toluene

OSHA 29 CFR 1910.1450(b) “Reproductive toxins”

Sensitizers:

Results in allergic reaction in normal tissue after repeated exposures

- **Skin sensitizers**
  - Substances that can and will lead to allergic response following skin exposure
- **Respiratory sensitizers**
  - Substances that will lead to hypersensitivity of the airways following inhalation
- Examples:
  - Latex
  - Chlorinated hydrocarbons
  - Nickel compounds
  - Formaldehyde

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Neurotoxins:

Damages the nervous system

- Can cause narcosis, behavioral changes, decreased muscle coordination
- Examples include:
  - Lead
  - Chlorinated compounds
  - Nickel compounds
  - Carbamates
  - Organophosphate pesticides (chlorpyrifos)

The Toxins That Threaten Our Brains - The Atlantic

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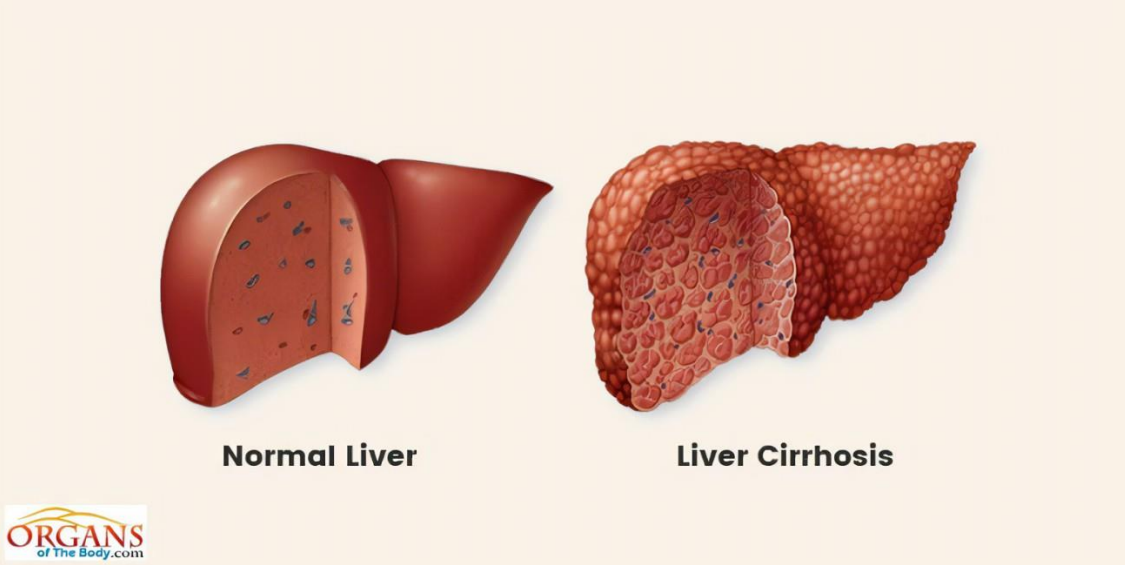
Hepatotoxins:

Can cause liver disease

- Can result in liver cancer, cirrhosis of the liver, jaundice, liver enlargement and others
- Examples:
  - Organic solvents
  - Chloroform
  - Carbon tetrachloride
  - Dimethyl sulfate
  - Ethanol



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Irritants:

Materials that cause inflammation of the mucous membranes

- Can also cause changes in the mechanics of the respiration and lung function
- Long term exposure can result in chronic bronchitis
- Examples:
  - Hydrogen chloride
  - Halogens
  - Formaldehyde
  - Acetic acid
  - Iodine

Corrosives

- Usually considered a physical hazard, but some can cause health effects too
- **Hydrofluoric acid** – “bone seeker”
  - Can cause decalcification of bones, cardiac arrhythmias, cardiac arrest
- **Phenol**
  - Cytotoxic at exposure site

Calgonate®

Biohazards

- Exposures to biological organisms such as viruses, bacteria, microorganisms and biological toxins that may result in sickness or disease.
- Examples
  - Pathogenic E. coli—gastrointestinal illness
  - *L. monocytogenes (Listeria)*—food poisoning, CNS impacts, reproductive toxin
  - Hepatitis B and C—liver cancer

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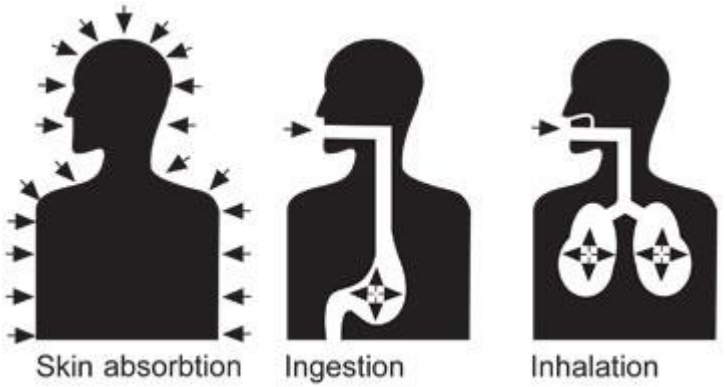
Radioactivity

- Ionizing Radiation at high dose rates can cause tissue death, at low dose it impacts the genetic material of cells and tissues
  - X-Rays, Phosphorus 32, Tritium (H3), Uranyl Acetate
- Non-Ionizing Radiation can cause skin burns, blindness, impact implanted medical devices and affect genetic materials of cells and tissues
  - LASERs, Electromagnetic Radiation, Magnetic Radiation
- Only those authorized to use instruments containing sealed sources of radioactive material or x-ray producing devices are allowed to do so
- Training is required for all ancillary users

Exposure Routes



- **Routes of entry:**
  - Dermal: absorption through skin
  - Inhalation: absorption through respiratory tract
  - Ingestion: absorption through digestive tract
  - Injection: puncture to the skin
  - Eyes: are susceptible to both liquid or vapor exposures
- The route of entry increases or decreases the toxicity depending on the circumstances.
  - For example, an acetone splash on the arm (a dermal exposure) may not cause any injury. An average human will receive a fatal exposure if they drink a pint glass of acetone (ingestion exposure).

Exposure Standards

- **OSHA PEL** (Occupational Safety Health Administration Permissible Exposure Limits)
  - Enforceable PELs to protect workers against the health effects of exposure to hazardous substances.
  - Based on an 8-hour time weighted average (TWA) exposure.
  - Legal limits in the United States for exposure of an employee to a substance or physical agent.
- **ACGIH TLV** (Threshold Limit Value) & **NIOSH REL** (Recommended Exposure Limit)
  - These limits are similar to OSHA's PEL, but they are developed by occupational health and safety organizations. However, they are not enforceable by OSHA.
  - The benefits of these limits include there are not PELs for all chemicals and these organizations can update the limits based on current information and science without having to go through the regulatory approval process.
- **STEL** (Short Term Exposure Limit)
  - Concentration to which workers can be exposed continuously for a short period of time without suffering from adverse health effects.

OSHA vs. NIOSH vs. ACGIH

Formaldehyde

OSHA (Occupational Safety and Health Administration)

8-hour TWA	0.75	ppm
STEL	2	ppm

NIOSH (National Institute of Occupational Safety and Health)

TWA	0.016	ppm (Ca)
Ceiling	0.1	ppm [15-minute]

ACGIH (American Conference of Governmental Industrial Hygienists)

Ceiling	0.3	ppm (URT, eye irr.)

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Exposure Standards

- Employees exposure may not exceed these set exposure limits.
- Employers must measure employee exposure when it is believed to be above an exposure standard.
- If you suspect that you are being exposed, immediately contact your Lab Manager or a member of the Safety Committee.
- The Safety Committee, with the help of Triumvirate Environmental, will perform a workplace assessment to determine what additional control may be necessary to protect the employee or student.
- **The Safety Committee's goal:**
    - Ensure exposure is at $_{1/10}$ of an established exposure standard or below to account for individual susceptibility.

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Types of Exposure

Acute Exposure

- Short duration exposure
- Symptoms immediate
- Can be fatal if medical attention not received right after exposure

Chronic Exposure

- Prolonged or repeated exposures over time (days, months, even years)
- Symptoms may not be noticeable until later

Latency Period – the time between exposure and resulting effects

Part 3: Physical Hazards

- Any agent, factor or circumstance that can cause harm if one comes into contact.
- Materials which present a physical hazard can be safely used if the specific hazard(s) are understood, and measures are taken to address the hazards.
- If appropriate precautions are not taken, a fire, an explosion, unwanted corrosion, personal injury, or property damage could occur.
- Detailed information is found in the Chemical Hygiene Plan and in chemical SDS.

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Examples of Physical Hazards

- Flammable/Combustible Materials
- Corrosives
- Oxidizing Agents
- Peroxide Formers
- Pyrophoric Chemicals
- Water Reactive Chemicals
- Compressed Gas
- Cryogenic Material
- Egress Hazards and Housekeeping
- Electrical Hazards
- Sharps Safety
- Soldering Operations
- Fire Safety
- Special Hazards

Flammables and Combustibles

- Materials under standard conditions that can generate enough vapor to cause a fire.
- **Flammable Liquid –** Flash Point < 100 degrees F
  - Examples – Acetone, Benzene, Ethyl Ether, Ethanol, Hexane, Toluene
- **Flammable Gases** – Gas that at ambient temperature and pressure forms a flammable mixture with air
  - Examples – Hydrogen, Acetylene, Carbon Monoxide, Propane
- **Combustible Liquid** – Flash Point between 100 – 200 degrees F
  - Examples – Fuel Oil, Pump Oil, Mineral Oil
- The Flash Point is the lowest temperature at which a liquid gives off enough vapor to form an ignitable substance and burn when an ignition source is present.

Work Practice Controls: Flammables

- Limit the number stock bottles on bench tops or in fume hoods.
- Utilize personal protective equipment!
- Eliminate sources of ignition.
- Work in the chemical fume hood.
- Store in flammable cabinet when not in use.
- Refrigerators/freezers must be “Laboratory Safe”.
- Never heat using open flames!
    - Use steam/water/oil/hot air baths, flask heaters, hot plates or heating mantels instead.

Explosion of residential type fridge improperly used for flammable storage.

Store flammable combustible liquids in rated flammable cabinets.

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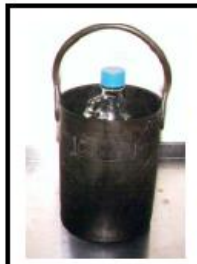
Corrosives

- Acidic or basic material that if spilled on skin, can cause burns or irritation, or in severe cases, tissue damage.
- Corrosive liquids or gases are absorbed into the body through skin contact, pose an eye and inhalation hazard as well.
- Corrosive solids and their dusts can damage tissue by dissolving rapidly in moisture on the skin or within the respiratory tract when inhaled.
- pH < 4 = acidic hazard
- pH >10 = caustic hazard
- Examples?

Work Practice Controls: Corrosives

- Make sure you know the hazards of any corrosive material you may be working with, ask your Lab Manager or Professor if you are unsure.
- Utilize personal protective equipment!
- Use corrosive resistant containers for storage.
- Conduct processes in the fume hood.
- When diluting, DO NOT add water to the acid. Instead, add acid to water slowly to avoid reactions/spills.
- Store acids separate from bases/caustics.



Use a bottle carrier to move chemicals from storage locations to the use areas

Store corrosive material in a rated storage cabinet

Inorganic Acids	Caustics	Flammable and Organic Material	Organic Acids

Proper segregation for Corrosive Materials

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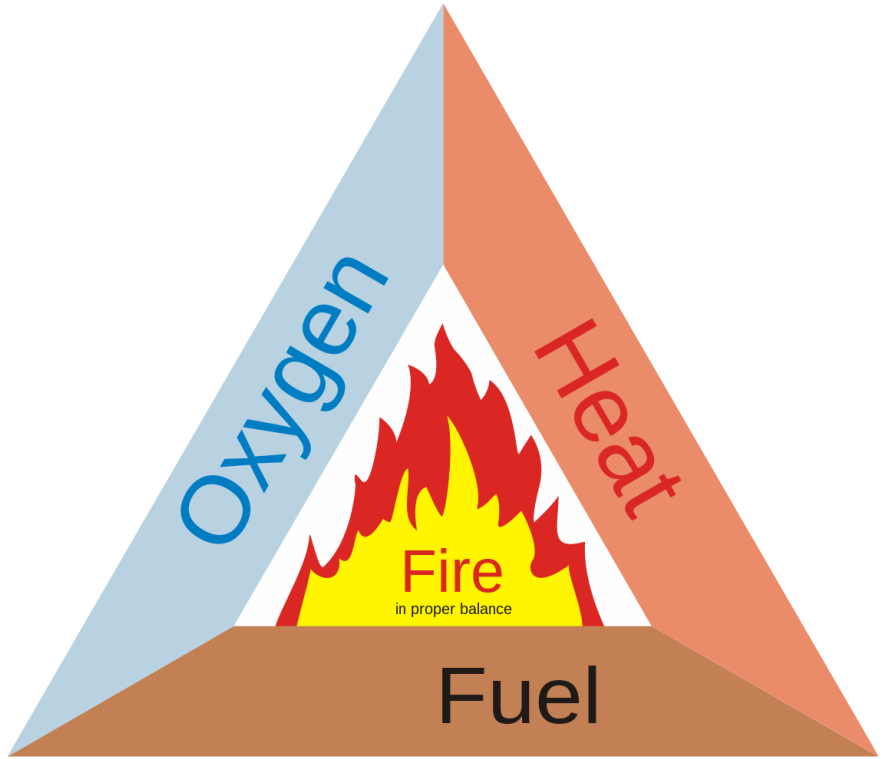
Oxidizers

- Substances may cause or enhance the combustion of other materials, generally by yielding oxygen.
- **Fire Triangle:** It takes three components for a fire to happen.
  - Fuel source (an organic compound)
  - Ignition source (such as a flame, a spark, friction, heat)
  - Oxygen source (this could be any oxidizing chemical or material, or just the oxygen in the air)



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Oxidizer Classes

Class Rating	Hazard Description
Class 1	An oxidizing material whose primary hazard is that is may increase the burning rate of combustible material with which it comes in contact.
Class 2	An oxidizing material that will moderately increase the burning rate or which may cause spontaneous ignition of combustible material with which it comes in contact.
Class 3	An oxidizing material that will cause a severe increase in the burning rate of combustible material with which it comes in contact or which will undergo vigorous self-sustained decomposition when catalyzed or exposed to heat.
Class 4	An oxidizing material that can undergo an explosive reaction when catalyzed or exposed to heat, shock or friction.

Work Practice Controls: Oxidizers

- Know the hazards of the materials that you are using!
  - If you are unsure, contact your Lab Manager and review hazards before doing any experiments/reactions.
- Conduct a process safety review to identify all potential hazards and develop mitigating steps.
- Consider the use of a safety shield or other method for isolating the material or the process.
- Store properly away from organic materials, flammables, reducers.

	Examples	
Class 1	Aluminum nitrate Ammonium persulfate Barium chlorate Barium peroxide Calcium chlorate Calcium nitrate Calcium peroxide Cupric nitrate Hydrogen peroxide (8-27%) Lead nitrate Lithium hypochlorite Lithium peroxide Magnesium nitrate Magnesium perchlorate Magnesium peroxide Nickel nitrate Nitric acid (< 70%)	Perchloric acid (<60%) Potassium dichromate Potassium nitrate Potassium persulfate Silver nitrate Sodium carbonate peroxide Sodium dichromate Sodium nitrate Sodium nitrite Sodium perborate Sodium perborate sodium Perchlorate Sodium persulfate Strontium chlorate Stromtium nitrate Strontium peroxide Zinc chlorate Zinc peroxide
Class 2	Calcium hypochlorite (<50%) Chromic acid Chromium trioxide Hydrogen peroxide (27-52%) Nitric acid (>70%)	Potassium permanganate Sodium chlorite (<40%) Sodium peroxide Sodium permanganate Trichloro-s-triazinetrione
Class 3	Ammonium dichromate Potassium chlorate Hydrogen peroxide (52-91%) Potassium dichloroisocyanurate Calcium hypochlorite (>50%)	Sodium chlorate Perchloric acid (60-72%) Sodium chlorite (>40%) Potassium bromate
Class 4	Ammonium perchlorate Ammonium permanganate Guanidine nitrate	Hydrogen peroxide (>91%) Perchloric acid (>72.5%) Potassium superoxide

Peroxide Formers

- Materials that react with oxygen to form peroxides which can explode due to impact, sudden change in temperature or friction.
- The formation of peroxides can occur under normal storage conditions, concentration by evaporation, distillation or consumption of an inhibitor.

List A Peroxide Hazard on Storage	List B Peroxide Hazard on Concentration	List C Hazard Due to Polymerization
Discard 3 months after opening	Discard 12 months after opening	Discard 12 months after opening
Isopropyl Ether Divinyl Acetylene Vinylidene Chloride Potassium Metal Sodium Amide	Ethyl Ether Tetrahydrofuran Dioxane Acetal Vinyl Ethers 2-Butanol 2-Propanol Cyclohexene Cumene Methylcyclopentane Methyl Acetylene Diacetylene Dicyclopentadiene	Styrene Butadiene* Tetrafluoroethylene* Chlorotrifluoroethylene Vinyl Acetylene Vinyl Acetate Vinyl Chloride Vinyl Pyridine Chloroprene*
*When stored as a liquid, the peroxide-forming potential of these materials increases and should be considered a List A compound		

Work Practice Controls: Peroxide Formers

- Additional experiment specific training should be conducted if using these.
- Conduct a process safety review to identify all potential hazards and develop mitigating steps.
- Date all peroxide formers when received and when opened w/ indelible ink.
- Keep a close eye on the expiration date!
- Make sure to dispose of within 3 to 12 months of opening (depending on type of peroxide former).
- Do not refrigerate below the temperature at which the peroxide freezes or precipitates, this will increase the shock sensitivity
- Never distill to complete dryness (this concentrates the peroxide) this has been implicated in many lab explosions.
- Store in a manner to protect from light
- Periodically check for peroxide concentration using test strips.
- If you see a bottle with crystal formation inside or around the cap, **DO NOT TOUCH**. Contact your Lab Manager or Triumvirate Environmental.

Peroxide Formers

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Pyrophorics

- Pyrophoric materials ignite spontaneously when exposed to air. Must be handled to rigorously exclude air/moisture.
- Can also be toxic, corrosive, water reactive, and flammable.
- Commonly manufactured to be dissolved in a flammable solvent, which increases flammability and chances of peroxide formation.

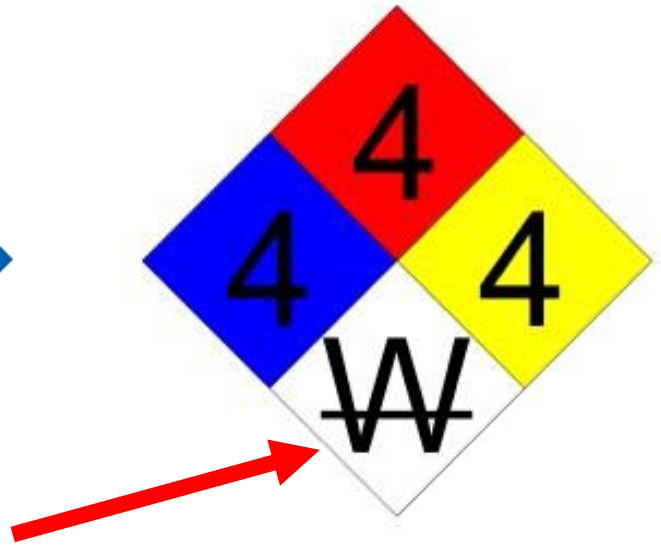
- Examples include:
  - T-Butyllithium
  - Triethyl zinc
  - Triethyl aluminum
  - Many organometallic compounds
  - Grignard reagents
  - Yellow or white phosphorus

Work Practice Controls: Pyrophorics

- Additional experiment specific training should be conducted if using these.
- Conduct a process safety review to identify all potential hazards and develop mitigating steps.
- Lab Coat, (not made from easily ignited material like nylon or polyester) *must be worn*.
    - Special fire-resistant lab coats made from Nomex are more expensive, but recommended for labs using these reagents routinely
- Use all other appropriate PPE!
- Handle only in an inert atmosphere.
- Inspect containers for cracked lids or corrosion.
- Store under recommended material, e.g. water, mineral oil or nitrogen.
- Store in an isolated area away from other materials.
- Minimize quantities stored whenever possible.
- Safety shielding is required any time there is a risk of explosion, splash hazard, or highly exothermic reaction. All manipulations of reactive materials, which pose this risk, should occur in a glove box, dry box or fume hood with the sash in the lowest feasible position.

Water Reactives

- Water reactive chemicals release heat, flammable, toxic, or oxidizing gas, metal oxide fumes or may form corrosive acids.
- Particularly hazardous to firefighters since they generally flood a fire with water.
- Indicate on labels and signs by symbol.
- Examples:
  - Alkali metals
  - Alkaline earth metals
  - Hydrides
  - Carbides
  - Phosphides
  - Nitrides
  - Metallic peroxides
  - Non-metal and transition metal chlorides



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Work Practice Controls: Water Reactives

- Additional experiment specific training should be conducted if using these.
- Conduct a process safety review to identify all potential hazards and develop mitigating steps.
- Handle away from water
- Even moisture in air can start a fire or cause an explosion
- Moisture in skin may form a corrosive
- Store under recommended material, e.g. kerosene, mineral oil, hexane
- Store in an isolated area
- Store in water-tight cabinet or desiccant
- Suitable fire suppressant must be available

A Class D fire extinguisher must be present in laboratories that use large quantities of water reactives.

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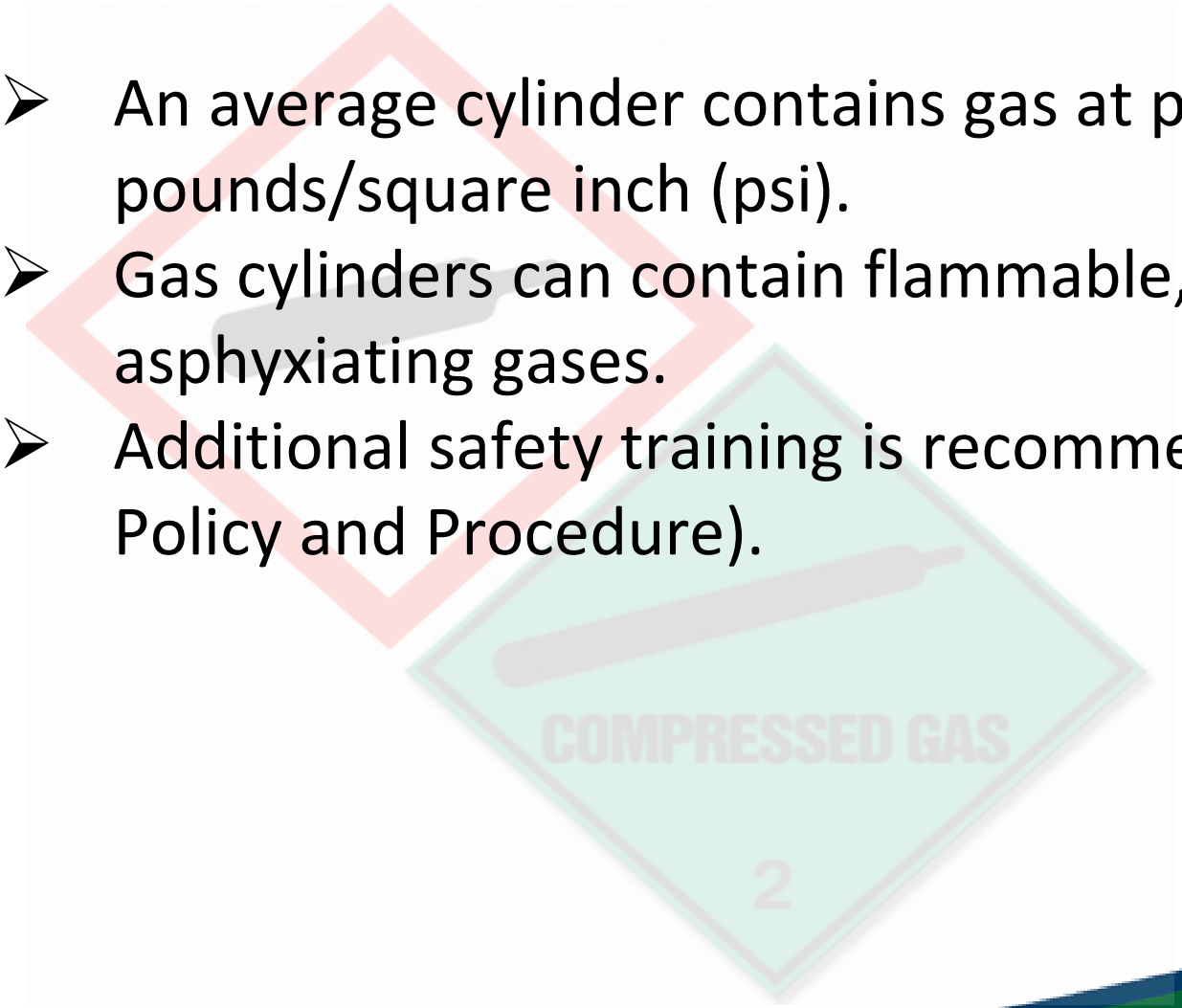
Compressed Gases

- An average cylinder contains gas at pressures of approximately 2000 pounds/square inch (psi).
- Gas cylinders can contain flammable, toxic, corrosive, reactive or asphyxiating gases.
- Additional safety training is recommended (UNH Compressed Gas Policy and Procedure).



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Work Practice Controls: Compressed Gases

- Conduct a process safety review to identify all potential hazards and develop mitigating steps.
- Use smallest size cylinder.
- Handle as high energy sources.
- Do not store a gas cylinder between a work area and an exit.
- Store in an upright position and chain each independently, approx. 2/3 the way up the cylinder.
- Use appropriate cart for moving.

- Always cap with the safety caps when not in use or when moving.
- Do not tamper, lubricate, replace or modify the gauges.
- Never bleed completely—prevents contamination.
- Check labels frequently and replace any that have been damaged or peeling immediately.
- Purchase gas/pressurized liquids from suppliers that accept cylinders back.
- Toxic, corrosive, and reactive gases—contact EH&S (Triumvirate Environmental) for specific storage and use instructions.
- Never situate cylinders near heat or outlets.

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Compressed Gases

- Cylinder Hang Tags:
  - “Full”
  - “In-Service”
  - “Empty”
- Make sure to tear off the section on the tag to update the status of the cylinder!

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Cryogenic Material

- Extreme cold temperatures can cause frost bite, tissue death and permanent eye damage.
- The expansion ratio when the liquefied cryogenic gases go through a phase change can displace all the oxygen in a room or laboratory.
    - For example, liquid nitrogen expands 700x.
- Special training is necessary to work with cryogenic liquids.

Work Practice Controls: Cryogenic Material

- Containers should have pressure relief valves.
- Systems should be able to withstand extreme cold without becoming brittle.
- Follow the established SOP for filling small and large dewars.
- Don appropriate personal protective equipment.
    - Liquid impervious cryogenic gloves.
    - Face shields for filling and pouring operations.
    - Hearing protection if necessary.

Required personal protective equipment for cryogenic liquid work.

Egress Hazards and Housekeeping

- Do not limit your safe egress from a laboratory with clutter.
- Assure that there is a clear 36” (or greater) aisle space throughout the laboratory.
- Housekeeping issues can cause a minor emergency or spill to be far more serious as excess materials become involved in a fire or chemical spill.
- These materials may prevent the sprinkler system from completely extinguishing a fire.

Egress Hazards and Housekeeping

Never store chemical or chemical waste on the floor of the laboratory

Do not block an aisle with cords or wires. There is also only a 16" aisle between the 2 pieces of equipment

Do not block safety showers, eyewash stations and fire extinguishers with equipment or clutter

Electrical Hazards

- Extension cords are permitted only for temporary use, provided the weight of the cord is adequate for load applied.
- Use UL listed power strips with an inline circuit breaker in place for extension cords.
- Check for frayed or damaged electric cords.
- Have a certified electrician make repairs to equipment (submit a work order to the Facilities department).

Sharps Safety

- Needles and syringes shall be secured at all times.
- Position a designated sharps disposal container or other collection container directly adjacent to the work area.
- Do not recap needles, dispose of them directly into the sharps container.
- If you are reusing needles, utilize a recapping device and store/secure them properly.
- If a spill happens, NEVER pick up sharps with hands.
    - Use dustpan/broom or forceps while wearing the proper PPE
- If using a blade to cut or scrap always cut/scrape away from hand.

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Fire Safety

- No storage within 18 inches of sprinkler heads – storage close to sprinkler head will limits its ability to extinguish a fire!
- Do not store excess combustible material such as cardboard boxes in the laboratory.
- Develop written SOPs for operations that use open flames.
- Position ovens and other heating devices away from combustibles and flammable liquid storage areas.

Soldering Operations

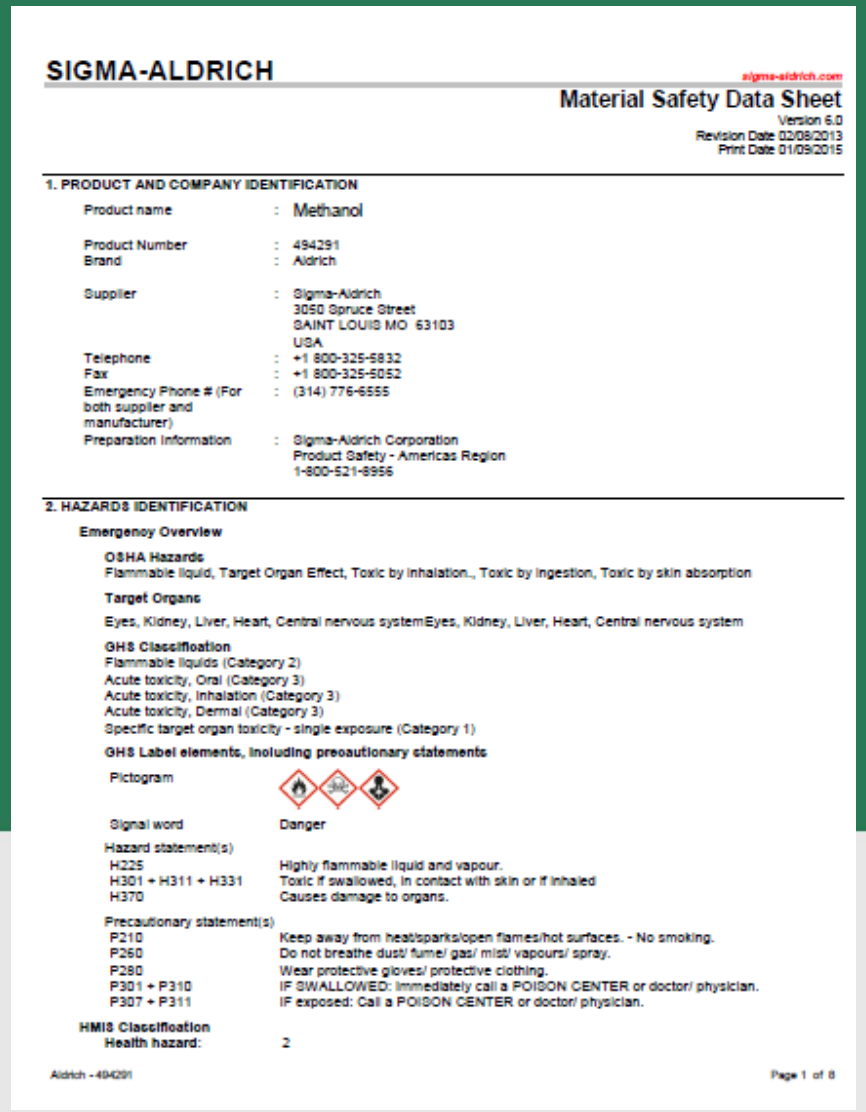
- Researchers performing soldering operations may be exposed to hazardous fumes and gases.
- Over exposure causes skin irritation, allergenic conditions, carcinogenic (heart/lung) diseases.
- Always perform soldering operations in fume hood.
    - If laboratory exhaust ventilation is not available, utilize a fume extractor design for soldering operations.

Commercially available Fume Extractors

Articulating Exhaust Trunk

TRIUMVIRATE ENVIRONMENTAL

Part 4: Hazard Information Sources



SIGMA-ALDRICH

sigma-aldrich.com

Material Safety Data Sheet

Version 6.0
Revision Date 02/08/2013
Print Date 01/09/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Methanol

Product Number : 494291
Brand : Aldrich

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Target Organ Effect, Toxic by inhalation., Toxic by ingestion, Toxic by skin absorption

Target Organs

Eyes, Kidney, Liver, Heart, Central nervous systemEyes, Kidney, Liver, Heart, Central nervous system

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Oral (Category 3)
Acute toxicity, Inhalation (Category 3)
Acute toxicity, Dermal (Category 3)
Specific target organ toxicity - single exposure (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled
H370 Causes damage to organs.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves/ protective clothing.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.

HMIS Classification
Health hazard: 2

Aldrich - 494291 Page 1 of 8

- MSDS Online
- Standardized Safety Data Sheets

TRIUMVIRATE ENVIRONMENTAL

How to Read and SDS

- **Section 1 : Chemical Identification** → Name, Synonyms, Manufacturer, Product # and CAS #
- **Section 2 : Hazard Identification** → Description of all chemical hazards, hazard statements, GHS
- **Section 3 : Chemical Composition** → List all constituents and percentages
- **Section 4 : First Aid Measures** → How to respond if exposed
- **Section 5 : Fire Fighting Measures** → What to do in case of fire
- **Section 6 : Accidental Release Measures** → Precautions, Environmental Precautions, spill clean up
- **Section 7 : Handling and Storage** → How to handle and store the chemical properly
- **Section 8 : Exposure Controls and PPE** → Exposure guidelines, PPE recommendations
- **Section 9 : Physical and Chemical Properties** → Physical state, color, flash point, pH, boiling point etc...
- **Section 10 : Stability and Reactivity** → Conditions to avoid, reactivity, incompatibles
- **Section 11 : Toxicological Information** → Acute and chronic toxicity levels, LC & LD 50 listed
- **Section 12 : Ecological Information** → Environmental hazards, degradability, bioaccumulation, etc.
- **Section 13 : Disposal Considerations** → Recommendations for disposal
- **Section 14 : Transport Information** → DOT hazard classes, information for waste carriers
- **Section 15 : Regulatory Information** → Safety, health or environmental regulations/legislation
- **Section 16 : Additional Information** → Misc. info, definitions, abbrevations

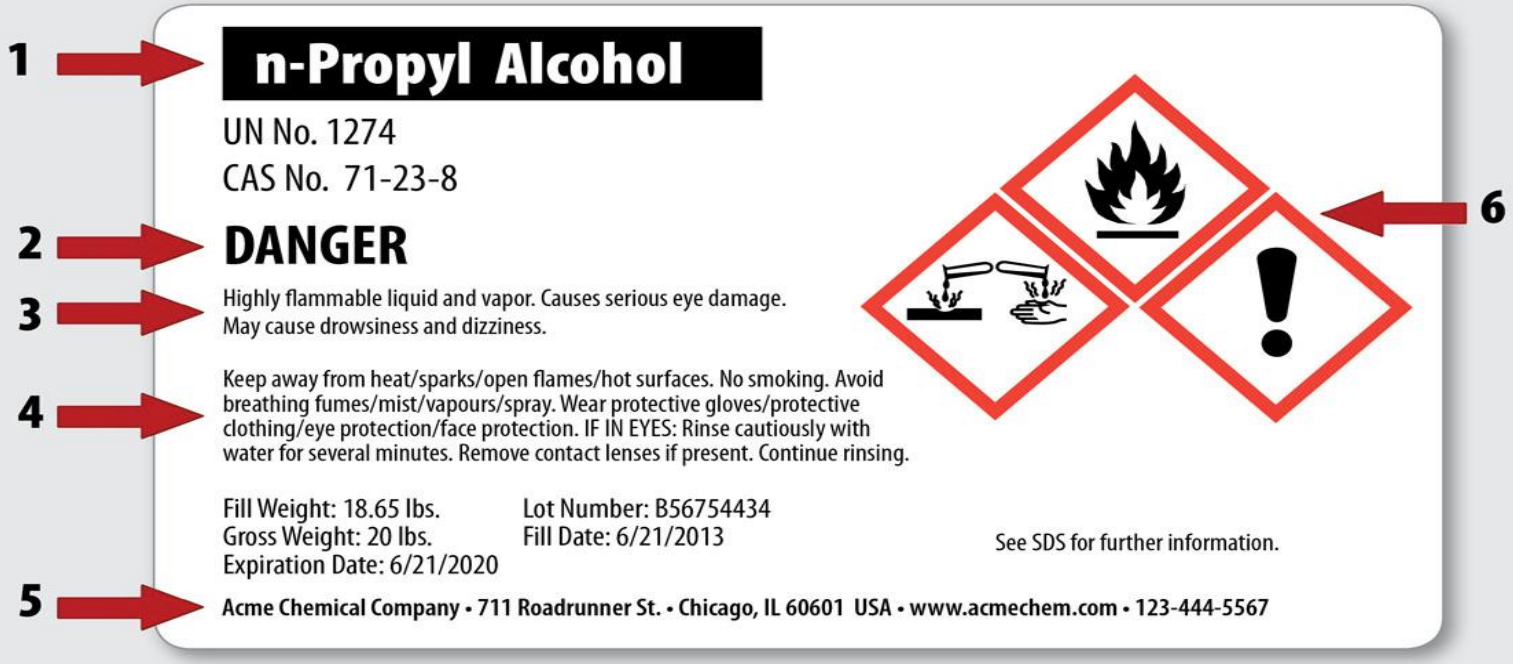
Chemical Labels

- Label should indicate if the chemical is hazardous.
- Look for key words such as *caution, hazardous, toxic, dangerous, corrosive, irritant, carcinogen.*
- Old containers of hazardous chemicals (before 1985) may not contain hazard warnings.
- All containers must be labeled, regardless of the container size or the quantity of the substance.
    - When labeling stock containers, use the common chemical name and the percentage of the solution.
    - Abbreviations are only permitted on very small containers.
- Do Not use any chemical that is not properly labeled
- Make sure that labels are not defaced or removed

TRIUMVIRATE ENVIRONMENTAL

GHS Label Components

The Basic Parts of A GHS-Compliant Label



1. **Product Identifier** - Should match the product identifier on the Safety Data Sheet.
2. **Signal Word** - Either use "Danger" (severe) or "Warning" (less severe)
3. **Hazard Statements** - A phrase assigned to a hazard class that describes the nature of the product's hazards
4. **Precautionary Statements** - Describes recommended measures to minimize or prevent adverse effects resulting from exposure.
5. **Supplier Identification** - The name, address and telephone number of the manufacturer or supplier.
6. **Pictograms** - Graphical symbols intended to convey specific hazard information visually.

Sample label courtesy of Weber Packaging Solutions • www.weberpackaging.com

TRIUMVIRATE ENVIRONMENTAL

GHS Hazard Categories

- Oxidizers

- Flammables
- Self-reactives
- Pyrophorics
- Self-heating
- Emits flammable gases
- Organic peroxides

- Explosives
- Self-reactives
- Organic peroxides

TRIUMVIRATE ENVIRONMENTAL

GHS Hazard Categories

- Irritants
- Dermal sensitizers
- Acute toxicity (harmful)
- Narcotic effects
- Respiratory tract irritation

- Carcinogens
- Respiratory sensitizers
- Reproductive toxicity
- Target organ toxicity
- Mutagenicity
- Aspiration hazard

- Acute Toxicity (severe)

TRIUMVIRATE ENVIRONMENTAL

GHS Hazard Categories

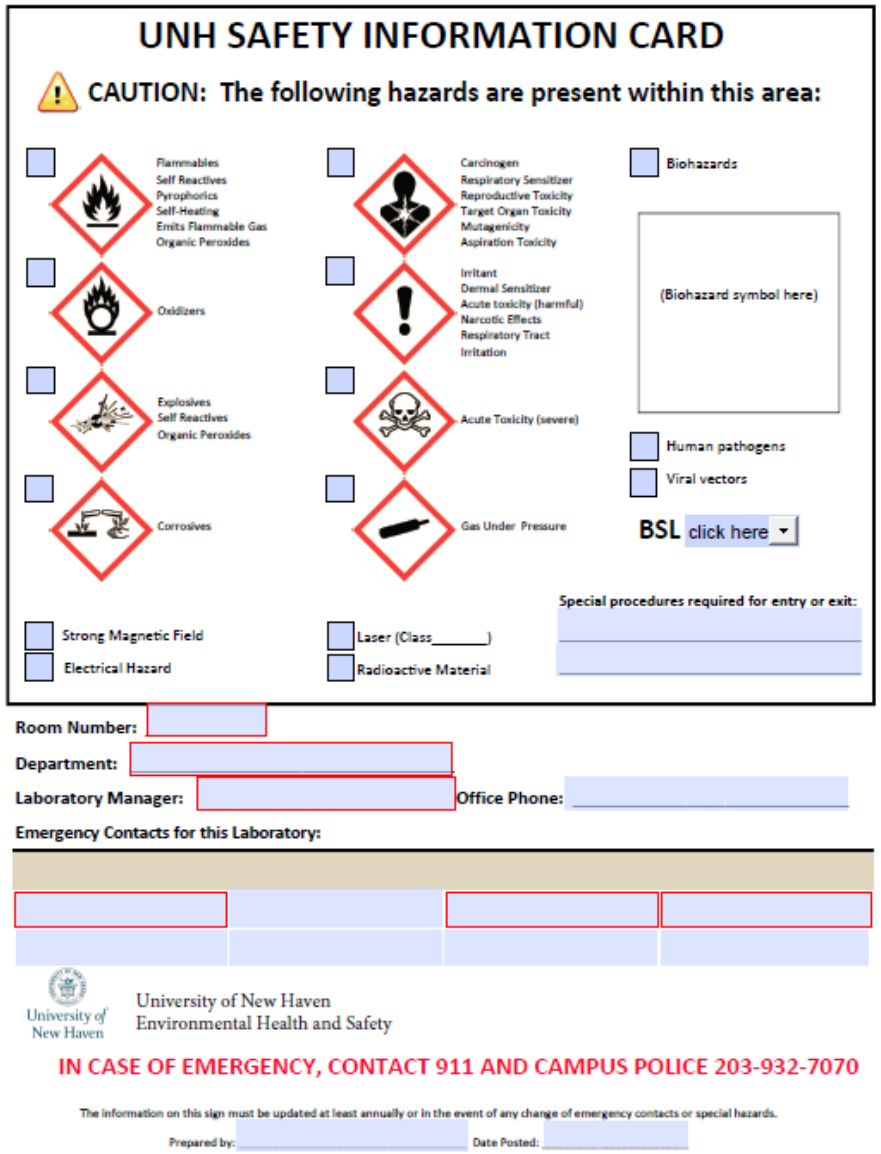
- Corrosives

- Environmental hazards

- Compressed gases

TRIUMVIRATE ENVIRONMENTAL

Lab Hazard Signs



UNH SAFETY INFORMATION CARD

CAUTION: The following hazards are present within this area:

- Flammables, Self Reactives, Pyrophorics, Self-Heating, Emits Flammable Gas, Organic Peroxides
- Oxidizers
- Explosives, Self Reactives, Organic Peroxides
- Corrosives
- Carcinogen, Respiratory Sensitizer, Reproductive Toxicity, Target Organ Toxicity, Mutagenicity, Aspiration Toxicity
- Irritant, Dermal Sensitizer, Acute toxicity (harmful), Narcotic Effects, Respiratory Tract Irritation
- Acute Toxicity (severe)
- Gas Under Pressure
- Biohazards
- (Biohazard symbol here)
- Human pathogens
- Viral vectors
- BSL click here
- Special procedures required for entry or exit:
- Strong Magnetic Field
- Electrical Hazard
- Laser (Class_____)
- Radioactive Material

Room Number:

Department:

Laboratory Manager: Office Phone:

Emergency Contacts for this Laboratory:

University of New Haven
Environmental Health and Safety

IN CASE OF EMERGENCY, CONTACT 911 AND CAMPUS POLICE 203-932-7070

The information on this sign must be updated at least annually or in the event of any change of emergency contacts or special hazards.

Prepared by: Date Posted:

- All laboratories and hazardous material storage areas should be placarded with a standard Laboratory Warning Sign. The signs will communicate the general hazards found in the room.

TRIUMVIRATE ENVIRONMENTAL

Part 5: Protective Measures

- After researchers and students understand the hazards they may be exposed to in the laboratory setting they must develop protective measures to minimize or eliminate injury, illness or accidents.

TRIUMVIRATE ENVIRONMENTAL

Administrative Controls

- The goal of administrative controls is to reduce work hazards through management arrangements and written rules
- Administrative controls include:
  - Attend all necessary training
  - Never lock doors while in a lab working (do not block lab windows)
  - Do not limit egress with clutter
  - Do not eat, drink or store food in the laboratory
  - Use secondary containers during storage for liquids
  - Restrict access to the laboratory—lock the door and secure the space when no one is in the laboratory
  - Never store liquids above eye level

Administrative Controls

- Use a bottle carrier or a sturdy cart to move containers of liquid chemicals
- Use a 5 gallon carboy tipper when refilling 4 liter glass bottles.

Administrative Controls

- One of the most important administrative controls when working with chemicals is to decontaminate before leaving the laboratory and eating, drinking, smoking, applying cosmetics/lip balm, or going to the bathroom.

Engineering Controls

- Engineering controls are used to minimize exposure to substances and/or remove the contamination
- These are typically implemented if an administrative control does not eliminate the hazard or exposure
- Examples:
    - Chemical fume hoods
    - Biological safety cabinets
    - Exhaust trunks
    - General laboratory ventilation
    - Glove boxes

Chemical Fume Hoods

- Chemical fume hoods are used to prevent the inhalation of chemical contaminants.
- Check the certification sticker for the expiration date.
    - Do not use if expired!
- Lower the sash to the level indicated on the sticker.
- Clear the fume hood deck area by removing items not needed for immediate work.
- Locate work at least 6 inches inside the sash and center relative to the hood sides.
- Completely clean and decontaminate your fume hoods regularly.
- Wear appropriate PPE!

TRIUMVIRATE ENVIRONMENTAL

Chemical Fume Hoods

- Position the sash so it provides splash, spray and mist protection
- It should cover as much of the user's body as possible
- Some hoods have both horizontal and vertical sashes
- If the sash does not provide body and face protection, contact EH&S for assistance
- **DO NOT** place anything directly against the back wall of the fume hood, this is where the air vents are located and they need to be kept clear to allow for proper ventilation.

Chemical Fume Hoods

- Proper way to work in a Chemical Fume Hood
  - This arrangement optimizes the capture velocity
  - Sash acts as physical barrier and provides splash and spray protection

TRIUMVIRATE ENVIRONMENTAL

Chemical Fume Hoods

- **Improper/unsafe way to work in a Chemical Fume Hood**
  - **There is minimal capture velocity**
  - **The sash does not provide physical barrier or splash and spray protection**

TRIUMVIRATE ENVIRONMENTAL

Chemical Fume Hoods

- Safety showers and eye wash stations are used as a safety measure in case of contact with a substance.
- They should free from obstruction and accessible at all times.
- Units are inspected monthly.

TRIUMVIRATE ENVIRONMENTAL

Personal Protective Equipment

- Personal protective equipment is used to protect you from chemical and physical hazards
- Areas of PPE include:
  - Eye and face protection (i.e. Visorgogs)
  - Hand protection (i.e. nitrile gloves)
  - Body protection (i.e. aprons and lab coats)
  - Foot protection (i.e. safety shoes, closed-toe shoes)

PPE Considerations

- Frequent inspection—make sure that there are not holes, tears, rips etc. that compromise the protection.
- All PPE, such as lab coats, gloves and any contaminated protective equipment, should be removed and left or properly disposed of in the lab area.
- For added protection, general lab clothing should include a laboratory coat, closed toe shoes, sleeved shirts, and pants or dresses that extend below the knees.
- Change or launder protective equipment as required.

CAUTION: Graphic Material

The Next two slides contain graphic material such as chemical burns that occurred do to lack of PPE.
If you are sensitive to this, please let the instructor know.

TRIUMVIRATE ENVIRONMENTAL

Lab Incidents

- This is a picture of an individual's leg who was wearing shorts and spilled liquid Bromine which is very corrosive!
- Notice how the sock protected her ankle. Long pants and a lab coat may have prevented the injury!

TRIUMVIRATE ENVIRONMENTAL

Lab Incidents

- Acid burn to the feet
- Researcher was wearing flip flops and dropped a 4L glass bottle of sulfuric acid on the floor.

TRIUMVIRATE ENVIRONMENTAL

Lab Incidents

- Burn caused by a caustic liquid. An eye exposure to 10% sodium hydroxide solution can cause permanent blindness.
- ALWAYS wear your Visorgogs while working the lab! Protect yourself from chemical splashes to the eyes.

Eye Protection

- It is campus policy that everyone working the lab must wear Visorgogs.
- Contact your lab manager to obtain a pair before lab work begins.

TRIUMVIRATE ENVIRONMENTAL

Protective Gloves

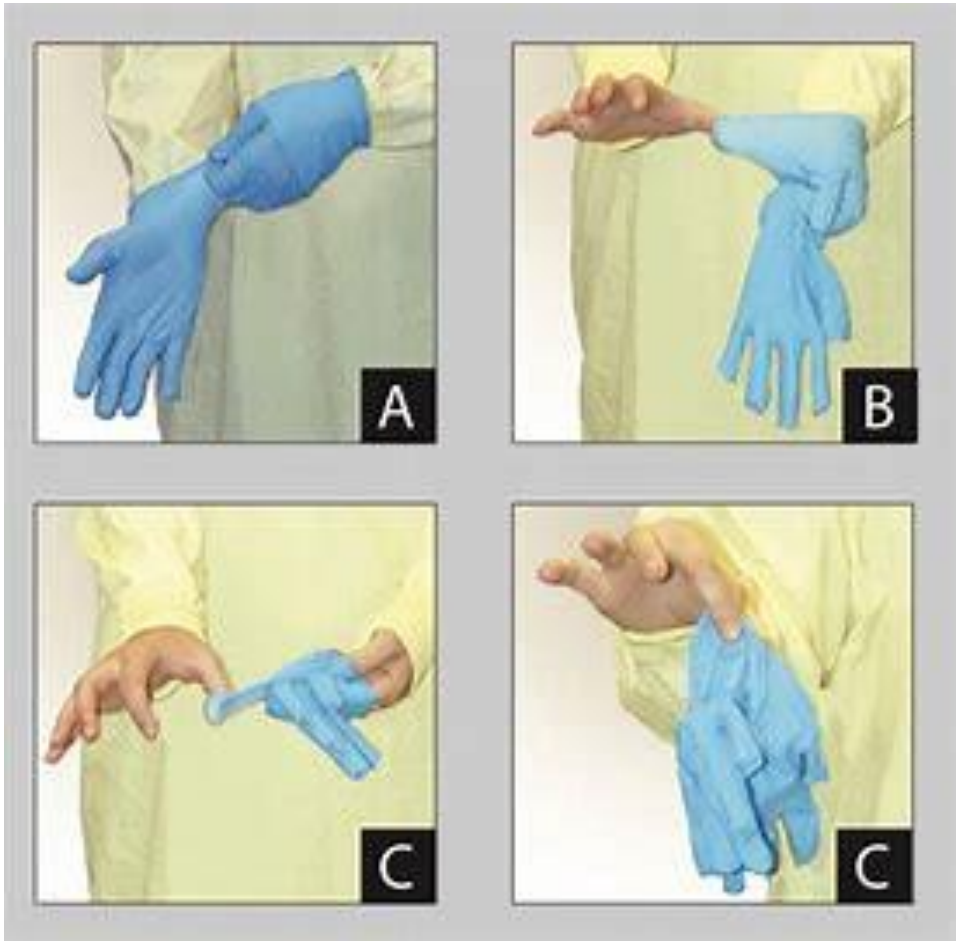
- Gloves are **task specific**; therefore, it is very important to choose the right type.
- One should be aware of **breakthrough time** of the gloves.
    - This is the time it takes for a substance to pass through the protective material of the glove.
- Chemicals will always move through PPE. It is only a matter of the time it takes.
- Disposable gloves are intended for **one time use**.
    - Properly dispose at the end of each use or according to the breakthrough time.
- **Material degradation** occurs naturally to disposable gloves, non-disposable gloves, and even to unused gloves.

How to Don Chemical Protective Gloves

- Proper donning of gloves will lessen the amount of stress on the glove's material. A few general considerations are listed below:
  - Gently inspect glove for damage prior to use. If the glove is damaged it must be properly disposed of.
  - Do not wear jewelry under gloves
  - Use caution when donning the glove to prevent damage
  - Make sure fingernails do not puncture the glove

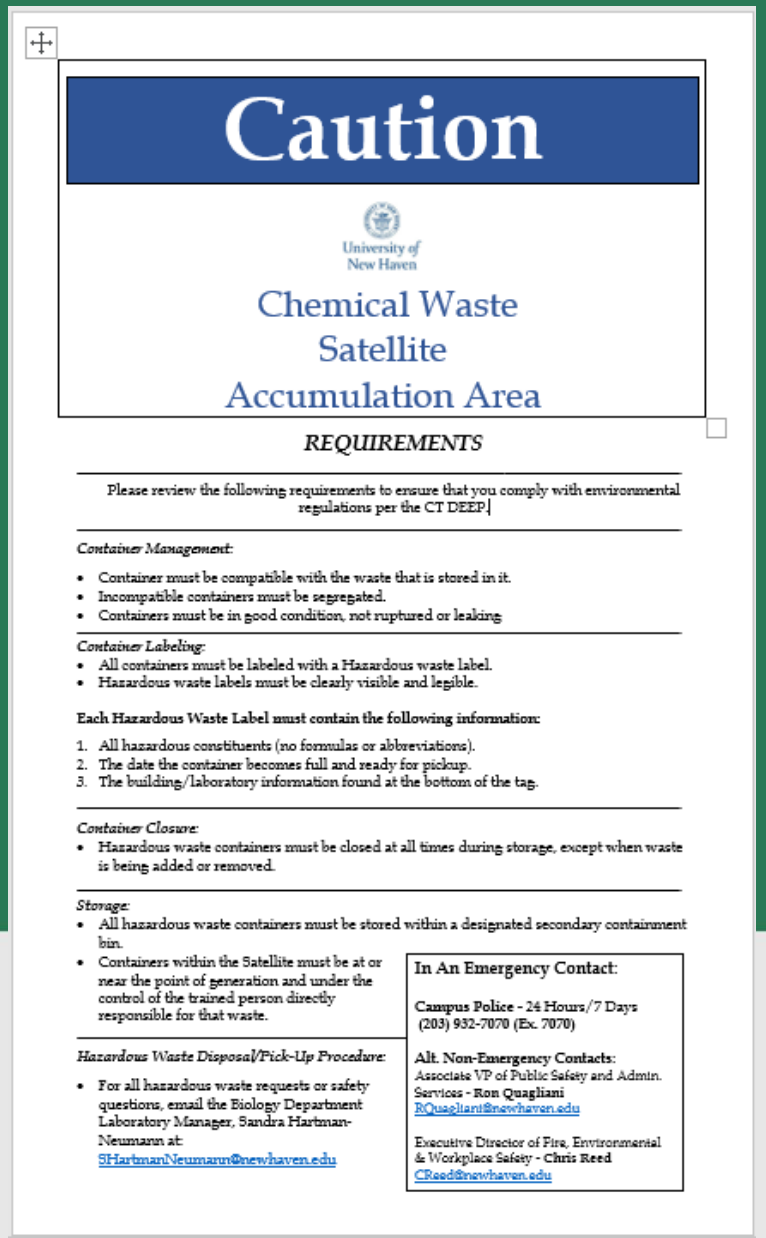
Proper Removal of Disposable Gloves

- **First Glove:** Pinch a section on the outside of the glove at the wrist (1/4 of an inch from the end) and pull the glove off the hand, toward and over the fingertips, ultimately turning the glove inside-out.
- **Second Glove:** Insert the fingertip of the ungloved hand under the wrist at the end of the glove and pull off (same as above).
- **Dispose** of contaminated gloves according to specification. (i.e. chemically contaminated gloves should be disposed of as chemical solid waste.)
- **Important**: Always wash your hands after removing gloves.



TRIUMVIRATE ENVIRONMENTAL

Part 6: Hazardous Waste - Satellite Accumulation Area (SAA)



Caution

University of New Haven

Chemical Waste
Satellite
Accumulation Area

REQUIREMENTS

Please review the following requirements to ensure that you comply with environmental regulations per the CT DEEP.

Container Management:

- Container must be compatible with the waste that is stored in it.
- Incompatible containers must be segregated.
- Containers must be in good condition, not ruptured or leaking.

Container Labeling:

- All containers must be labeled with a Hazardous waste label.
- Hazardous waste labels must be clearly visible and legible.

Each Hazardous Waste Label must contain the following information:

1. All hazardous constituents (no formulas or abbreviations).
2. The date the container becomes full and ready for pickup.
3. The building/laboratory information found at the bottom of the tag.

Container Closure:

- Hazardous waste containers must be closed at all times during storage, except when waste is being added or removed.

Storage:

- All hazardous waste containers must be stored within a designated secondary containment bin.
- Containers within the Satellite must be at or near the point of generation and under the control of the trained person directly responsible for that waste.

Hazardous Waste Disposal/Pick-Up Procedure:

- For all hazardous waste requests or safety questions, email the Biology Department Laboratory Manager, Sandra Hartman-Neumann at: SHartmanNeumann@newhaven.edu

In An Emergency Contact:

Campus Police - 24 Hours/7 Days
(203) 932-7070 (Ex. 7070)

Alt. Non-Emergency Contacts:
Associate VP of Public Safety and Admin. Services - **Ron Quagliani**
RQuagliani@newhaven.edu

Executive Director of Fire, Environmental & Workplace Safety - **Chris Reed**
CReed@newhaven.edu

- Any lab that generates hazardous waste must have an SAA in their lab.
- The SAA shall be posted with this sign to notify lab members of its location.
- When waste is generated, it must be stored in the SAA and labeled appropriately.

TRIUMVIRATE ENVIRONMENTAL

Satellite Accumulation Areas: *Storage Requirements*

- All hazardous waste containers must be stored within a designated secondary containment bin.
- Containers in the SAA must be “at or near the point of generation” and under the control of the trained person directly responsible for that waste.

40 CFR 262.15(a)

TRIUMVIRATE ENVIRONMENTAL

Satellite Accumulation Areas: *Container Management*

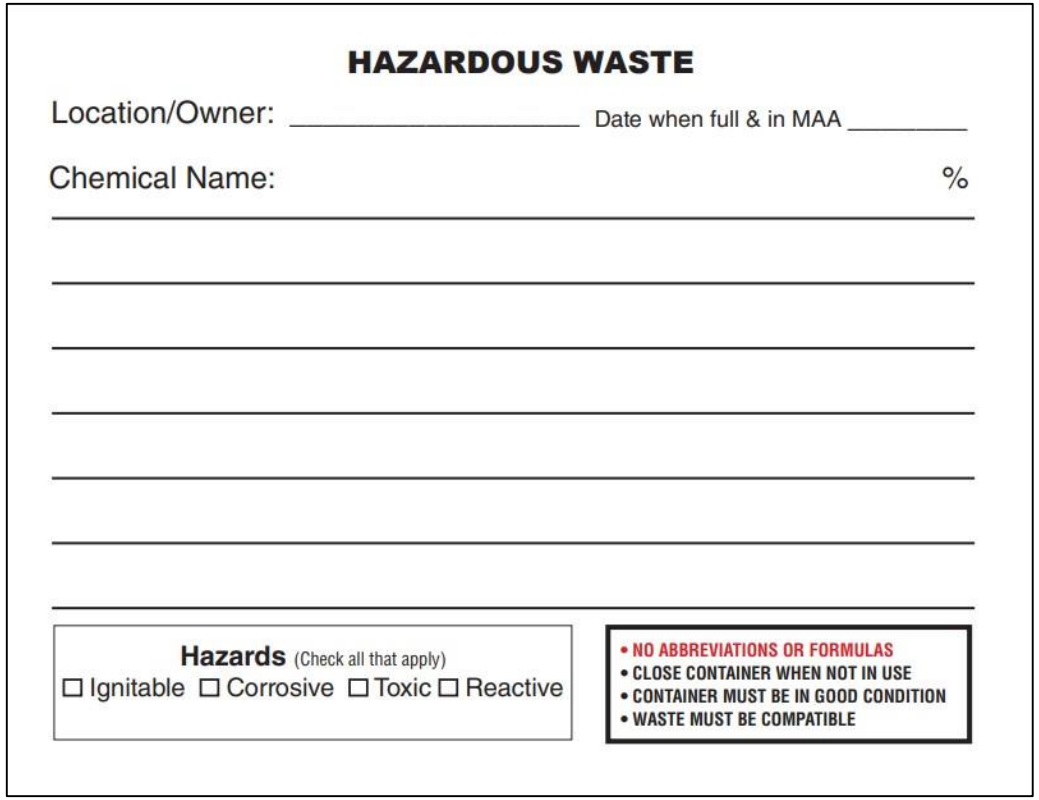
- Container must be **compatible** with the waste that is stored in it.
  - Example: Acids should not be stored in metal containers.
- Incompatible containers must be **segregated**.
  - Example: Bottles containing acids should be stored in a separate containment than containers storing caustic material.
- Containers must be in **good condition**, not ruptured or leaking.
- Hazardous waste containers must be **closed** at all times during storage, except when waste is being added or removed.

40 CFR 262.15(a)

TRIUMVIRATE ENVIRONMENTAL

Satellite Accumulation Areas: *Container Labeling*

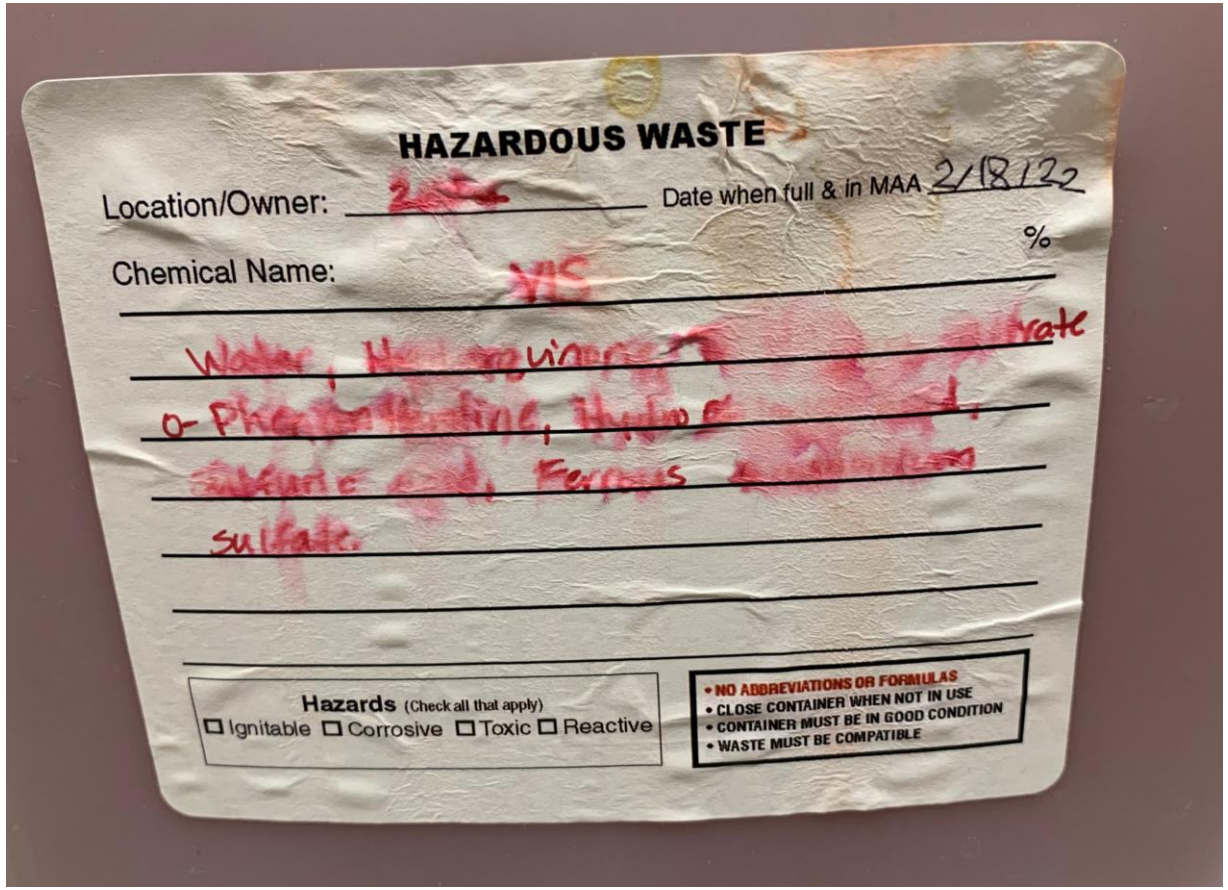
- All hazardous constituents must be written on the label. **NO FORMULAS OR ABBREVIATIONS.**
  - Include concentrations of each chemical
- Location/owner section – must know which lab waste originated from.
- Check the boxes next to the hazards that are associated with the waste in the container.
  - Example: Methanol is considered both "Toxic" and "Ignitable"
- Please **DO NOT DATE** the container.
  - When a container fills up, notify your lab manager.



40 CFR 262.15(a)

TRIUMVIRATE ENVIRONMENTAL

Satellite Accumulation Areas: *Container Labeling*



Use pencil instead of markers or pen!

TRIUMVIRATE ENVIRONMENTAL

Part 7: Biological Waste Management

TRIUMVIRATE
ENVIRONMENTAL

Biological Waste

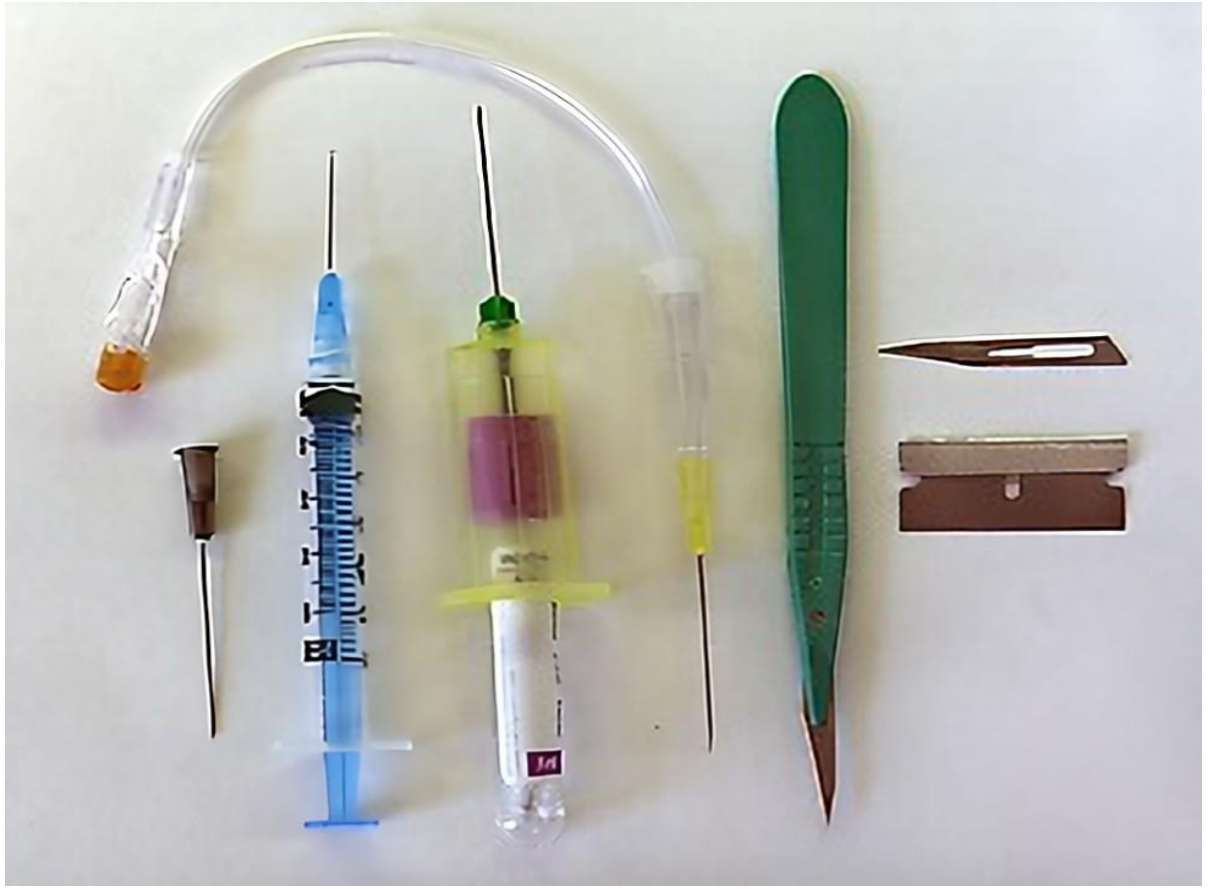
- “Red bag waste” or Regulated Medical Waste (RMW)
  - Any lab items that are visibly contaminated with blood or other potentially infectious materials
- Examples include any of the following contaminated items:
  - Personal protective equipment (PPE)
  - Petri dishes
  - Plastic containers
  - Test tubes
  - Paper towels / kimwipes

Biological Waste Examples

- Pathological (or anatomical) waste
  - Limbs, specimens, tissue samples
- Trace chemotherapy waste
  - Any masks, gloves / gowns, empty vials, empty intravenous bags, tubing and bottles used in the administration of chemotherapeutic drugs
- Infectious agents
  - Cultures and stocks that contain human disease-causing agents

Contaminated Sharps

- Examples include:
  - Needles
  - Syringes
  - Scalpels
  - Razors
  - Broken glass



Contaminated Sharps Disposal

- Any and all contaminated sharps must be placed into a designated puncture resistant container.
- Once a sharps container has been filled, the lid must be completely CLOSED and locked shut before disposal.
- Contact department lab manager if sharps container fills up so it can be replaced with an empty one.
- DO NOT OVER FILL sharps containers. Sharps containers have a “Fill Line” that must never be exceeded.

TRIUMVIRATE ENVIRONMENTAL

Biohazardous Waste Disposal

- Steps for preparing a bio box for lab use:
  1. **Fold** the cardboard bio box and seal the bottom closed with strips of packing tape in both directions.
  2. **Place** 2 red biohazard bags inside the box, one inside the other so the box is double lined.
  3. **Fold** the biohazard box lid so the writing is visible on the outside.
  4. **Place** lid onto the top of the box.
  5. **Fill** the box with biological waste.

****Note:** The bio box lid must always be closed when not actively adding biological waste to the container.

TRIUMVIRATE ENVIRONMENTAL

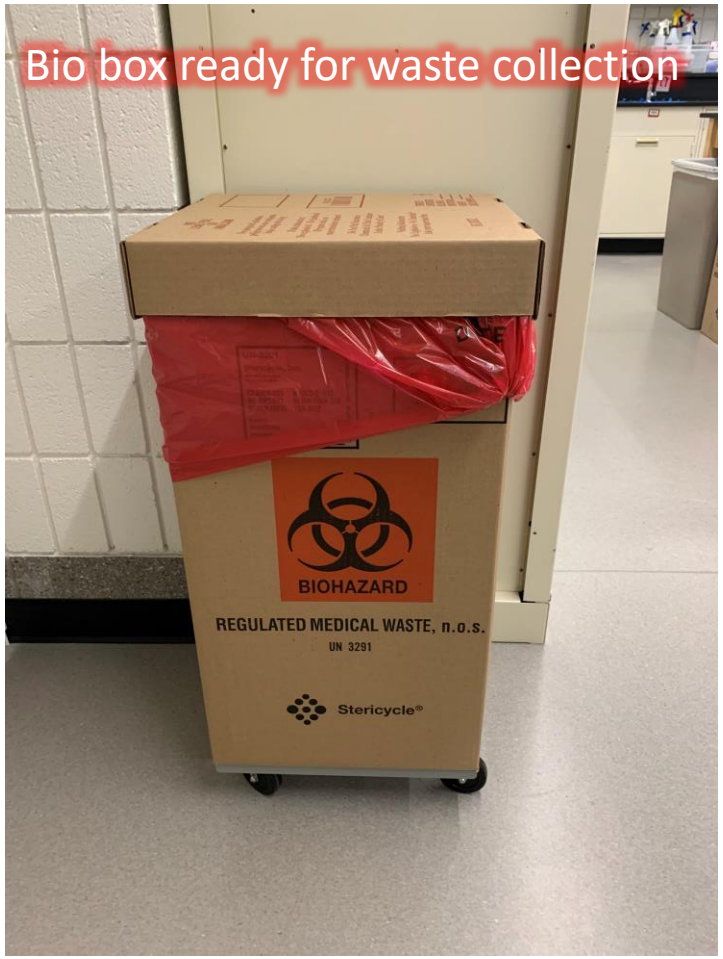
Biohazardous Waste Packaging Requirements

- Steps for preparing a biological waste box for disposal:
  1. **Fill** the box only **¾ full**. This is to ensure the box **does not exceed 50 pounds.**
  2. **DO NOT** place loose sharps into the bio box!! All sharps must be placed in a separate designated sharps collection container first.
  3. **Seal** the red bag by gathering the sides and twisting into a “gooseneck” to tie into a knot **AND** use a zip-tie to ensure the contents is **closed completely**.
  4. **Place** lid onto bio box and make sure lid is properly fitted to the box.
  5. **Seal** the lid onto the box with at least 2 strips of packing tape in both directions that extend around the bottom of the box to tape onto itself.
  6. **Apply** Stericycle label to the lid, and **DATE** the label with the date it was closed.
  7. **Removal and Disposal** is done by Stericycle at request of Lab Manager.

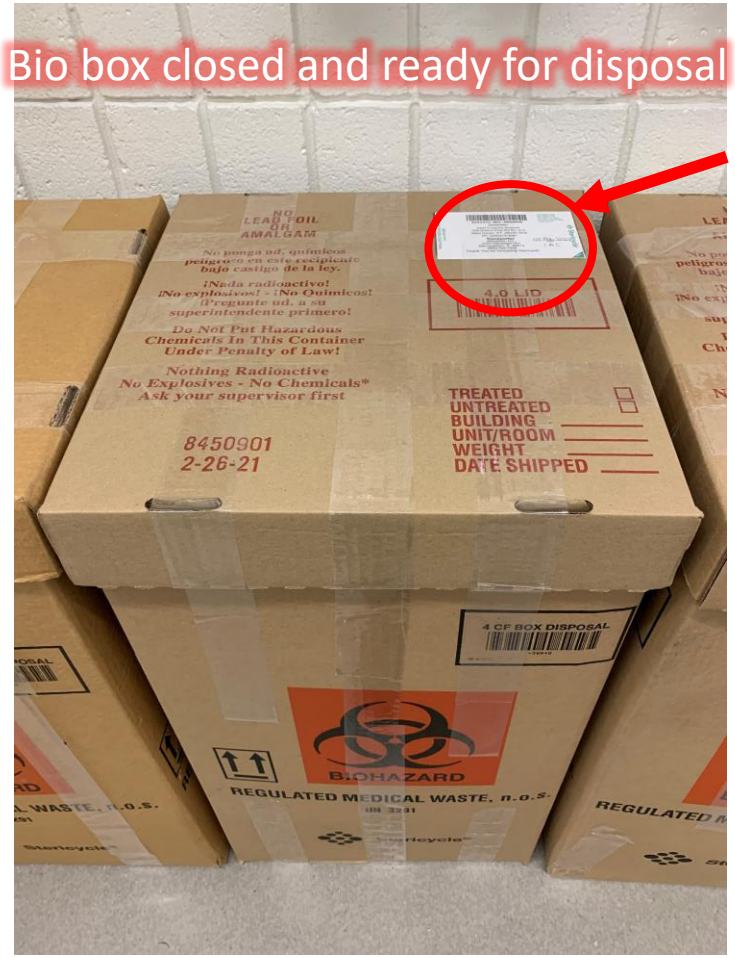
TRIUMVIRATE ENVIRONMENTAL

Biohazardous Waste Box

Bio box ready for waste collection



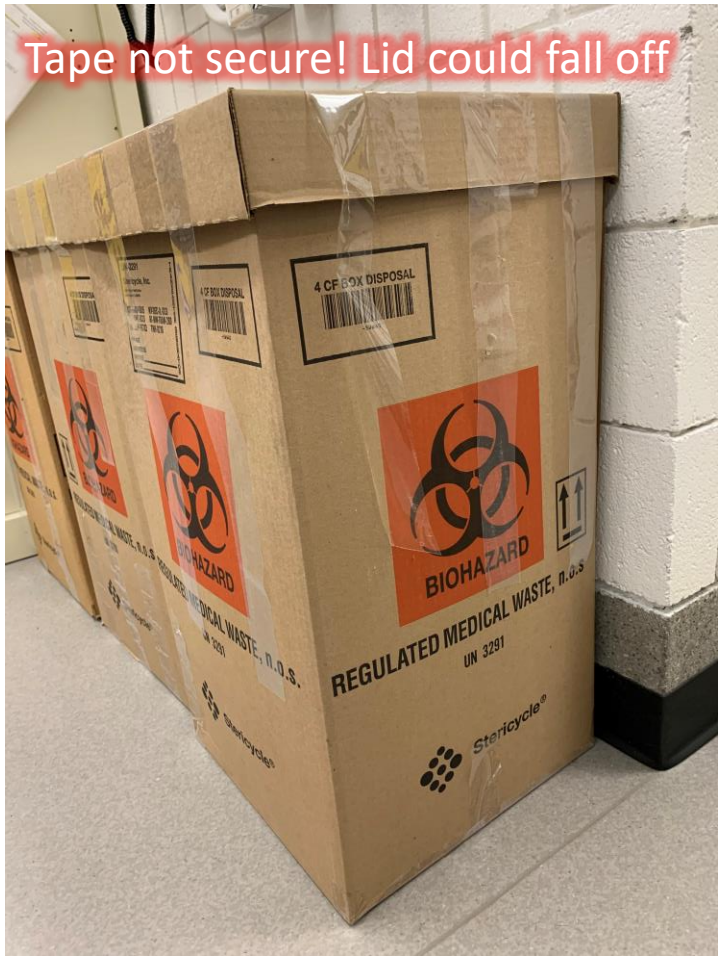
Bio box closed and ready for disposal

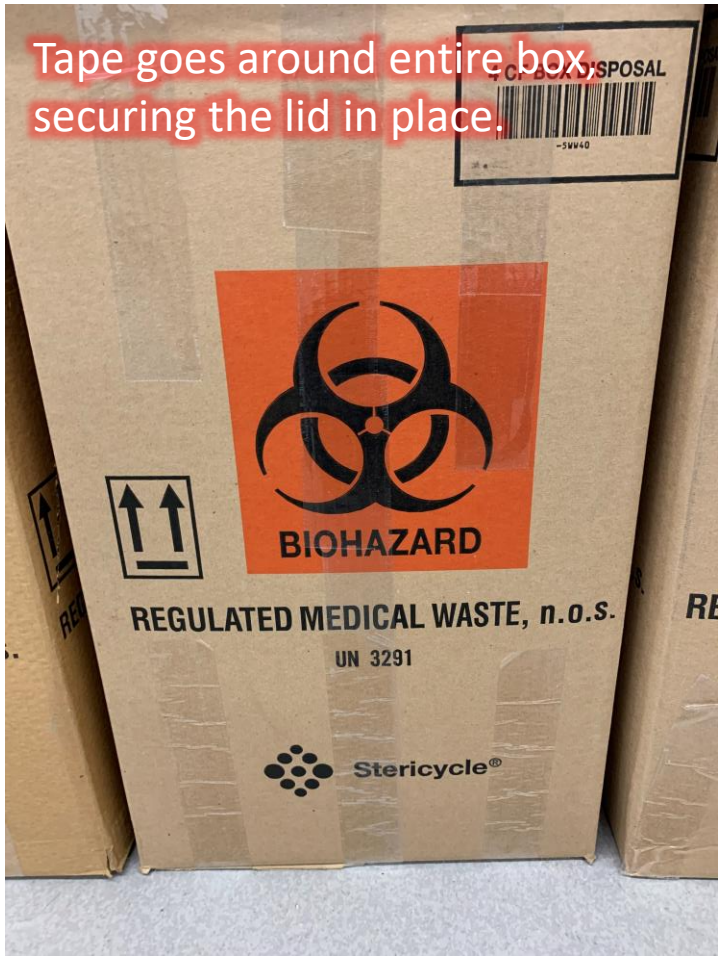


LABEL AND DATE!

TRIUMVIRATE ENVIRONMENTAL

Biohazardous Waste Box





TRIUMVIRATE ENVIRONMENTAL

What is wrong with this picture?

- Bag not tied shut!
- Tape not secure around bottom of box!
- No Stericycle label affixed!
- No date was provided!

TRIUMVIRATE ENVIRONMENTAL

Non-Contaminated Glassware Disposal

- Lab glassware that is not contaminated with any biological or chemical materials shall be disposed of in designated cardboard boxes in the labs.
- Examples:
  - Pasteur pipettes
  - Glass beakers/test tubes
  - Sample vials
  - Clean broken glass

- Once box is filled, ensure inner bag is tied shut and box is completely taped closed before requesting pick-up.

Regulated Medical Waste Guidance Poster

TRIUMVIRATE ENVIRONMENTAL

[Regulated Medical Waste - Administrative Services Gateway - University at Buffalo]

Part 8: Spills & Personal Contamination

- Despite initiatives to minimize or eliminate accidents, chemical spills, injuries and exposures, incidents may occur in the laboratory. A proper, efficient and organized response is necessary to minimize potential harm to personnel, equipment and laboratory space.
- Upon noticing a chemical or biological spill, clear the area and seek immediate assistance from the Laboratory Manager.
- Laboratory Manager will follow the Emergency Spill Response Procedure to ensure proper response to spill is initiated.
- Chemical and biological spill kits are available in the laboratory; however, only those specifically trained to do so are authorized to clean up spills.

TRIUMVIRATE ENVIRONMENTAL

Injury, Illness, Personal Contamination and Minor First Aid

- All injuries, illness and personal contamination must be reported to the Laboratory Manager.
  - This will ensure that you receive the proper medical attention and that the proper forms are filled out for insurance and worker's compensation purposes.
  - This will also initiate a proper investigation by UNH EHS in order to prevent the issue from happening in the future.
- Report non-threatening or non-serious issues to the Laboratory Manager.
- For serious injuries, serious illnesses or chemical exposures contact the Laboratory Manager and Campus Police and they will dispatch the appropriate resources to assist with the emergency.

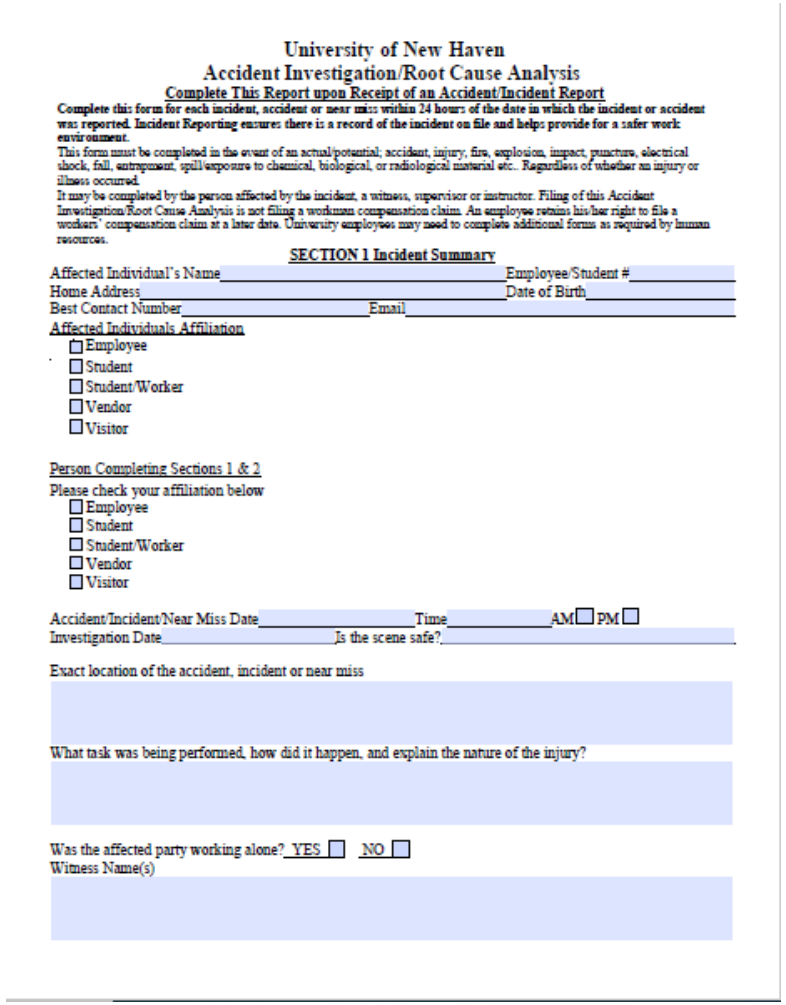
Injury, Illness, Personal Contamination and Minor First Aid

- All spill kits and first aid kits in the lab have a tamper evident seal on them.

- This helps notify Lab Managers when a kit has been opened and supplies need to be replaced.
- If one of these kits are opened, an Accident/Incident report MUST be filled out.
- Opening these kits should be reserved for accident/emergency situations only.
- For non-serious or non-threatening incidents, contact your Lab Manager **before** breaking the seal on these kits, as they can provide you one or two spill pads or a band aid as necessary.

TRIUMVIRATE ENVIRONMENTAL

Incident/Near-Miss Report Form



University of New Haven
Accident Investigation/Root Cause Analysis
Complete This Report upon Receipt of an Accident/Incident Report

Complete this form for each incident, accident or near miss within 24 hours of the date in which the incident or accident was reported. Incident Reporting ensures there is a record of the incident on file and helps provide for a safer work environment.

This form must be completed in the event of an actual/potential, accident, injury, fire, explosion, impact, puncture, electrical shock, fall, entrapment, spill/exposure to chemical, biological, or radiological material etc.. Regardless of whether an injury or illness occurred.

It may be completed by the person affected by the incident, a witness, supervisor or instructor. Filing of this Accident Investigation/Root Cause Analysis is not filing a workman compensation claim. An employee retains his/her right to file a workers' compensation claim at a later date. University employees may need to complete additional forms as required by human resources.

SECTION 1 Incident Summary

Affected Individual's Name_____ Employee/Student #_____
Home Address_____ Date of Birth_____
Best Contact Number_____ Email_____

Affected Individuals Affiliation
- ☐ Employee
- ☐ Student
- ☐ Student/Worker
- ☐ Vendor
- ☐ Visitor

Person Completing Sections 1 & 2
Please check your affiliation below
- ☐ Employee
- ☐ Student
- ☐ Student/Worker
- ☐ Vendor
- ☐ Visitor

Accident/Incident/Near Miss Date_____ Time_____ AM☐ PM☐
Investigation Date_____ Is the scene safe?_____

Exact location of the accident, incident or near miss

What task was being performed, how did it happen, and explain the nature of the injury?

Was the affected party working alone? YES ☐ NO ☐
Witness Name(s)

- Can be found on the MyCharger Environmental Health and Safety Webpage.
- [Work Place Safety - myCharger (newhaven.edu)]

TRIUMVIRATE ENVIRONMENTAL

Skin and Eye Exposure Response

- **For Spills on the Skin**:
  - The lab partner should assist the person to a safety shower and initiate the call to the Lab Manager and/or Campus Police.
  - Flush the affected area in the safety shower with water for at least **15 minutes** unless otherwise specified.
  - The lab partner should retrieve the Safety Data Sheet and provide to EMS.
  - Localized exposures can be flushed under a faucet.
- **For Contamination to the Eyes:**
  - The lab partner should assist the person to an eyewash and initiate the call to the Lab Manager and/or Campus Police.
  - Flush eyes with water for at least **15 minutes** using the eyewash.
  - Hold your eyelids open when using the eyewash.
  - Remove contact lenses if not already removed by water.
  - Lab partner should retrieve SDS and provide to EMS.

Chemical Inhalation Response

- The lab partner should assist the person to fresh air and initiate the call to the Lab Manager and/or Campus Police.
    - If trained and necessary, provide Rescue Breathing or CPR.
    - The lab partner should retrieve the SDS and provide to EMS.
- **Important: Do not enter an area that poses a threat to your own safety.**
- Do not administer first aid if you are not properly trained to do so.

TRIUMVIRATE ENVIRONMENTAL

Ingestion of Hazardous Substance Response

- The bystander should initiate the call to Campus Police.
- The lab partner should identify the substance(s) ingested and retrieve the SDS to provide to EMS.

Burning Clothing

- Do not panic! Running/sprinting will only exacerbate the flames.
- Instead use the designated lab safety shower
  - Or any other cold water from other water source in the lab, whatever method is quicker and closer to you.
- If no water source is available, use the Stop-Drop-and-Roll Technique.

- The lab partner should assist as necessary and when safe initiate the call to Campus Police.

Conclusion

- Be mindful of your surroundings and educate yourself of hazards present.
- Use safe practices and proper personal protective equipment for the job and for the environment you are working within.
- Reduce the presence of hazards if possible.
- If you have any questions about the hazards posed by the job or by environment you are working within, please contact your Lab Manager for clarification.

TRIUMVIRATE ENVIRONMENTAL

Thank You!

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1-888-TEI-WOWS www.triumvirate.com