

Portland Community College Environmental Health & Safety EH&S

Laboratory Safety

Agenda – Lab Safety

Introduction
Compliance
Lab Safety & Risk Exposures
Hazard Communications
Laboratory Chemical Hygiene
Hazardous Waste Management
Biological
Emergency Response
Resources
What's Next?



Introduction

Environmental, Health & Safety (EH&S department & staff)

Course Objective

To help provide employees/faculty/staff with an overview of the regulations applying to their laboratory, as well as important safety considerations they will encounter, this Course is designed to review the fundamentals of laboratory safety.

Upon completion of the Course, PCC employees should:

- Recognize the most recent OSHA regulations affecting their laboratory environment.
- Know what basic personal protective equipment is available to them and when it should be used.
- Understand the importance of good housekeeping in the laboratory.
- Be able to recognize various ventilation controls, and know when they should be used.
- Know the importance of being able to read a Safety Data Sheet (SDS), recognize chemical labeling and know how to store chemicals correctly.
- Know the basic actions to take in emergency situations, including the use of safety showers and eye washes

Compliance

OSHA

Lab Safety

Hazard communication,
Laboratory chemical hygiene,
Hazardous waste management
Emergency response

Lab Safety, Health and Environmental Risk Exposures

Chemical

Biological/Sharps

Fire

Hazardous Waste/Spills

Chemical – Hazard Communications

Chemical Purchasing & Management
Labeling
Safety Data Sheets
Chemical Usage

Ch 6.	Electrical Safety Appendix A - Definitions Appendix B - Electrical Safety Training Appendix C - Understanding Arc Flash [pdf] [pdf] Appendix D - Resetting Circuit Breakers [pdf] Appendix E - Electrical Energized Work Permit
Ch 7.	Emergency Response Action Plan - Chapter 7 is being updated
Ch 8.	Hazard Communication [pdf] Form 1: PCC Chemical Hazard Communication Training Documentation [pdf]
Ch 9.	Chemical Hygiene Plan - Laboratories [pdf] [pdf] <ul style="list-style-type: none">• Appendix A - Definitions [pdf]• Appendix B - Lab Storeroom Locations [pdf]• Appendix C - Prior Approval Process Form [pdf]• Appendix D - CHP Employee Training Document [pdf]• Appendix E - Chemical Checklist [pdf]• Appendix F - GHS Ratings [pdf]

PCC Hazard Communication Plan: Chapter 8 of Health and Safety Manual
PCC Chemical Hygiene Plan: Chapter 9 of the Health and Safety Manual

Both located on the PCC Safety & Risk Services intranet site

Chemical – Hazard Communications

Chemical Purchasing/Storage

Documentation

- All chemicals go through approval process when submitted through MSDSonline
- Prior approval required for all radioactive materials or equipment with radioactive materials.
- Purchases of all new particularly hazardous substances require the completion of CHP Appendix C Approval Form which is basically a “safety plan” for use of that chemical.
- Particularly hazardous substances for PCC are based on the following GHS classifications:
 - Acute Toxic, 1 and 2
 - Germ Cell Mutagen, 1a, 1b
 - Reproductive Hazard, 1, 2
 - Carcinogen, 1, 2



Storage Locations

Chemical – Hazard Communications

Department Responsibilities:

Train employees on specific chemicals

Safety data sheets (SDS) are submitted to MSDSonline and approved prior to purchase of chemicals.

Must have the correct manufacturer's SDS for each chemical

Must not purchase any chemical without an OSHA GHS compliant label and SDS

All chemicals must be marked with the received date. –observe storage time limits for peroxide formers

Conduct annual inventory to verify SDS available for each chemical on the shelf.

Chemical Hygiene Plan requires an annual review of integrity of chemicals and their containers

Maintain an SDS backup so SDS are always readily available to employees

Chemicals are labeled and stored correctly



Chemical – Hazard Communications

Employee Responsibilities:

- Read and follow safety data sheets and chemical labels
- Use appropriate safeguards for each chemical, including personal protective equipment
- Follow personal hygiene practices for eating, drinking, handwashing
- Good lab housekeeping
- Return chemicals to proper storage area
- Wipe down work areas
- Follow safety signage
- Know the location and proper use of all emergency equipment
- Report and properly respond to chemical exposures and releases
- Follow waste storage and disposal procedures



Chemical – Hazard Communications

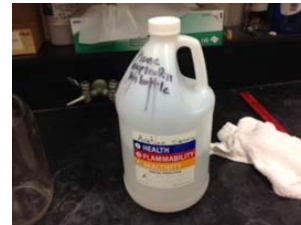
Labeling

When do you need workplace labels at PCC? Immediate use containers for experiments are not required to be labeled but stock or storage containers must be labeled.

Does this label meet OSHA workplace label requirements?



Departments should phase out HMIS and NFPA labeling of workplace containers.



Chemical – Hazard Communications

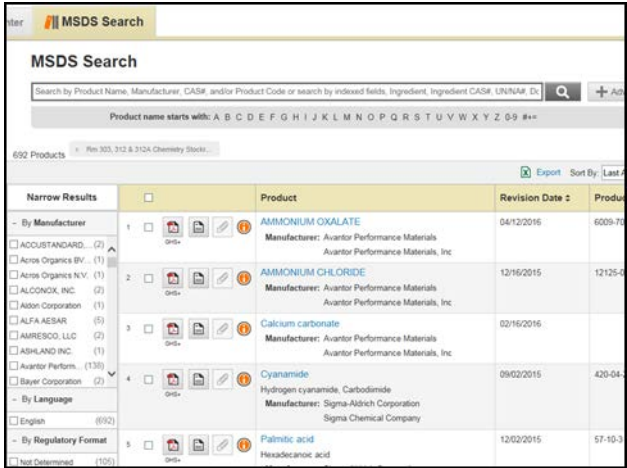
Safety Data Sheets

MSDSonline











Lists of hazardous chemicals by location

View safety data sheets for products PCC employees use or are exposed to

Search to view health and physical hazards of chemicals (GHS classification) by location



The screenshot shows the MSDS Search interface. On the left, there are filters for 'By Manufacturer' (listing various companies like ACQUASTANDARD, ALCONOX, etc.), 'By Language' (English), and 'By Regulatory Format' (MSDS, etc.). The main table displays search results with columns for Product, Revision Date, and Product ID. The results include AMMONIUM OXALATE, AMMONIUM CHLORIDE, Calcium carbonate, Cyanamide, and Palmitic acid.

Narrow Results		Product	Revision Date	Product ID
1	<input type="checkbox"/>  	AMMONIUM OXALATE Manufacturer: Avantor Performance Materials Avantor Performance Materials, Inc.	04/12/2016	6009-70
2	<input type="checkbox"/>  	AMMONIUM CHLORIDE Manufacturer: Avantor Performance Materials Avantor Performance Materials, Inc.	12/16/2015	12125-4
3	<input type="checkbox"/>  	Calcium carbonate Manufacturer: Avantor Performance Materials Avantor Performance Materials, Inc.	02/16/2016	
4	<input type="checkbox"/>  	Cyanamide Hydrogen cyanamide, Carbodiimide Manufacturer: Sigma-Aldrich Corporation Sigma Chemical Company	09/02/2015	420-04
5	<input type="checkbox"/>  	Palmitic acid Hexadecanoic acid	12/02/2015	57-10-3

Chemical – Hazard Communications

Safety Data Sheets - MSDS ONLINE

There are several ways to access PCC's safety data sheet inventory using MSDSonline

1. No password or login needed
2. Shortcut icon on classroom podiums, PC's, labs
3. Link on the PCC Intranet
4. Designated URL (Web page) – must have exact web address to have access outside of PCC internet, for use with mobile devices



<https://msdsmanagement.msdsonline.com/company/fbaa552b-9486-47db-8dd3-7c5b26b499f5/>

Chemical – Hazard Communications

Safety Data Sheets

Laboratory Chemical Hygiene – Chemical Usage

Personal Protective Equipment

OSHA Employer requirements:

Employers must assess the workplace hazards and select PPE for employees. We will discuss location specific PPE that is available

Employer pays for PPE. (there are some exceptions)

PPE must be available that fits each affected employee

PEE must be provided, used, and maintained in a sanitary and reliable condition

Must regularly inspect and maintain PPE

Ensure employee are wearing PPE for identified tasks

Train employees on:

When PPE is necessary

What PPE is necessary

How to properly don, doff, adjust, and wear PPE

The limitations of the PPE

Proper care, maintenance, useful life and disposal of PPE

Laboratory Chemical Hygiene - GHS

Globally Harmonized System uses specific criteria to standardize how physical and chemical hazards are expressed on chemical labels and safety data sheets

Physical Hazards:

- Explosive
- Flammable
- Oxidizer
- Self reactive
- Self heating
- Pyrophoric
- Organic Peroxide
- Water contact emits flammable gas
- Corrosive to metal
- Pressurized gases
- Combustible dust
- Simple asphyxiants

Health Hazards-acute and chronic:

- Acute toxicity
- Specific target organ toxicity
- Skin corrosion or irritation
- Serious eye damage or irritation
- Respiratory or skin sensitization
- Aspiration hazard
- Germ cell mutagenicity
- Carcinogenicity
- Reproductive toxicity

Laboratory Chemical Hygiene – GHS Pictograms

Exploding Bomb



Explosives
Self Reactive
Organic Peroxide

Flame



Flammable
Self Reactive
Pyrophoric
Self-Heating
Emits Flammable Gas
Organic Peroxides

Flame Over Circle



Oxidizers

Gas Cylinder



Gases Under Pressure

Skull and Crossbones



Acute Toxicity
(Fatal or toxic)

Corrosion



Skin Corrosion/
Burns
Corrosive to Metals
Serious Eye Damage

Health Hazard



Carcinogenicity
Respiratory Sensitizer
Reproductive Toxicity
Target Organ Toxicity
Mutagenicity
Aspiration Toxicity

Exclamation Mark



Skin & Eye Irritant
Dermal Sensitizer
Acute Toxicity (Harmful)
Narcotic Effects
Respiratory Tract Irritant
Harmful to Ozone Layer
(Not mandatory)

Environment



(Not mandatory for HazCom 2012)

Aquatic Toxicity

Laboratory Chemical Hygiene

GHS Chemical Label Examples

EPICHLOROHYDRIN **1 Product Identifier**

UN No. 2023
CAS No. 106-89-8

2 Signal Word
DANGER

3 Pictograms

4 Hazard Statements
Fatal if swallowed.
Toxic in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. May cause cancer.

5 Precautionary Statements
Do not breathe dust/fume/gas/mist/vapours/spray.
Wear protective gloves/protective clothing/eye protection.

Fill Weight: 18.52 lbs. Lot Number: A0323111323
Gross Weight: 20 lbs Fill Date: 1/15/2012
Expiration Date: 1/15/2018

6 Supplier Information
JACKSON CHEMICAL COMPANY - City of Industry, Los Angeles, California, USA (800)-444-456-8988

1-Chloro-2,4-dinitrobenzene

Danger

Precautionary Statements

Fatal in contact with skin - Causes skin irritation - Causes serious eye damage - May cause an allergic skin reaction - May cause damage to organs (or state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause hazard) - Very toxic to aquatic life - Very toxic to aquatic life with long lasting effects - Toxic if inhaled - Toxic if swallowed

Do not eat, drink or smoke when using this product. - Collect spillage. - Do not get in eyes, on skin, or on clothing. - IF ON SKIN: Wash with plenty of soap and water. - Call a POISON CENTER or doctor/physician. - Remove/Take off immediately all contaminated clothing. - Store in a well-ventilated place. Keep container tightly closed. - Rinse mouth. - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. - Use only outdoors or in a well-ventilated area. - Do not breathe dust/fume/gas/mist/vapours/spray. - Get medical advice/attention if you feel unwell. - Immediately call a POISON CENTER or doctor/physician. - Contaminated work clothing should not be allowed out of the workplace. - Dispose of contents/ container to an approved waste disposal plant. - If skin irritation or rash occurs: Get medical advice/attention. - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - IF ON SKIN: Gently wash with plenty of soap and water. - Wear protective gloves/protective clothing/eye protection/face protection. - Avoid release to the environment.

ALDRICH CHEMICAL COMPANY Please refer to the original SDS for more information

Laboratory Chemical Hygiene

Laboratory Chemical Hygiene

Laboratory – Waste & Spills

Waste Disposal/Spills

The rules change when chemicals become waste.

What is a waste?

- Served its purpose

- It's not longer usable

- Discarded or abandoned

Laboratory – Waste & Spills

Types of Regulated Waste at PCC



Laboratory – Waste & Spills

Types of Regulated Waste at PCC



Laboratory – Waste & Spills

Types of Regulated Waste at PCC

Lab Waste Disposal

Chemical
Biological

Laboratory Emergency Response

Injury/Illness

Portland Community College SYLVANIA CAMPUS <small>12800 SW 49th Avenue, Portland, OR 97219</small>
EMERGENCY GUIDE
EMERGENCY - Call 9-911 or Public Safety (503) 977-4444
Non-Emergency - Call Public Safety (503) 977-4902 TTY (503) 977-8887

CONTACT INFORMATION
DEFINITIONS
CRIME in PROCESS
FIRE
MEDICAL EMERGENCY - FIRST AID
UTILITY EMERGENCY
EARTHQUAKE
CHEMICAL or HAZARDOUS LEAK OR SPILL
BUILDING EVACUATION
EVACUATION OF PEOPLE WITH DISABILITIES
BOMB THREAT or SUSPICIOUS/ABANDONED ITEM
ACTIVE SHOOTER
QUICK SUMMARY

Bloodborne Pathogens

Exposure Control Plan

Laboratory Emergency Response

Fire



Resources

What's Next?

Commitment to safety
Engagement in safety programs & activities
Access resources/remain knowledgeable