

## Introduction

Welcome to the course material for Hazard Communication (HS200). Regulatory Agencies require this training as part of your [Right-To-Understand](#). For further assistance or information, contact UAB's Department of Environmental Health and Safety (EH&S) at (205) 934-2487 or visit the [website](#).

## Who is Covered?

The Hazard Communication Program covers all UAB Employees (including Faculty, Staff, and Other Employees) on campus. The Chemical Hygiene Plan includes anyone working in a laboratory. The Hazard Communication Plan applies to any hazardous material, which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. This Plan is also applicable to employees involved in work operations where employees only handle chemicals in sealed containers, which are not opened under normal conditions. The written Hazard Communication Plan is available [here](#).

## Objectives

By the end of this course, participants should be able to:

1. Recognize any hazardous chemicals or materials in their workplace.
2. Read and understand the Safety Data Sheets (SDS) and labels on any hazardous chemicals or materials.
3. Describe the process for storing and disposing of hazardous chemicals or materials.
4. Implement control measures to reduce hazardous chemical exposure and respond to emergencies.

## Regulatory Overview

The following agencies regulate hazardous chemicals or materials and their disposal:

- [Alabama Department of Environmental Management \(ADEM\)](#)
- [Jefferson County Commission \(JeffCo\)](#)
- [Occupational Safety and Health Administration \(OSHA\)](#)
- [United States Department of Transportation \(DOT\)](#)
- [United States Environmental Protection Agency \(EPA\)](#)

## The Hazard Communication Standard

UAB strives to follow the OSHA Hazard Communication Standard. Employers are also required to have a written Hazard Communication Plan (HCP). Components of the HCP include training, chemical labeling, inventories, Safety Data Sheets (SDS), hazard assessments, and exposure controls. The Hazard Communication Standard also requires employers to inform workers about chemical hazards in the workplace and how they can protect themselves from chemical exposures through training programs. Training must occur when a new person begins work and whenever new chemicals/hazards are introduced.

The standard is to ensure workers know that hazardous chemicals are present in the workplace, where or how hazardous materials are stored, and handling the materials properly. It specifies standards for:

- Labeling hazardous chemicals or materials in their workplace.
- Reading and understanding a Safety Data Sheet (SDS) and original label.
- Reducing exposure to hazardous chemicals and exposure monitoring.
- Responding to emergencies.
- Completing this course initially and then every three years.
- Forming the required written Plan.

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## Employee Rights and Responsibilities

Employees have the following rights under the Hazard Communication Program:

- Receiving information regarding hazardous substances at your workplace.
- Granting access to your physician or representative for any information related to any hazardous substance exposure you may have had.
- Accessing your medical and exposure monitoring records.
- Protecting against discharge or other discrimination due to exercising your rights.

Employee responsibilities:

- Complying with the Hazard Communication Program.
- Completing UAB's Hazard Communication (HS200) training course and attending department or job specific HazCom training sessions.
- Learning how to read and understand chemical label(s) or the SDS.
- Learn and implement the necessary steps while handling hazardous materials.
- Using appropriate Personal Protective Equipment (PPE) while working with or around hazardous materials.

## Laboratory Standard

EH&S requires each laboratory to follow [The OSHA Laboratory Standard](#) and must have the following:

1. Each lab must have a written Chemical Hygiene Plan (CHP) available to all employees working in the area. The CHP should be specific to the individual lab or research group. For a CHP template, [click here](#).
2. Department Heads or Principal Investigator's (PIs) appointing Laboratory Chemical Hygiene Officers (CHOs) are responsible for:
  - a. Implementing and updating the CHP (including provisions for obtaining prior approval of especially dangerous procedures).

## Hazard Communication (HS200) Course Material

- b. Ensuring that the laboratories they oversee have accurate and up-to-date chemical inventories.
- c. Conducting, arranging, and keeping up-to-date training records.
- d. Ensuring compliance with the CHP.
- e. Serving as the liaison with EH&S.

## Hazardous Chemicals

### Hazard vs. Risk

A **hazard** is anything that is a source of potential damage, harm, or adverse health effects on something or someone. Examples include but not limited to a knife that cuts, Benzene causing cancer, and a virus or bacteria causing disease. **Risk** is the probability and severity of a worker being harmed by the hazard. How to reduce the risk of injury or exposure?

- Follow written procedures and protocol provided by your Supervisor.
- Select and use appropriate Personal Protective Equipment (PPE).
- Attend job-specific training and follow the guidelines.
- Proper use, maintenance, and inspection of equipment.

### Hazardous Chemical

A hazardous chemical is defined by the Hazard Communication Standard (HCS) as any chemical which can cause a physical or health hazard.

Type	Potential Hazard	Example
<b>Toxins (Poisons)</b>	Potential damage to reproductive capabilities and fetus.	Lead
<b>Corrosives</b>	It can destroy or cause irreversible alterations to living tissue	Acids and Bases
<b>Carcinogens</b>	May cause cancer.	Benzene
<b>Nephrotoxins</b>	Produces kidney damage.	Naproxen Sodium (Ibuprofen)
<b>Hepatotoxins</b>	Produces liver damage.	Ethylene Bromide
<b>Flammable</b>	Catch Fire	Acetone, gasoline
<b>Explosive</b>	Can cause violent explosions	TNT

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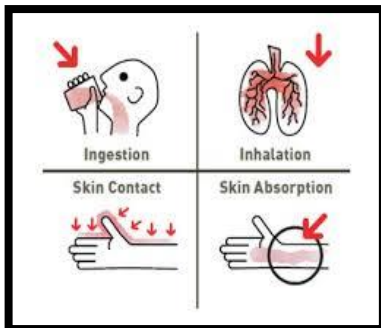
**Health hazards** are a chemical for which there is statistically significant evidence that acute or chronic health effects occur in exposed employees.

**Acute Toxicity** is the adverse effects of a chemical happening quickly either from a single exposure or from multiple brief exposures. Examples include Carbon Monoxide poisoning and inhalation of Cyanide.

### Chronic toxicity:

- May be caused by chemical exposures that do not cause immediate, apparent harm, or make you feel sick right away.
- May not see, feel, or smell the danger.
- Effects are long, continuous, and follow repeated long-term exposures (i.e., lung cancer from cigarette smoking or Mesothelioma from asbestos exposure).

### Exposure vs. Toxicity



Exposure is how chemicals enter the body, and toxicity is the poisonous level of the chemicals. Chemicals can enter the human body by ingestion, inhalation, or skin absorption. Toxicity of a chemical depends on dosage, duration, and exposure to other chemicals.

How is chemical toxicity measured? The answer is One way to measure toxicity is LD<sub>50</sub>. LD<sub>50</sub> is the amount of a chemical that if given in once dose could kill 50% of the animal group exposed.

Examples		
Chemical	8-hr TWA	STEL
Bromine	0.1 ppm	0.3 ppm
Mercury	0.1 mg/m <sup>3</sup>	0.025 mg/m <sup>3</sup>
Formaldehyde	0.025 mg/m <sup>3</sup>	2 ppm

## Hazard Communication (HS200) Course Material

**Permissible Exposure Limits (PELs):** A PEL is the maximum amount of a chemical substance that a worker may be exposed to under OSHA regulations. PEL is usually given as a Time-Weighted Average (TWA). A TWA is an average over a specified period, usually a nominal eight hours. A **Short-Term Exposure (STEL)** is acceptable average exposure over a short period of time (usually 15 minutes if the time-weighted average is not exceeded).

### Physical vs. Health Hazards

**Physical hazards** are based on the physical properties of substances.

- Flammables and Combustibles:  
Acetone or Isopropyl Alcohol
- Explosives: Nitroglycerin or Dry  
Picric Acid
- Compressed Gases: Oxygen or  
Nitrous Oxide
- Oxidizers: Oxygen or Nitrous  
Oxide
- Reactive Materials: Sodium or  
Phosphorus

HCS Listed Hazard Categories		
Physical Hazards		
<u>Fire Hazards</u> Combustible Liquid Flammable Liquid, Aerosol, Gas, or Solid Oxidizer Pyrophoric	<u>Reactive Hazards</u> Organic Peroxide Unstable (Reactive) Water-Reactive	<u>Explosion Hazards</u> Compressed Gas Explosive
Health Hazards		
<u>Systemic Effects</u> Carcinogen Toxic Agent Highly Toxic Agent Corrosive Irritant Sensitizer	<u>Target Organ Effects</u> Hepatotoxin Nephrotoxin Blood/Hematopoietic Toxin Respiratory Toxin Reproductive Toxin Cutaneous Hazard Eye Hazard	

Some chemicals present both physical and health hazards. E.g. hydrazine, that is both flammable and toxic

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### Gas Cylinders

Chemicals inside compressed gas cylinders may be flammable, combustible, explosive, oxidizing, corrosive, or toxic. The sudden release of these materials can cause fire explosions, exposure to toxic gases, and even cause asphyxiation (suffocation). Compressed gas cylinders that are not appropriately secured can pose both chemical and physical hazards. If you see gas cylinders that are not chained or bound correctly, report it immediately to your Supervisor or Manager.



### Chemical Inventory

Anyone responsible for an area where hazardous materials are stored is required to maintain a complete inventory of all the materials. EH&S will perform the initial inventory in each area. After this, it becomes the Area Supervisor's responsibility to maintain and update whenever a new chemical is introduced or ultimately used up.

All chemicals that are considered hazardous (corrosive, acutely toxic, reproductive toxins, flammable, etc.) must be included in the chemical inventory. For more information regarding the chemical inventory management system, [click here](#). It is the responsibility of the Supervisor to make the inventory available to all employees under their supervision.

### Monitoring

EH&S has exposure measurement plans for most of the hazardous chemicals commonly found in the workplace. Assessment of exposure to chemicals as well as physical agents such as noise and non-ionizing electromagnetic radiation can be requested through EH&S. Anyone concerned with over-exposure to a chemical agent or regular work with significant amounts of hazardous chemicals can contact EH&S at (205) 934-2487 to determine the need for monitoring. The EH&S Occupational Medicine Program provides medical surveillance that involves the evaluation of health risks associated with an employee's exposure to animals and hazardous agents. It is a free service for all eligible employees.

## Safety Data Sheets (SDS)

Regulations require manufacturers provide an SDS on all hazardous materials sold. Employers are required to make the SDS available to all workers handling hazardous material. An SDS provides information on specific hazards, health effects, handling and storage, spill response, disposal, and personal protective equipment regarding a substance. The information on an SDS is divided into 16 sections.

### Access

Supervisors shall ensure employees can obtain SDS's from the following sources:

- Keeping a hard copy of any or all the SDS's in a folder accessible to all employees in the workplace.
- UAB has subscribed to [ChemWatch](#). It may be accessed from any computer on the UAB Campus, within the UAB Medical System, or connected via VPN. You can learn how to search the ChemWatch database by [clicking here](#). If you can't find the SDS that you are looking for, contact EH&S at (205) 934-2487.

File Date 04/18/2017

**1. PRODUCT AND COMPANY IDENTIFICATION**

**1.1 Product identifiers**  
Product name : Hydrazine  
Product Number : 215155  
Brand : Sigma-Aldrich  
Index No. : 007-006-00-3  
CAS-No. : 332-01-2

**1.2 Relevant identified uses of the substance or mixture and uses advised against**  
Identified uses : Laboratory chemicals, Synthesis of substances


**1.3 Details of the supplier of the safety data sheet**  
Company : Sigma-Aldrich  
355 Spruce Street  
SAINT LOUIS MO 63103  
USA  
Telephone : +1 800-326-6832  
Fax : +1 800-326-6922

**1.4 Emergency telephone number**  
Emergency Phone # : +1-703-627-3887 (CHEMTREC)

**2. HAZARD IDENTIFICATION**

**2.1 Classification of the substance or mixture**  
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)  
Flammable liquids (Category 3), H228  
Acute toxicity, Oral (Category 3), H302  
Acute toxicity, Inhalation (Category 3), H330  
Acute toxicity, Dermal (Category 3), H311  
Skin corrosion (Category 1B), H314  
Serious eye damage (Category 1), H318  
Skin sensitizer (Category 1), H317  
Carcinogenicity (Category 1B), H350  
Acute aquatic toxicity (Category 1), H400  
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

**2.2 GHS Label elements, including precautionary statements**  
Pictogram :   
Signal word : Danger  
Hazard statement(s) :  
H228 : Flammable liquid and vapour.  
H302+H311 : Toxic if swallowed or in contact with skin.  
H314 : Causes severe skin burns and eye damage.  
H317 : May cause an allergic skin reaction.

Sigma-Aldrich 215155 Page 1 of 3



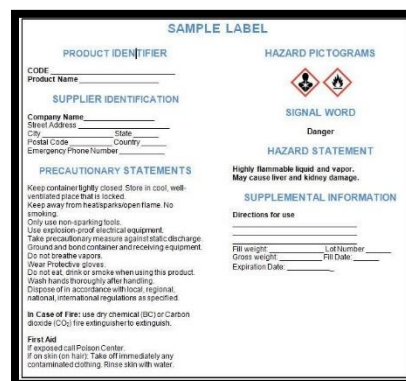
## Signage and Labeling

### Labeling

#### Manufacturer Label Requirements

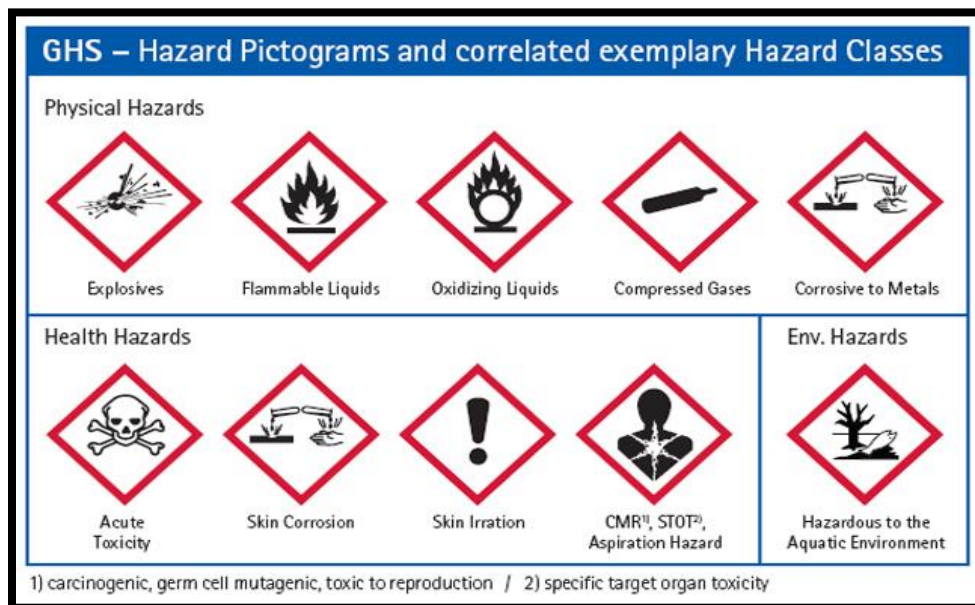
The best method of protecting yourself and others from the hazardous materials in your area is to read the label before using it. Other languages may be present on the label, but regulations require the primary language to be in English. Original labels on the chemicals are the best source for obtaining information about the hazards. By law, the manufacturer's label must:

- Identify the chemical substance by name.
- Give the contact information of the manufacturer.
- Contain any hazard or warning information appropriate for the chemical [including a Pictogram or Signal Word (Danger or Warning)].



#### Pictograms

The Hazard Communication Standard (HCS) uses pictograms on labels to warn the users of the hazards associated with the chemicals. Each pictogram consists of a symbol on a white background with a red border and represents a distinct hazard(s).



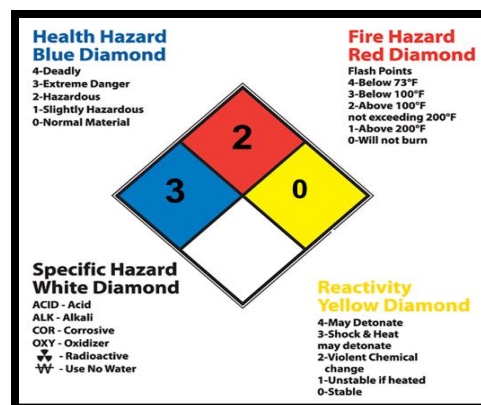
# Hazard Communication (HS200) Course Material

## Signal Words

A signal word indicates the relative hazard severity. Danger means a severe hazard, and warning means less severe hazards.

## NFPA

There are two other standard hazard-warning systems used in the United States. One you will see the most often is the National Fire Protection Association (NFPA) diamond. Look for these on large tanks that contain chemicals. Some areas or buildings may have these as well. NFPA diamond has four colors and each represents a hazard

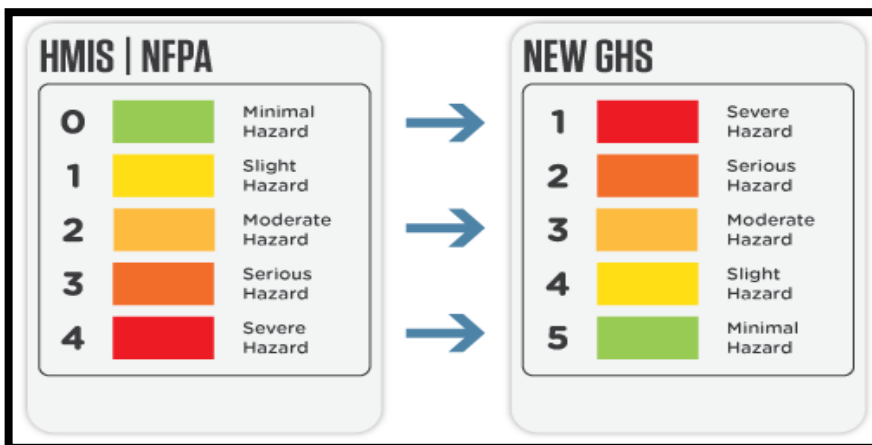


- Blue: Health hazard
- Red: Flammability
- White: Other hazards
- Yellow: Instability

Numbers 0-4 on the diamond indicate the severity of the different hazards for the chemical with 0= little or no risk, 4= extreme risk.

## GHS vs. NFPA

The Globally Harmonized System (GHS) hazard rating is the opposite of the NFPA rating system. The hazard categories under GHS are numbered from 1 to 5. The lower the number, the higher the severity of the hazard. So category 1 hazards are the most dangerous.



## Hazard Communication (HS200) Course Material

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### DOT

The Department of Transportation (DOT) uses placards and labels with warning symbols on trucks and boxes containing hazardous materials.



### Transferring Labels

When transferring chemicals from the original to a secondary (portable) container, those containers must also comply with the labeling requirements listed above. Chemicals transferred to another container should have the following information.

- The name of the chemical on the new container.
- Never use acronyms, abbreviations, and formulas of the substance.
- All warning and target organ information from the label of the original container.

[ChemWatch](#) can be used to print labels for both primary and secondary contains. All personnel working with chemicals must be fully trained on how to label chemicals utilizing the system and how to understand the labeling system. Training must occur when a new person begins work, when new chemicals are introduced and should occur regularly and annually. To learn how to use ChemWatch, [click here](#).

## Hazard Communication (HS200) Course Material

The best way to label the container is to never remove or deface the original label from the supplier. Workplace containers, which can be labeled with alternative labeling methods, as described below.

- All chemical containers, both hazardous and nonhazardous, must be prominently and accurately labeled with the chemical name and the appropriate hazard warnings. Formulas and abbreviations are not acceptable for any containers. The label must be legible, permanently displayed, and in English. The hazard warning must provide the health and physical hazards of the chemical. This can be done through pictures, symbols, or a combination of both. Chemical container labels can be generated using [ChemWatch](#).
- Date all chemical containers and especially peroxide formers and other chemicals that may become unstable over time. They should display both the arrival date and date opened.



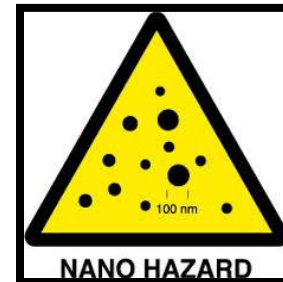
If you see unlabeled, unknown chemical containers in your area, ask those in your area to identify and label the container. If no one knows what is in the container, call EH&S at (205) 94-2487. However, there could be a charge for this service.

### Signage

Door signs located outside of each laboratory or room containing hazardous materials, provide location-specific hazard information to emergency response personnel. Hazard labels and pictograms on the door represent the different types of hazards present in the lab.

Below are some other hazard warning signs you may notice around campus. If you have to work around areas, these signs are posted, talk with your Supervisor or Manager about the possibility of exposure. You may also contact EH&S at (205) 934-2487 if you have questions.

LAB SAFETY INFO		
<b>NFPA Diamond</b> 	<b>Lab Contact Info</b> Name: _____ Phone: _____ Building Administrator: Name: _____ Phone: _____ UAB Police: 934-3535	<b>PPE for Entry</b> 
<b>NFPA Diamond Legend</b> 	<b>Radiation Safety Info</b> N/A	<b>Biosecurity Info</b>  Agent: _____ BIOSECURITY LEVEL 2
<b>LASER Safety Info</b> N/A	<b>Compressed Gas Info</b> 	N/A



### *Animal Facility Areas*

If you work in an animal facility, you may see an Animal Use and Safety Information Sheet (AUSI) Form on the door. If you must go into the room, read the AUSI first! Ensure that you know what hazards may exist inside the room and what PPE to wear. Unless adequately trained or with a trained individual, you should stay out of these areas.

## PPE

Wearing the appropriate Personal Protective Equipment (PPE) is very important when working with or around hazardous substances or materials. The appropriate PPE should be available and used by all persons, including visitors while working with hazardous materials and entering an area where they are used or stored. The most important way to know what to wear for your protection is to read! Read labels, signage, SDS, etc. If you need assistance with what to wear, contact your Supervisor, Manager, PI, or EH&S at (205) 934-2487.

## Types

### *Reusable vs. Disposable*

Reusable PPE must be cleaned after use. Disposable PPE must be thrown out after the workday or if soiled or damaged. Wear PPE in a way that prevents chemicals from entering your body by inhalation, ingestion, or through the skin and type of PPE, which depends on the chemicals and situation.

# Hazard Communication (HS200) Course Material

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## Hands

Gloves must be worn during handling, including repairing equipment contaminated with chemicals. If the label requires a specific material, such as Nitrile, gloves must be made of the specified material. You must not wear cotton, suede, or leather gloves with chemicals.



## Eyes

Provide front, brow, and temple protection. The nature of the device depends on the type of work you are performing. Examples include Safety Glasses, Chemical Splash Goggles, Face Shield, or Welders Goggles.



## Respirator

Respirators may be needed if there is a likelihood of inhalation exposure to droplets or vapors. Make sure to use the respirator, cartridges, and filters on the label. You must be fit-tested and enrolled in the UAB Occupational Medicine Program to use respirators (including N95 Face Masks).

## Special

Chemical-resistant footwear, coveralls, chemical-resistant suits, aprons, etc. may be required in certain situations. Consult with your Supervisor if you are not sure about the PPE needs.

## Maintenance

- Check PPE routinely and keep a maintenance log (including recommended replacement periods and shelf-lives).
- Identify an individual responsible for the maintenance of PPE.
- Store in a clean and sanitary condition away from the sun, heat, and moisture.

## Emergencies

Prepare for emergencies by learning how to respond to everyday emergencies that could occur, such as fires, explosions, chemical exposures, injuries, and chemical or biological spills. For emergencies or spills, during the regular business day, call EH&S at (205) 934-2487. They will direct your call to the proper person. During non-business hours and holidays, call 911 from a campus phone or (205) 934-3535 from a cell phone.



## Safety Equipment

Learn the location of the emergency equipment in your area and get familiarized with the operation.



### Spills

#### *Sizes*

At UAB, spills are classified as small or large based on the volume of the material spilled.

1. Spills of 500 ml (one pint or two cups) or less are considered small.
2. Spills of more than 500 ml are considered large. Spills of less than 500 ml may be regarded as large spills if the material involved is particularly hazardous. Call the EH&S Support Facility at (205) 934-2487.

#### *Spill Plan*

Because of the unique hazards of biological and chemical agents, develop a spill plan for the agents in your specific area. Everyone working in the area should be familiar with the Plan. Your area's Plan should include these four essential elements:

1. PPE: Your Plan should contain a list of all the PPE you may need when a spill occurs in the area.
2. Assessment: Your Plan should contain the extent and nature of the spill. What constitutes a large or small spill and could a small spill be considered large due to the nature of the substance.
3. Disinfection: Your Plan should contain the correct disinfectant for the material being used. Not all disinfectants work with all substances or materials.
4. Disposal: Your Plan should explain what to do with the materials used to clean up the spill.

#### *Basic Spill Kit*

There should be a spill kit readily available in all areas where hazardous materials are used or stored. They can be purchased "readymade" or assembled from readily available materials. If you are not trained to handle spills (whether chemical, biohazard, or radioactive); do not attempt to clean it up.



### Injuries

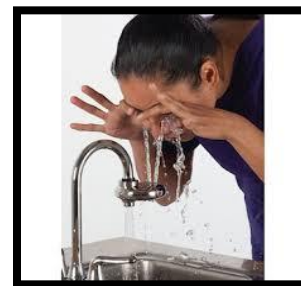
#### *Spill on Individual*

- Locate Safety shower
- Remove contaminated clothing
- Rinse for 15 minutes
- Seek medical attention if needed
- Contact EH&S



#### *Chemical in the Eye*

- Flush eyes for 15 minutes
- Remove contacts if wearing them
- Seek medical attention



#### *Person on Fire*

- Locate a safety shower or fountain
- Use the shower to remove any contaminating material and to cool the skin immediately
- If safety shower is not available wrap the person with a safety blanket
- Drop and roll on the floor if both are not available
- Call 911

### Conclusion

This section concludes the Hazard Communication (HS200) Course Material. Things to remember:

- What are the hazards? Explosion, Flammable, Toxic, etc. refer to the label and SDS for information.
- What is the worst thing that could happen (impact)? Explosion, Personal Exposure, Fire.
- What can be done to prevent this from happening (strategies)? Modify process, barriers, or guards.
- What can be done to protect me from these hazards (mitigation)? PPE, SOP.
- What should be done if something goes wrong? Spill control, fire extinguisher, call help.

### Other Training

- If you handle, work with, or are around hazardous chemicals, it is strongly recommended you complete [Chemical Safety Training \(CS101\)](#).
- If you are responsible for generating, handling, packing, or electronically signing a manifest requesting hazardous waste for pickup and disposal, it is required you complete [Hazardous Waste Handling and Packing \(CS055\)](#).
- If you work with or around hazardous materials, it is strongly recommended you complete [Personal Protective Equipment \(PPE\) \(OHS100\)](#).

EH&S has many training courses available to all active UAB Employees and Students. A [decision tree](#) is available to help you choose the right training courses to supplement the knowledge and skills you may need at work. If you have any questions or comments, contact EH&S at (205) 934-2487.