College of Engineering
Hazard Materials Management & Chemical Safety
Training Booklet

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Hazard Communication Training Booklet

Revised: 10/02/2013

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BLR's
Safety Training Presentations

Hazard Communication 29 CFR 1910.1200 and 5194
Title 8 CCR

Close Encounters with Chemicals

- We encounter chemicals almost every day
  - Filling your vehicle with gasoline
  - Cleaning the bathroom
  - Applying pesticides or insecticides
  - At work: Laboratory Chemicals, White Board Markers, White Board Cleaners, Copier Toner, Batteries, etc and possible exposure to paint, bathroom cleaners, etc.
- Many chemicals can cause injury or illness if not handled properly.

Hazard Communication 'Goals'

- Right to Know chemical hazards
- PPE, first aid, spills/leaks
- Labels, Material Safety Data sheets
- Program Responsibilities
- Quiz

Right to Know

- OSHA created the Hazard Communication Standard to help ensure your safety when working with hazardous chemicals.
- You have a **RIGHT TO KNOW** about the hazardous chemicals you use on the job and how to work safely with those chemicals.

Hazard Communication Standard

Chemical manufacturers must:

- Determine a chemical's hazards
- Provide labels and MSDSs

Employers must:

- Provide a hazard communication program (http://www.csupomona.edu/~ehs/ftp/HazardCommunicationManual/HazcomManual.doc)
- Maintain MSDSs
- Train on hazardous materials

HazCom Standard (cont.)

Employees must:

- Read labels and MSDSs
- Follow employer instructions and warnings
- Identify hazards before starting a job
- Participate in training

Chemical Hazards

Physical Hazards:

- Flammable
- Explosive
- Reactive

Health Hazards:

- Corrosive
- Toxic

Routes of Entry

- Skin and eye contact
- Inhalation
- Swallowing
- Penetration (skin absorption)

Chemical Exposure

- Dosage
- Acute effects
- Chronic effects

Personal Protective Equipment

- Dust masks and respirators
- Glasses, goggles, and face shields
- Hearing protection
- Gloves
- Foot protection
- Head protection
- Aprons or full-body suits

Hazardous Materials First Aid

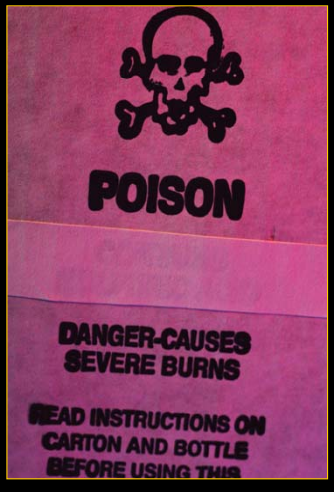
- Eyes: Flush with water for 15 minutes
- Skin: Wash with soap and water
- Inhalation: Move to fresh air
- Swallowing: Get emergency medical assistance

Spills and Leaks

- Evacuate the area
- Notify a supervisor or the emergency response team
- Remove ignition sources (if safe to do so)
- Stay away

Importance of Labels

- The identity of the chemical
- Name, address, and emergency phone number of the manufacturer
- Physical and health hazards
- Special handling instructions
- Basic PPE recommendations
- First aid, fire response, spill cleanup



NFPA Labeling Systems

NFPA = National Fire Protection Association

- Blue = Health
- Red = Flammability
- Yellow = Reactivity
- White = Other hazards or special handling

Scale: 0 (No Hazard) to 4 (Extreme Hazard)

Other Label Warnings

- The identity of the chemical
- Name, address, and emergency phone number of the manufacturer
- Physical and health hazards
- Special handling instructions
- Basic PPE recommendations
- First aid, fire response, spill cleanup

Material Safety Data Sheet Program

- Reading an MSDS
- MSDS locations
- Finding a specific MSDS
  - Vendor's Representative or Web Site
  - List of Manufacturer Web Sites and Information http://www.csupomona.edu/~ehs/msds.html
  - MSDS Online at http://hq.msdsonline.com/csuedusl

Material Safety Data Sheets

- Chemical and manufacturer identity
- Hazardous ingredients
- Physical and chemical characteristics
- Fire, explosion, and reactivity

Material Safety Data Sheets (cont.)

- Health hazards
  - Routes of entry
  - Exposure levels (PEL or TLV)
  - Symptoms of exposure
  - First-Aid and emergency information

Material Safety Data Sheets (cont.)

- Personal Protective Equipment (PPE)
- Safe handling and storage
- Spills and leaks
- Compliance issues

Hazard Communication Summary

- Identify chemical hazards by reading labels and MSDSs
- Follow warnings and instructions, or ask your supervisor if in doubt
- Use the correct personal protective equipment
- Practice sensible, safe work habits
- Learn emergency procedures

Program Responsibilities

- EH&S Department
  - Develop, implement, and monitor the Program.
  - Provide general Hazard Communication Training.
  - Assist departments in complying with the program.
  - Maintain computerized inventory of hazardous substances and MSDSs on campus.

Program Responsibilities

- EH&S Department Continued
  - Maintain master files of MSDSs.
  - Conduct periodic inspection to document the level of compliance.
  - Maintain all environmental monitoring, employee exposure, and employee medical records.
  - Provide access to these records to authorized individuals.
  - Review hazardous material donations to ensure that MSDSs are received.

Program Responsibilities

- Department & Principle Investigator (PI)
  - Develop local procedures to ensure effective compliance with the Hazard Communication.
  - Ensure that all requirements of the Hazard Communication Program have been met before employees are exposed to hazardous.
  - When ordering any suspected hazardous substances request an MSDS if needed.
  - Develop and maintain an inventory of hazardous substances present in all work areas within the department and maintain a current file of MSDSs.

Program Responsibilities

- Department & Principle Investigator (PI) Continued
  - Conduct and certify that they have conducted an annual hazardous substance inventory and MSDS reconciliation.
  - Post in a conspicuous location for all employees the HAZARD COMMUNICATION NOTICE poster (http://www.csupomona.edu/~ehs/ftp/HazcomPoster.doc).
  - Develop methods to inform employees of the hazards of non-routine tasks and the hazards associated with unlabeled pipes in their work areas.
  - Develop methods as appropriate, to inform researchers, campus employees and outside employees who work in department areas and/or PI's Laboratory of the hazardous substances to which they may be exposed.

Program Responsibilities

- Procurement
  - Request Vendor to provide MSDS on the Purchase Order.
  - Provide EH&S a copy of all Purchase Orders that include any suspected hazardous materials.
  - Receiving will send copies of the MSDSs with the shipment to the department ordering the material.
  - Receiving will forward original MSDSs to EH&S.

Program Responsibilities

- Employee
  - Must use common sense and good judgment at all times.
  - Read and comply with all procedures, whether written or oral.
  - Read and comply with information and instructions in the MSDS.
  - Using appropriate Personal Protective Equipment
  - Employees who must read and comply with this program and complete written documentation that this has been done.

Quiz

1. Chemical manufacturer's must label containers and provide _____.
2. Employers should keep material safety data sheets in a locked file cabinet. True or False
3. Dizziness, nausea, rashes, and respiratory irritation are signs of _____ exposure.
4. List three routes by which a chemical can enter the body: _____, _____, _____.
5. Household chemicals are never as hazardous as chemicals used at work. True or False

Quiz (cont.)

6. On NFPA labels, a 4 in the red diamond indicates an extreme health hazard. True or False
7. Typical first-aid for chemicals splashed in the eyes includes _____.
8. You will only know the health hazards and PPE requirements if you _____.
9. A _____ can be used to protect against breathing hazardous vapors or gases.
10. If you see a chemical spill, you should clean it immediately. True or False

GHS Hazard Communication

Environmental Health & Safety

What is GHS?

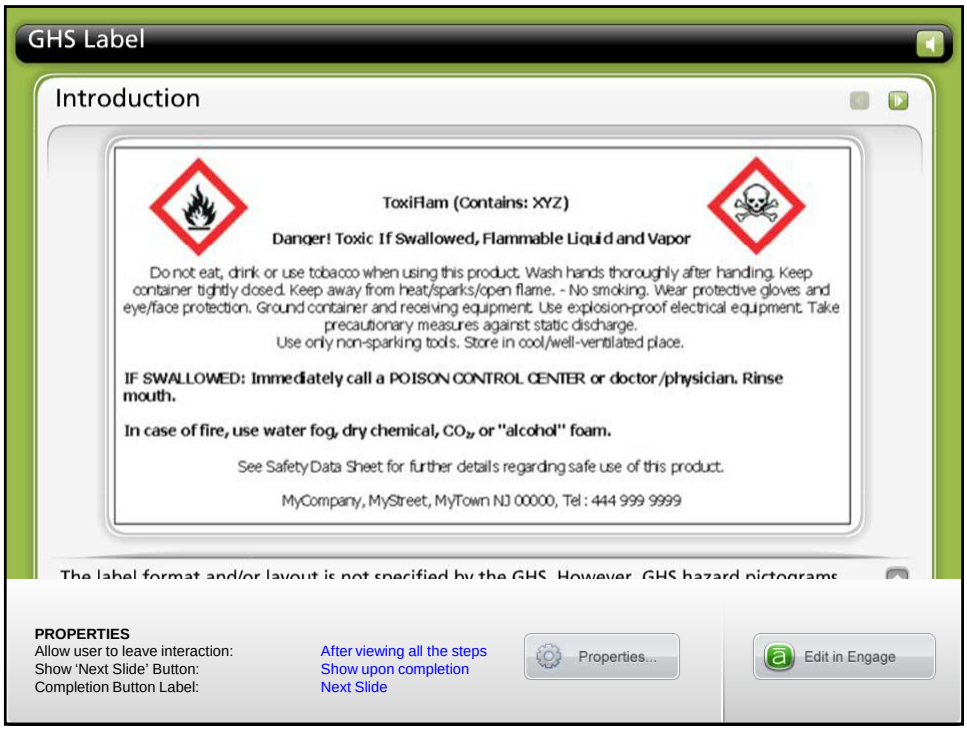
- GHS stands for the Globally Harmonized System of Classification and Labeling of Chemicals.
  - It is the new standard for hazard communication that gives workers the “right to understand,” rather than the original 1983 standard that gave workers the “right to know.”

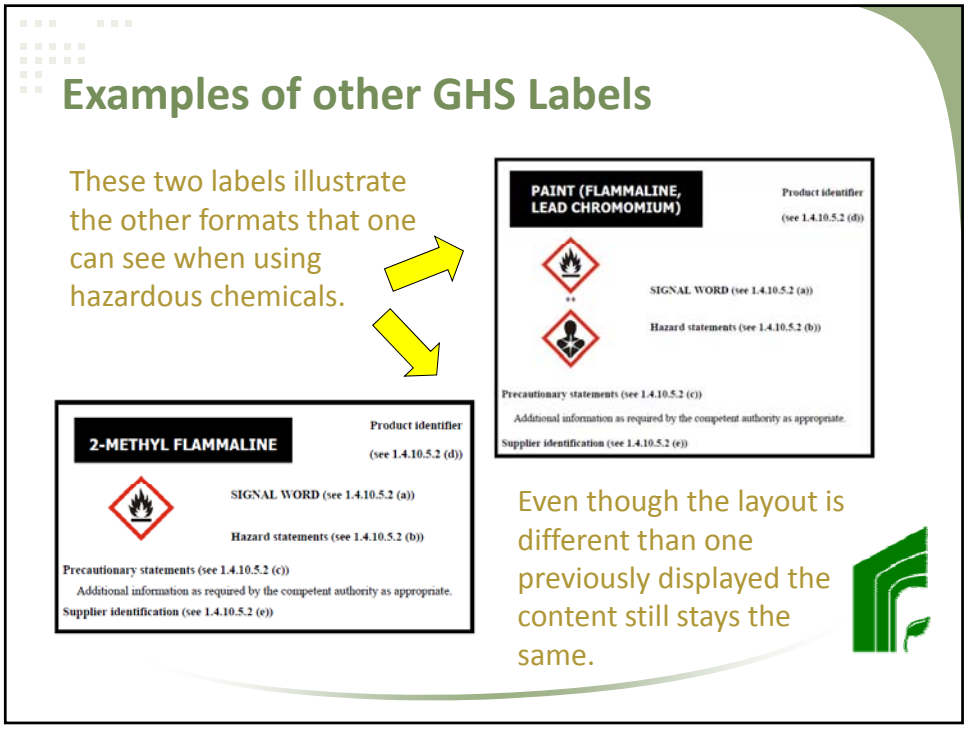
What are the benefits of GHS?

- GHS provides a harmonized system for classifying and identifying hazardous chemicals according to their physical, health and environmental hazards.
  - This newly defined system can be used and understood across international borders which improve the quality and consistency of hazardous information.
  - It also helps reduce worker confusion and improves their understanding of the information being provided.

Major Changes in GHS

- Labels will now include a signal word, pictogram, hazard statement, and precautionary statement for each hazard class and category.
- Safety Data Sheets require a new format with sixteen different sections to ensure consistency and are formally known as a Material Safety Data Sheet (MSDS).


GHS Label
Introduction
ToxiFlam (Contains: XYZ)
Danger! Toxic If Swallowed, Flammable Liquid and Vapor
Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. - No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge.
Use only non-sparking tools. Store in cool/well-ventilated place.
IF SWALLOWED: Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth.
In case of fire, use water fog, dry chemical, CO_2, or "alcohol" foam.
See Safety Data Sheet for further details regarding safe use of this product.
MyCompany, MyStreet, MyTown NJ 00000, Tel : 444 999 9999
The label format and/or layout is not specified by the GHS. However, GHS hazard pictograms
PROPERTIES
Allow user to leave interaction:
Show 'Next Slide' Button:
Completion Button Label:
After viewing all the steps
Show upon completion
Next Slide
Properties...
Edit in Engage


Examples of other GHS Labels
These two labels illustrate the other formats that one can see when using hazardous chemicals.
PAINT (FLAMMALINE, LEAD CHROMOMIUM)
Product identifier
(see 1.4.10.5.2 (d))
SIGNAL WORD (see 1.4.10.5.2 (a))
Hazard statements (see 1.4.10.5.2 (b))
Precautionary statements (see 1.4.10.5.2 (c))
Additional information as required by the competent authority as appropriate.
Supplier identification (see 1.4.10.5.2 (e))
2-METHYL FLAMMALINE
Product identifier
(see 1.4.10.5.2 (d))
SIGNAL WORD (see 1.4.10.5.2 (a))
Hazard statements (see 1.4.10.5.2 (b))
Precautionary statements (see 1.4.10.5.2 (c))
Additional information as required by the competent authority as appropriate.
Supplier identification (see 1.4.10.5.2 (e))
Even though the layout is different than one previously displayed the content still stays the same.

GHS Symbols & Hazard Classes

•Oxidizers

•Flammables
•Self Reactives
•Pyrophorics
•Self-Heating
•Emits Flammable Gas
•Organic Peroxides

•Explosives
•Self Reactives
•Organic Peroxides

GHS Symbols & Hazard Classes

•Acute Toxicity (severe)

•Corrosives

•Gases Under Pressure

GHS Symbols & Hazard Classes

- Carcinogen
- Respiratory Sensitizer
- Reproductive Toxicity
- Target Organ Toxicity
- Mutagenicity
- Aspiration Toxicity

- Environmental Toxicity

- Irritant
- Dermal Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritation

GHS Safety Data Sheet

- The GHS Safety Data Sheet (SDS) provides comprehensive information on hazards in the workplace and offers advice on safety precautions.
- It has a format of sixteen defined sections to ensure consistency and understanding.
- A Safety Data Sheet is also formally known as a Material Safety Data Sheet or MSDS.

Sections 1-2 of a GHS SDS

- Section 1: Identification of the substance or mixture and of the supplier.
  - Section 1 should consist of a product identifier (the same one used on the GHS label), supplier or manufacture details, recommendations and restrictions of use, and an emergency telephone number.
- Section 2: Hazards identification
  - Consists of the GHS classification of the substance and/or mixture, as well as any national or local information.
  - GHS label elements, such as symbols (can be provided with the written name of the symbol or pictogram), precautionary statements and other hazards which are not covered by the GHS can also be provided in this section.

Sections 3-4 of a GHS SDS

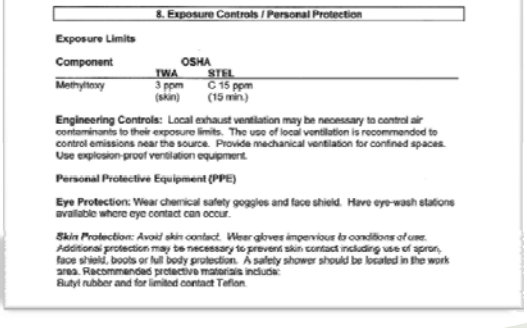
- Section 3: Composition/Information on ingredients
  - Section 3 contains the chemical identity, common name and synonyms of the given substance and/or mixture. The chemical identity and concentration of all hazardous ingredients will be provided for all hazardous mixtures.
  - CAS numbers, EC numbers, impurities and stabilizing additives should also be provided in this section as well.
- Section 4: First aid measures
  - Consists of descriptions for necessary measures that are subdivided according to the most important symptoms/effects from different routes of exposure, such as, inhalation, skin and eye contact and ingestion.

Sections 5-8 of a GHS SDS

- Section 5: Firefighting measures
  - Consists of suitable extinguishing media and special protective equipment and precautions for firefighters, as well as any specific hazards arising from the chemical.
- Section 6: Accidental release measures
  - Includes personal precautions, protective equipment and emergency procedures. Environmental precautions, methods and materials for containment and cleaning up are available in this section as well.
- Section 7: Handling and storage
  - Section 7 contains precautions for safe handling and conditions for safe storage, including any incompatibilities with other chemicals.

Section 8 of a GHS SDS

- Section 8: Exposure controls/personal protection
  - Includes control parameters, such as, occupational exposure limits or biological limits. Appropriate engineering controls and individual protection measures, such as protective equipment is provided in this section as well.



8. Exposure Controls / Personal Protection

Exposure Limits

Component	OSHA TWA	OSHA STEL
Methyltoxy	3 ppm (skin)	C 15 ppm (15 min.)

Engineering Controls: Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces. Use explosion-proof ventilation equipment.

Personal Protective Equipment (PPE)

Eye Protection: Wear chemical safety goggles and face shield. Have eye-wash stations available where eye contact can occur.

Skin Protection: *Avoid skin contact. Wear gloves impervious to conditions of use.* Additional protection may be necessary to prevent skin contact including use of apron, face shield, boots or full body protection. A safety shower should be located in the work area. Recommended protective materials include:
Butyl rubber and for limited contact Teflon.

Sections 9-12 of a GHS SDS

- Section 9: Physical and chemical properties
  - This section contains the physical and chemical properties, such as, appearance, odor, pH. level, melting point/freezing point and flash point
- Section 10: Stability and reactivity
  - Contains information on the chemical stability and possible hazardous reactions.
- Section 11: Toxicological information
  - Consist of a full and clear description of various health effects and the information one needs to know in order to identify the side effects.
- Section 12: Ecological information
  - Includes any adverse effects on the environment such as ecotoxicity and degradability.

Sections 13-16 of a GHS SDS

- Section 13: Disposal considerations
  - Include a description of waste remains and information on safe disposal.
- Section 14: Transport information
  - Contains information such as the UN number, shipping name and the transport hazard class or classes.
- Section 15: Regulatory information
  - Consists of any specific regulations for the identified product.
- Section 16: Other information
  - Contains any other information, such as preparation and revision of the SDS.

APPENDICES

1. MSDS-Material Safety Data Sheet (AKA SDS- Safety Data Sheet) for Epoxy Adhesive
2. MSDS (New SDS- Safety Data Sheet Format) for Bromothymol Blue
3. NFPA Hazard Classification
4. GHS Labeling

MATERIAL SAFETY DATA SHEET

DATE: 02/20/08
Rev. 6 Page 1 of 2

Section 1

PACER TECHNOLOGY
9420 Santa Anita Avenue
Rancho Cucamonga, CA 91730

For Chemical Emergency Only:
In the US & Canada: (800) 424-9300
Int'l & Wash DC (COLLECT): (703) 527-3887
Telephone for Information: (909) 987-0550

PRODUCT IDENTIFICATION:
Quick Setting Epoxy Adhesive - Part A: Resin

HAZARD RATING
1
2 x 0

Section 2 - HAZARDOUS INGREDIENTS INFORMATION:

Hazardous Components (Common Names, CAS Number)		OSHA PEL	ACGIH TLV	OTHER LIMITS	% OPTION
Bisphenol A/Epichlorohydrin based epoxy resin*	(25068-38-6)	NE	NE	NE	90-100%

* This product is an epoxy resin produced by the condensation reaction of Epichlorohydrin and Bisphenol-A. These raw materials are consumed in the process. Residual levels of Epichlorohydrin are controlled to 1ppm, max., in the product.

Section 3 - PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	>500F	Specific Gravity (H2O=1):	1.16
Vapor Density (Air=1):	NA	Melting Point:	NE
Vapor Pressure (mm Hg):	0.03 @ 77F	Evaporation Rate (Butyl Acetate = 1):	NA

VOC: This product is VOC compliant for sale in California.
Solubility in Water: Negligible.
Appearance & Odor: Light yellow colored viscous liquid.

Section 4 - FIRE AND EXPLOSION HAZARD DATA:

Flash Point (Method Used): 480F (PMCC) Flammable Limits: LEL: NE UEL: NE
Extinguishing Media: Water fog, foam, dry chemical or carbon dioxide.
Special Fire Fighting Procedures: Material will not burn unless preheated. Do not enter confined fire space without full bunker gear (helmet/face shield, bunker coat, gloves & rubber boats). Use positive pressure NIOSH-approved self-contained breathing apparatus. Cool fire exposed containers with water.
Unusual Fire and Explosion Hazards: Heating of resin above 300F in presence of air may cause slow oxidative decomposition. Above 500F polymerization may occur. Some curing agents, e.g. aliphatic amines can produce exothermic reactions which in large masses can cause runaway polymerization & charring of reactants. Fumes & vapors from these thermal & chemical decompositions vary widely in composition/toxicity. DO NOT BREATHE FUMES. Unidentified fumes & vapors may be toxic.

Section 5 - REACTIVITY DATA:

Stability: Unstable __ Stable XX Conditions to Avoid: Keep away from open flames & high temperatures.
Incompatibility (Materials to Avoid): Strong oxidizing agents, strong Lewis or mineral acids, strong mineral & organic bases, esp. primary & secondary aliphatic amines.
Hazardous Decomposition Products: Carbon monoxide, aldehydes, acids & other organic substances may be formed during combustion (>500F) temperature degradation.
Hazardous Polymerization: May Occur __ May Not Occur XX (Avoid heating >300F).

Section 6 - HEALTH HAZARD DATA:

Route(s) of Entry: Inhalation: YES Skin: YES Ingestion: YES

Health Hazards (Acute and Chronic):

Product moderately irritating to eyes, skin; contact with product at elevated temperatures can result in thermal burns; may cause skin sensitization; low order of acute oral toxicity noted; unlikely to be inhalation hazard due to low volatility.

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated: No

Signs and Symptoms of Exposure & First Aid Procedures:

Eye contact - irritation: flush eyes with copious amounts of water for 15 min. while holding eyes open. Get medical attention immediately.

Skin contact - irritation/rash: remove contaminated clothing and wash with soap/water. Get medical attention if symptoms persist, (contaminated leather articles, i.e. shoes, should be disposed of as contaminated waste). NOTE: hot product burns require immediate medical attention.

Inhalation - Remove to fresh air and provide oxygen if breathing is difficult. Get medical attention.

Ingestion - Do not induce vomiting. In general, no treatment unless large amount is ingested; however, get medical advice.

NOTE TO PHYSICIAN: Emesis induction is normally not necessary in high viscosity, low volatility products, e.g. neat epoxy resins.

Medical Conditions Generally Aggravated by Exposure: Pre-existing eye/skin disorders or lung allergies.

Section 7 - PRECAUTIONS FOR SAFE HANDLING AND USE:

Steps to Be Taken in Case Material is Released or Spilled: Product may burn although not readily ignitable. Use cautious judgment when cleaning up large spills. Respirator and protective equipment as appropriate. Dike and contain material. Soak up residue with absorbent (clay, sand) materials and dispose of properly.

Waste Disposal Method: If product becomes waste, not considered hazardous waste by RCRA criteria (40 CFR 261). Dispose of according to federal, state and local regulations.

Precautions to Be Taken in Handling and Storing: Store in cool, dry place away from open flames and high temperatures.

Other Precautions: Empty containers may contain product residues and should be disposed of properly.

Section 8 - CONTROL MEASURES:

Respiratory Protection (Specify Type): Organic vapor respirator in areas with poor ventilation.

Ventilation: Local Exhaust: Good Mechanical (General): As needed.

Protective Clothing or Equipment: Safety glasses/goggles with side shields, chemically resistant gloves and other protective equipment to avoid direct contact.

Work/Hygienic Practices: Avoid contact with eyes or skin. Use in well ventilated area. Wash hands with soap and water after product use. Launder contaminated clothing before reuse and disposed of leather articles as contaminated waste.

Section 9 - OTHER: Shipping - Non-Flammable – for Department of Transportation, DOT, purposes.

TSCA - All ingredients in this product are listed and comply with TSCA Requirements.

California Proposition 65 – No known ingredients in this product.

NA = Not applicable

NE = Not established

Material Safety Data Sheet

Version 4.1
Revision Date 05/14/2012
Print Date 06/06/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Bromothymol Blue
Product Number	:	114413
Brand	:	Sigma-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
No known OSHA hazards

Not a dangerous substance according to GHS.

HMIS Classification

Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms	:	3′,3″-Dibromothymolsulfonphthalein
Formula	:	$C_{27}H_{28}Br_2O_5S$
Molecular Weight	:	624.38 g/mol

No ingredients are hazardous according to OSHA criteria.

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Hydrogen bromide gas

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber

Minimum layer thickness: 0.11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	violet

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 200 - 202 °C (392 - 396 °F) - lit.
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Hydrogen bromide gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Bromothymol Blue	76-59-5	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Bromothymol Blue	76-59-5	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

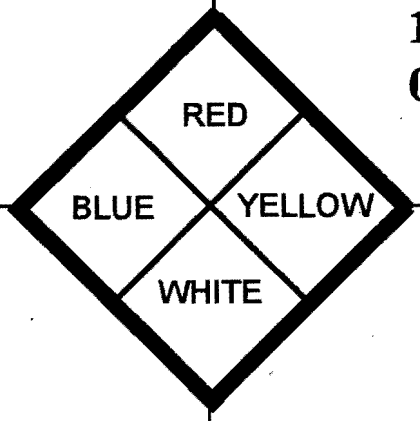
NFPA Hazard Classifications

HEALTH HAZARD
(BLUE BOX)

4 Deadly
3 Extreme Danger
2 Hazardous
1 Slightly Hazardous
0 Normal Material

FIRE HAZARD
(RED BOX)

Flash Points
4 Below 73' F
3 Below 100' F
2 Above 100' F
Not Exceeding 200' F
1 Above 200' F
0 Will Not Burn



SPECIFIC HAZARD
(WHITE BOX)

Oxidizer	**OX**
Acid	**ACID**
Alkali	**ALK**
Corrosive	**COR**
Use NO WATER	**W**
Radioactive	

REACTIVITY
(YELLOW BOX)

4 May Detonate
3 Shock and Heat May Detonate
2 Violent Chemical Change
1 Unstable If Heated
0 Stable

HEALTH

4 Can cause death or major injury despite medical treatment.
3 Can cause serious injury despite medical treatment.
2 Can cause injury. Requires prompt treatment.
1 Can cause irritation if not treated.
0 No hazard.

FLAMMABILITY

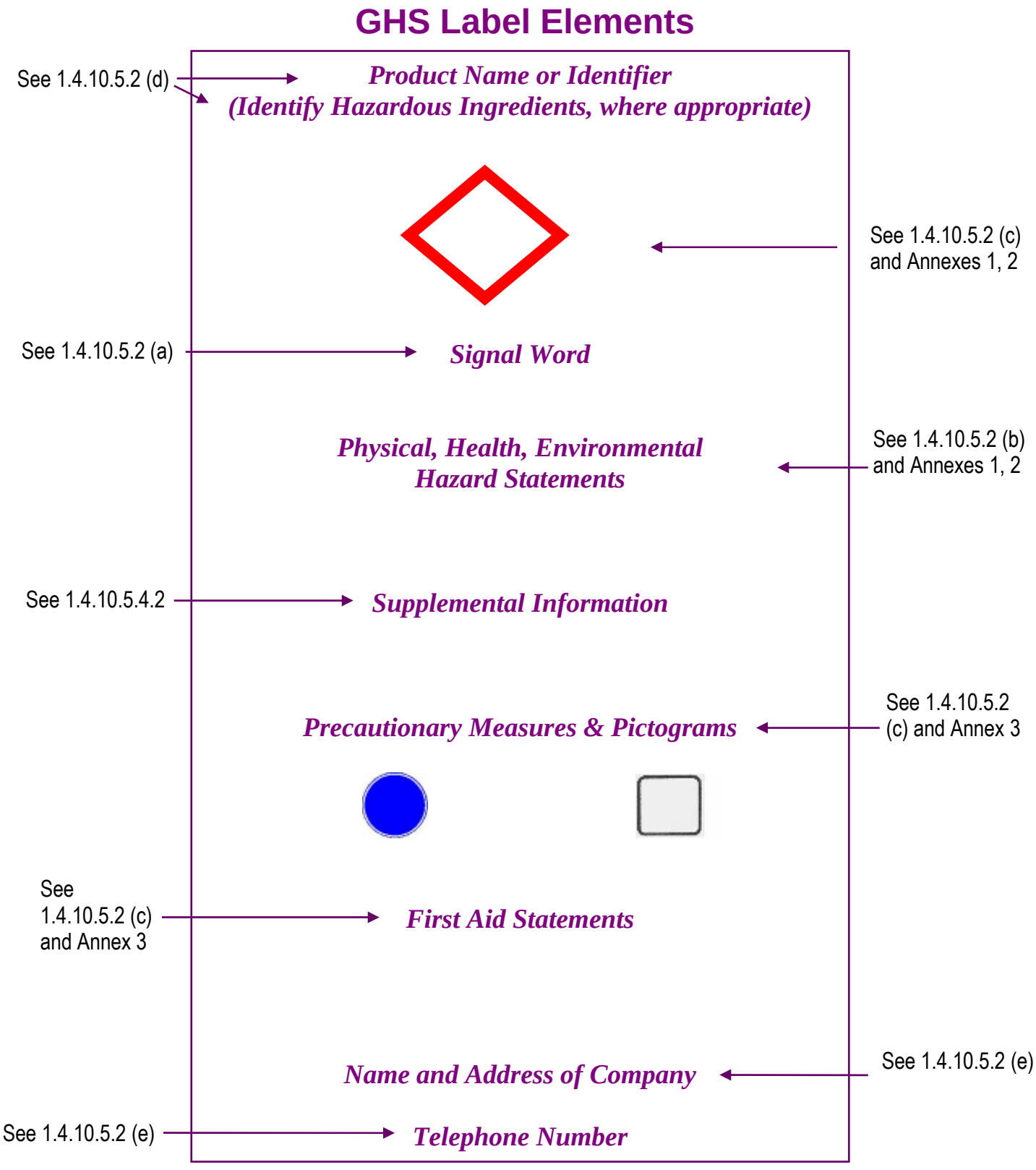
4 Very flammable gases or very volatile flammable liquids
3 Can be ignited at all normal temperatures.
2 Ignites if moderately heated.
1 Ignites after considerable preheating.
0 Will not burn.

REACTIVITY

4 Readily detonates or explodes.
3 Can detonate or explode but requires strong initiating force or heating under confinement.
2 Normally unstable but will not detonate.
1 Normally stable. Unstable at high temperature and pres sure. Reacts with water.
0 Normally stable. Not reactive with water.

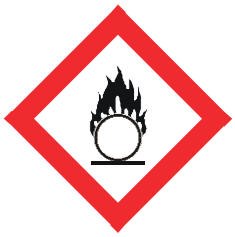
References: NFPA 704. National Fire Protection Association, Boston, MA

Figure 4.8



The Section numbers refer to the sections in the GHS Document or "Purple Book".

Figure 4.9

GHS Pictograms and Hazard Classes		
		
• **Oxidizers**	• **Flammables** • **Self Reactives** • **Pyrophorics** • **Self-Heating** • **Emits Flammable Gas** • **Organic Peroxides**	• **Explosives** • **Self Reactives** • **Organic Peroxides**
		
• **Acute toxicity (severe)**	• **Corrosives**	• **Gases Under Pressure**
		
• **Carcinogen** • **Respiratory Sensitizer** • **Reproductive Toxicity** • **Target Organ Toxicity** • **Mutagenicity** • **Aspiration Toxicity**	• **Environmental Toxicity**	• **Irritant** • **Dermal Sensitizer** • **Acute toxicity (harmful)** • **Narcotic Effects** • **Respiratory Tract Irritation**

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

Hazardous Materials Management Plan
Summary

(Revised March 23, 2009)

The University's Environmental Health & Safety (EH&S) Department has developed this plan summary to identify methods of protecting individuals and the environment from the use and storage of hazardous substances (chemical, infectious or radioactive materials) in teaching, research and development laboratories at the University.

Identification of Chemicals and Hazards

- All Instructors and Instructors and/or Principle Investigators (PIs) shall comply with the University Hazard Communication Program (http://www.csupomona.edu/~ehs/ftp/HazardCommunicationManual/HazcomManual.doc), which is incorporated by reference. Specifically, the Instructor and/or PI shall
  - Ensure that all requirements of the Hazard Communication Program have been met before individuals are exposed to hazardous substances under normal conditions of use or in a foreseeable emergency.
  - When ordering any suspected hazardous substances through Procurement, Foundation Financial Services or other sources, Instructors and/or Principle Investigators will make a request to the vendor for an MSDS (Material Safety Data Sheet) if one is not currently present in the laboratory.
  - Develop and maintain an inventory of hazardous substances present in the laboratory and maintain a current file of MSDSs for each hazardous substance. Provide copies of the MSDSs and the inventory to the EH&S Department. Instructors and/or Principle Investigators will report any increases of hazardous substances, that are reportable under the Hazardous Materials Business Plan, to Environmental Health & Safety (EH&S) on a monthly basis. Instructors and/or Principle Investigators will conduct an annual hazardous substance inventory review and verify that they have an MSDS for each hazardous substance. Instructors and/or Principle Investigators will be required to obtain copies of any MSDS that they do not have on file from EH&S or the vendor.
  - Post in a conspicuous location for all workers the HAZARD COMMUNICATION NOTICE, available on the Environmental Health & Safety Web Site at http://www.csupomona.edu/~ehs/ftp/HazcomPoster.doc.
  - Develop methods to inform students and workers of the hazards of non-routine tasks.
  - Develop methods, as appropriate, to inform outside contractors' employees and other individuals who may occasionally work in your laboratory of the hazardous substances to which they may be exposed. The posting of a completed Laboratory Warning Sign, available on the Environmental Health & Safety Web Site at http://www.csupomona.edu/~ehs/ftp/LabSign.doc, on or near the entry door to the laboratory will be considered as substantial compliance with this section, provided the principle investigator responds to any questions that may be asked and the sign includes appropriate information. The appropriate information is the completed NFPA diamond, information about the general hazards in the laboratory (Radiation, Infectious Agents, and/or Chemicals), personnel protective equipment required, Principle Investigator's name and campus extension.
  - Ensure that all containers of hazardous substances in the workplace are labeled, tagged or marked with the Identity of the hazardous substance(s), appropriate hazard warnings, and name of the manufacturer, address and phone number. Labels on all containers of hazardous substances shall be maintained.

Methods of isolation, separation, containment, engineering controls and administrative controls

- The Instructor and/or PI will provide sufficient storage space to safely and securely store the hazardous substances.
- Only quantities of hazardous substances that can be used within a reasonable and legal period of time will be stored. The quantities of hazardous substances stored or used in a room should not exceed the limits contained in the Uniform Building and Fire Codes (see Table I).
- Potentially unstable chemicals having a specific shelf life will be removed for proper disposal prior to the expiration of the shelf life.
- Hazardous substance containers will be maintained in good condition (e.g., no rust or structural defects). If a container begins to leak, the contents will be transferred to another compatible container in good condition.
- Hazardous substance containers shall be closed except when adding or dispensing material. Additionally, containers shall be kept in approved storage cabinets with spill containment, unless being utilized.
- Incompatible hazardous substances shall be separated in storage to prevent mixing, in the event of an earthquake, leak, spill or other similar event.
- Containers of flammable and combustible substances will be stored in Fire Marshal approved flammable storage cabinets, except when in use.
- The use of volatile hazardous substances that present an exposure risk to individuals will be utilized in a chemical fume hood, biosafety cabinet or other appropriate control device. Chemical fume hoods and Biosafety cabinets are required to be tested annually.
- The Instructor and/or PI will comply with the more detailed procedures for the isolation, separation and containment of hazardous substances found in the following University Hazardous Substance Management Plans, which are incorporated in this plan by reference:
  - Bloodborne Pathogen Program Manual (http://www.csupomona.edu/~ehs/ftp/blood.doc)
  - CDC's Biosafety in Microbiological and Biomedical Laboratories 5th Edition (http://www.cdc.gov/od/ohs/biosfty/bmbl5/bmbl5toc.htm).
  - Chemical Safety Plan for Laboratories (http://www.csupomona.edu/~ehs/ftp/CSPL.doc)
  - Hazardous Waste Manual (http://www.csupomona.edu/~ehs/ftp/HazWasteManual.doc)
  - Medical Waste Disposal Manual (http://www.csupomona.edu/~ehs/ftp/medwst.doc)
  - Radiation Safety Manual (http://www.csupomona.edu/~ehs/ftp/RadiationManual.doc)
- The Instructor and/or PI will conduct the periodic inspections in the above listed Hazardous Substance Management Plans, as applicable. Copies or summaries of these inspections will be submitted to the EH&S Department.

Hazardous Waste Management

- The Instructor and/or PI will comply with the procedures for the isolation, separation and containment of hazardous waste found in the following University Hazardous Substance Management Plans, as applicable:

  - Hazardous Waste Manual (http://www.csupomona.edu/~ehs/ftp/HazWasteManual.doc)
  - Medical Waste Disposal Manual (http://www.csupomona.edu/~ehs/ftp/medwst.doc)
  - Radiation Safety Manual (http://www.csupomona.edu/~ehs/ftp/RadiationManual.doc)

Emergency Response Plans

- The Instructor and/or PI will develop standard operational procedures to maintain control of hazardous substances, including exposure, in compliance with established campus programs for the management of chemical, infectious or radioactive materials.
- The Instructor and/or PI will maintain spill response kits to deal with hazardous substance spills that may occur as a result of their work.
- All Laboratory personnel should be trained on and follow the emergency procedures, including the use of the available hazardous substance spill kits.
- In the event that a hazardous substance spill occurs that cannot be safely contained and cleaned up by laboratory personnel, the campus Emergency Management Plan will be activated by dialing Campus Police at 911 and contacting Environmental Health & Safety at Extension 4697.
- A video overview of the University's Emergency Management Plan can be found on the web at http://video.csupomona.edu/EHS/EmergencyManagementPlan-1999-035.asx.
- The campus emergency procedures for emergency contacts, medical assistance, gas leaks, explosions, evacuation, earthquake, fire response, hazardous materials spills, bomb threats and other emergencies are found in the Emergency Procedures Pamphlet (http://www.csupomona.edu/~ehs/ftp/Emerg_Proc_%20Man1.pdf). This pamphlet will be posted in all laboratories.
- The Instructor and/or PI will comply with the University's First-Aid Program (http://www.csupomona.edu/~ehs/Firstaid.pdf), which is incorporated in this plan by reference.
- Portable Fire Extinguishers shall be inspected monthly to make sure they are in the designated location, visible, accessible, instruction/nameplate is facing forward, safety seal/pin is intact and fully charged (Section 574.2 Title 19 CCR).
- Plumbed emergency eyewash/shower equipment shall be tested/activated at least monthly to flush the line and to verify proper operation. Inspection tags shall be maintained to document this testing (Section 5162 Title 8 CCR).

Training

- All laboratory personnel will receive initial training on:
  - Potential occupational hazards in general in the work area and associated with their job assignment.
  - Mandatory Safe Work Practices, which indicate the safe work conditions, safe work practices and personal protective equipment required for their work. Recommended safe work practices for the University are located on the Internet at http://www.csupomona.edu/~ehs/ftp/safeworkpractices.doc.
  - Hazards of any chemicals to which they may be exposed and their right to information contained on material safety data sheets for those chemicals, and how to understand this information.
  - Their right to ask any questions, or provide any information to the employer on safety either directly or anonymously without any fear of reprisal (See Safety Concern Reporting below).
  - Disciplinary procedures the employer will use to enforce compliance with Mandatory Safe Work Practices.

- All laboratory personnel should be trained on and follow the emergency procedures, including the use of the available hazardous substance spill kits and portable fire extinguishers.
- Instructors and/or PIs shall provide workers with information and training on hazardous substances in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area.
- Instructors and/or PIs will ensure that workers receive training as required in the University Hazardous Substances Management Plans, as applicable. These plans are the Injury and Illness Prevention, Bloodborne Pathogens, Hazard Communication, Infectious Materials, Medical Waste, Chemical Safety in Laboratories, Emergency Procedures, Hazardous Waste, Radiation Safety and Fire Safety.
- Information on training, including a training schedule, is available on the EH&S Web Site at http://www.csupomona.edu/~ehs/training.html.

Safety Concern Reporting

The University has established procedures for reporting safety-related issues as part of the Injury and Illness Prevention Program. All safety concerns should be reported immediately to your supervisor/principal investigator, as well as the department responsible for abatement or control of the hazard.

Serious Injuries or Crimes
Dial 911 Police Services

Hazardous Substance Releases
Dial 911 Police Services
and
Dial 4697 Environmental Health and Safety

Routine Repairs/Maintenance
Dial 3030 Facilities Administration (M-F, 8 am—5 pm)
or
Dial 3070 Police Services (after hours)

Pedestrian/Vehicle Safety
Dial 3070 Police Services

Other Safety Information
Dial 4697 Environmental Health and Safety

EH&S Confidential Voice Mailbox
Dial 4313

In addition to the telephone numbers listed above, a confidential voice mailbox (**extension 4313**), web-based/on-line reporting (http://www.csupomona.edu/~ehs/safetyconcern.html) and an Employee Safety Information Form (F-2554-00) are available to assist staff in reporting potential safety hazards. Every effort has been made to maintain the confidentiality of those using the voicemail extension; David Patterson, Director of Environmental Health and Safety, is the only individual with access to the voicemail messages. Please do not use the voicemail number or the information form for reporting hazards that require immediate assistance. Emergency calls should be directed to 911, urgent calls should be directed to University Police Services (3070) or Facilities Management (3030).

Supervisors and departments receiving a report of an imminent safety hazard should respond immediately to prevent serious injuries. Most safety hazards can be avoided by the abatement or removal of the hazard, posting warning signs, closing the area to prevent entry, or through the proper use of person protective equipment.

Injury & Illness Prevention Plan

The Instructor and/or PI shall comply with the following University Programs:

- Department Safety Coordinator Program (http://www.csupomona.edu/~ehs/ftp/deptsafetycoordinator.doc) for office or non-laboratory areas.
- Injury & Illness Prevention Plan (http://www.csupomona.edu/~ehs/ftp/iipp.doc)

Table I: Building and Fire Code Limits for Hazardous Substances

NFPA Classification	Form	Units	Building/ Fire Code Limit	Building/ Fire Code Limit w/Sprinklers	Building/ Fire Code Limit w/Cabinets	Building/ Fire Code Limit w/Sprinklers and Cabinets
Carcinogens	Gas	Cubic Feet	810			810
Carcinogens	Liquid	Gallons	500			500
Carcinogens	Solid	Pounds	5,000			5,000
Combustible Liquids II	Liquid	Gallons	120	240		240
Combustible Liquids IIIA	Liquid	Gallons	330	660		660
Combustible Liquids IIIB	Liquid	Gallons	13,200	26,400		26,400
Corrosives	Gas	Cubic Feet	810		1,620	1,620
Corrosives	Liquid	Gallons	500			500
Corrosives	Solid	Pounds	5,000			5,000
Explosives	Liquid	Pounds	0	1	0	2
Explosives	Solid	Pounds	0	1	0	2
Flammable Gas	Gas	Cubic Feet	750	1,500	1,500	3,000
Flammable Gas	Liquefied	Gallons	15	30	30	60
Flammable Liquids IA	Liquid	Gallons	30	60		60
Flammable Liquids IB	Liquid	Gallons	60	120		120
Flammable Liquids IC	Liquid	Gallons	90	180		180
Flammable Solid	Solid	Pounds	125	250		250
Highly Toxics	Gas	Cubic Feet	0		20	20
Highly Toxics	Liquid	Pounds	10			10
Highly Toxics	Solid	Pounds	10			10

Hazardous Materials Management Plan
Summary
Page 6 of 6

Table I: Building and Fire Code Limits for Hazardous Substances Continued

NFPA Classification	Form	Units	Building/ Fire Code Limit	Building/ Fire Code Limit w/Sprinklers	Building/ Fire Code Limit w/Cabinets	Building/ Fire Code Limit w/Sprinklers and Cabinets
Organic Peroxide Detonatable	Liquid	Pounds	0	1	0	2
Organic Peroxide Detonatable	Solid	Pounds	0	1	0	2
Organic Peroxide Class I	Liquid	Pounds	5	10	10	20
Organic Peroxide Class I	Solid	Pounds	5	10	10	20
Organic Peroxide Class II	Liquid	Pounds	50	100	100	200
Organic Peroxide Class II	Solid	Pounds	50	100	100	200
Organic Peroxide Class III	Liquid	Pounds	125	250	250	500
Organic Peroxide Class III	Solid	Pounds	125	250	250	500
Organic Peroxide Class IV	Liquid	Pounds	500	1,000	1,000	2,000
Organic Peroxide Class IV	Solid	Pounds	500	1,000	1,000	2,000
Organic Peroxide Class V	Liquid	Pounds	No Limit	No Limit	No Limit	No Limit
Organic Peroxide Class V	Solid	Pounds	No Limit	No Limit	No Limit	No Limit
Other Health Hazards	Gas	Cubic Feet	810		1,620	1,620
Other Health Hazards	Liquid	Gallons	No Limit	No Limit	No Limit	No Limit
Other Health Hazards	Solid	Pounds	No Limit	No Limit	No Limit	No Limit
Oxidizer 1	Liquid	Pounds	4,000	8,000	8,000	16,000
Oxidizer 1	Solid	Pounds	4,000	8,000	8,000	16,000
Oxidizer 2	Liquid	Pounds	250	500	500	1,000
Oxidizer 2	Solid	Pounds	250	500	500	1,000
Oxidizer 3	Liquid	Pounds	10	20	20	40
Oxidizer 3	Solid	Pounds	10	20	20	40
Oxidizer 4	Liquid	Pounds	0	1	0	2
Oxidizer 4	Solid	Pounds	0	1	0	2
Oxidizer Gas	Gas	Cubic Feet	1,500	3,000	3,000	6,000
Oxidizer Gas	Liquefied	Gallons	15	30	30	60
Pyrophorics	Liquid	Pounds	0	4	0	8
Pyrophorics	Solid	Pounds	0	4	0	8
Pyrophorics	Gas	Cubic Feet	50			50
Toxics	Gas	Cubic Feet	810		1,620	1,620
Toxics	Liquid	Pounds	500			500
Toxics	Solid	Pounds	500			500
Water Reactive 1	Liquid	Gallons	No Limit	No Limit	No Limit	No Limit
Water Reactive 1	Solid	Pounds	No Limit	No Limit	No Limit	No Limit
Water Reactive 2	Liquid	Pounds	50	100	100	200
Water Reactive 2	Solid	Pounds	50	100	100	200
Water Reactive 3	Liquid	Pounds	5	10	10	20
Water Reactive 3	Solid	Pounds	5	10	10	20

Standard Operating Procedures and Safe Work Practices for Laboratory Safety

Be Safe!

All employees are to ensure that safe and healthful conditions and practices are provided and followed within the area under their control.

- ✓ Explosives
- ✓ Compressed Gases
- ✓ Flammable Liquids
- ✓ Flammable Solids
- ✓ Oxidizers
- ✓ Poisons
- ✓ Corrosives
- ✓ Pyrophorics
- ✓ Cryogenics
- ✓ Teratogens
- ✓ Mutagens

Questions and Requests for Additional Information Should be Directed to:

Environmental Health & Safety
3801 W. Temple Avenue, Pomona, CA 91768
Phone: (909) 869-4697
Fax: (909) 869-4698
Web: http://www.csupomona.edu/ehs

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STANDARD OPERATING PROCEDURE (SOP)

[**Explosives**]

Revision Date: *Click here to enter date*

SOP Number: *####* **This SOP Supersedes**: *Click here to enter SOP*

Prepared by: Click here to enter Prepared by

Name: *Click here to enter name*
Title: *Click here to enter title*
Dept: *Click here to enter department*
Company: *Click here to enter company*

Table of Contents

1.0 Definition and Characteristics

Explosives are any substances with a rapid release of gas or heat in response to a sudden shock, heat or pressure. Can also be chemicals which react with itself to produce explosions.

2.0 Potential Hazards

Fire	Fire can be present after the explosion
Explosion	The substance is easily ignited by any kind of ignition source
Health	The explosion can cause flying particles that are capable of causing damage

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3.0 Storage and Handling

- The stored area of the substance must be free from all potential ignition sources.
- Store in tightly sealed containers to prevent peroxide crystal
- The equipment must be grounded and free from radio transmitters within 100 meters of electric detonators
- Should not be ground with materials that create friction or have abrasive properties (e.g. stone mortar and pestle)
- Do not work with magnetic stirrers
- Refer to MSDS for specific disposal time for specific chemicals
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

4.1.1 Wear appropriate goggles to prevent eye contact
4.1.2 Lab coat (non synthetic fabric) or appropriate protective gear to prevent skin contact
4.1.3 Shields (depending on explosive type)
4.1.4 Wear protective gloves to prevent skin contact
4.1.5 Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

5.1.1 Dimethyl sulfoxide
5.1.2 Ether
5.1.3 Hydrogen peroxide
5.1.4 Percholoric acid
5.1.5 Picric acid

6.0 First Aid

Eye	Wash immediately with large amounts of water and seek professional attention immediately
Skin	Immediately wash affected area with soap and water and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

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STANDARD OPERATING PROCEDURE (SOP)

[**Compressed Gases - Flammable**]

Revision Date: *Click here to enter date*

SOP Number: *####* **This SOP Supersedes**: *Click here to enter SOP*

Prepared by: Click here to enter Prepared by

Name: *Click here to enter name*
Title: *Click here to enter title*
Dept: *Click here to enter department*
Company: *Click here to enter company*

Table of Contents

1.0 Definition and Characteristics

Gas in a container with either an absolute pressure exceeding 40 psi at 70°F (21.1 °C) or with an absolute pressure exceeding 104 psi at 130 °F (54.4 °C). Can also be in a liquid vapor form with a pressure exceeding 40 psi at 100°F (37.8°C). Flammable gasses will ignite in the presence of an ignition source.

2.0 Potential Hazards

Fire	Most are extremely flammable
Explosion	Can ignite if in contact with any ignition source
Health	Substance can be toxic or can reduce oxygen

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3.0 Storage and Handling

- Kept away from any heat sources such as sunlight
- Storage of gas cylinders must be securely held (double strapped) in sturdy racks or stations to prevent falling or knocking over
- Separated from oxidizing gases
- Cylinder caps need to be tightly closed
- Open cylinders in fume hood or gas cabinet and avoid ignition sources
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear goggles (if required) to prevent eye contact
- Recommended material: non- ventilated or gas proof
- Wear appropriate clothing/gear to prevent skin contact
- Wear appropriate gloves
- Recommended material: butyl
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Acetylene
- Ammonia
- Ethane
- Hydrogen
- Methane
- Propane
- Carbon Disulfide

6.0 First Aid

Eye	Wash immediately with large amounts of water and seek professional attention immediately
Skin	Immediately flush affected area with water and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required

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STANDARD OPERATING PROCEDURE (SOP)

[**Compressed Gases - Inert**]

Revision Date: *Click here to enter date*

SOP Number: *####* **This SOP Supersedes**: *Click here to enter SOP*

Prepared by: Click here to enter Prepared by

Name: *Click here to enter name*
Title: *Click here to enter title*
Dept: *Click here to enter department*
Company: *Click here to enter company*

Table of Contents

1.0 Definition and Characteristics

Gas in a container with either an absolute pressure exceeding 40 psi at 70°F (21.1 °C) or with an absolute pressure exceeding 104 psi at 130 °F (54.4 °C). Can also be in a liquid vapor form with a pressure exceeding 40 psi at 100°F (37.8°C). This type of gas is nonreactive under normal conditions but may still cause harm if inhaled.

2.0 Potential Hazards

Health	Inhalation can cause reduction of oxygen and dizziness

3.0 Storage and Handling

- Kept away from any heat sources such as sunlight
- Storage of gas cylinders must be securely held (double strapped) in sturdy racks or stations to prevent falling or knocking over
- Cylinder caps need to be tightly closed
- Place in well ventilated cylinder storage area
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear goggles (if required) to prevent eye contact
- Recommended material: non- ventilated or gas proof
- Wear appropriate clothing/gear to prevent skin contact
- Wear appropriate gloves
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Argon
- Carbon dioxide
- Helium
- Nitrogen

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15min and seek professional attention if frostbite occurs
Skin	Quickly wash affected area with soap and water and remove any contaminated clothing. If frostbite occurs, Do NOT wash with water and seek medical attention
Inhaled	Acquire fresh air immediately and perform artificial respiration if required

CAL POLY POMONA

STANDARD OPERAxdTING PROCEDURE (SOP)

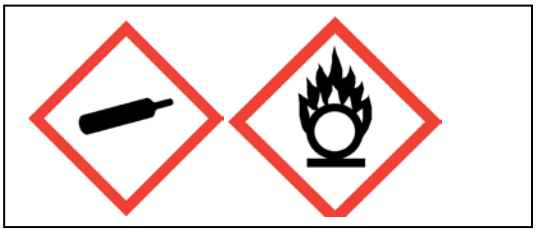
[**Compressed Gases - Oxidizing**]

Revision Date: *Click here to enter date*

SOP Number: *####* **This SOP Supersedes**: *Click here to enter SOP*

Prepared by: **Click here to enter Prepared by**

Name: *Click here to enter name*
Title: *Click here to enter title*
Dept: *Click here to enter department*
Company: *Click here to enter company*



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1.0 Definition and Characteristics

Gas in a container with either an absolute pressure exceeding 40 psi at 70°F (21.1 °C) or with an absolute pressure exceeding 104 psi at 130 °F (54.4 °C). Can also be in a liquid vapor form with a

pressure exceeding 40 psi at 100°F (37.8°C). Oxidizing gases promote the burning of combustible materials and can create larger fires.

2.0 Potential Hazards

Fire	Most are extremely flammable
Explosion	Can ignite if in contact with ignition source
Health	Inhalation, toxic or reduction oxygen

3.0 Storage and Handling

- Kept away from any heat sources such as sunlight
- Storage of gas cylinders must be securely held (double strapped) in sturdy racks or stations to prevent falling or knocking over
- Separated from flammable gases
- Cylinder caps need to be tightly closed
- Place in well ventilated cylinder storage area
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear goggles (if required) to prevent eye contact
- Recommended material: non- ventilated or gas proof
- Wear appropriate clothing/gear to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Chlorine
- Fluorine
- Nitrogen dioxide
- Oxygen

6.0 First Aid

Eye	Wash immediately with large amounts of water and seek professional attention immediately
Skin	Immediately wash affected area with soap and water and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention.

CAL POLY POMONA

STANDARD OPERATING PROCEDURE (SOP)

[**Compressed Gases - Toxic**]

Revision Date: *Click here to enter date*

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1.0 Definition and Characteristics

Gas in a container with either an absolute pressure exceeding 40 psi at 70°F (21.1 °C) or with an absolute pressure exceeding 104 psi at 130 °F (54.4 °C). Can also be in a liquid vapor form with a pressure exceeding 40 psi at 100°F (37.8°C). Toxic gases can cause many health hazards due to their poisonous components.

2.0 Potential Hazards

Fire	Some can be potentially flammable
Explosion	Can ignite if in contact with ignition source
Health	Can be fatal if inhaled or absorbed through the skin. Irritation may also result from the gas odors.

3.0 Storage and Handling

- Kept away from any heat sources such as sunlight
- Storage of gas cylinders must be securely held (double strapped) in sturdy racks or stations to prevent falling or knocking over
- Cylinder caps need to be tightly closed
- Place in well ventilated cylinder storage area
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear goggles (if required) to prevent eye contact
- Recommended material: non- ventilated or gas proof
- Wear appropriate clothing/gear to prevent skin contact
- Wear appropriate gloves to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Chlorine
- Fluorine
- Hydrogen selenide
- Nitric oxide

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins while avoiding rubbing the eyes. Seek professional attention if required
Skin	Immediately wash affected area with soap and water and remove any contaminated clothing

Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention.

[**Compressed Gases - Corrosive**]

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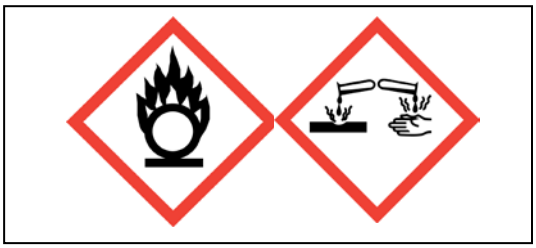

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6.0 First Aid

1.0 Definition and Characteristics

Gas in a container with either an absolute pressure exceeding 40 psi at 70°F (21.1 °C) or with an absolute pressure exceeding 104 psi at 130 °F (54.4 °C). Can also be in a liquid vapor form with a pressure exceeding 40 psi at 100°F (37.8°C). This gas type can cause severe damage or alternations to the skin.

2.0 Potential Hazards

Health	If inhaled or contact, can reduce oxygen intake or irreversibly alter skin

3.0 Storage and Handling

- Kept away from any heat sources such as sunlight
- Storage of gas cylinders must be securely held (double strapped) in sturdy racks or stations to prevent falling or knocking over
- Cylinder caps need to be tightly closed
- Place in well ventilated cylinder storage area
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear goggles (if required) to prevent eye contact
- Recommended material: non- ventilated or gas proof
- Wear appropriate clothing/gear to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Acetylene
- Methyl acetylene
- Vinyl chloride
- Vinyl fluoride

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with large amounts of water for at least 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention.

[**Flammable Liquid**]

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2.0 Potential hazards
3.0 Storage and handling
4.0 Personal protection equipment
5.0 Common examples
6.0 First Aid

1.0 Definition and Characteristics

Liquids with a flashpoint below 140°F (60°C) with a vapor pressure not exceeding 40 pounds per square inch at 100 °F.

2.0 Potential Hazards

Fire	Material is flammable and can cause fires
Explosion	The substance is easily ignited by any kind of ignition source
Health	Can cause irritation or be toxic

3.0 Storage and Handling

- The stored area of the substance must be free from all potential ignition sources.
- Store in dry, cool and appropriate temperatures
- Do not mix with oxidizing agents
- Work or dispense in fume hood
- Dispense in small bottles or quantities to prevent large amounts of fumes from spreading
- Work with low amounts if possible to minimize possible hazards
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles to prevent eye contact
- Recommended material: splash proof
- Lab coat (cotton material) or appropriate protective gear to prevent skin contact
- Wear appropriate gloves to prevent skin contact
- Recommended material: SilverShield®/4H or neoprene
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Acetone
- Alcohol

- Ethanol
- Octane
- Toluene

6.0 First Aid

Eye	Wash immediately with large amounts of water and seek professional attention immediately
Skin	Immediately wash affected area with soap and water and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

[**Flammable Solid**]

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1.0 Definition and Characteristics

Any solid capable of causing fire or ignition leading to serious hazards. Material is considered flammable if tested under 16 CFR 1500.44, if the material ignites and burns with a self-sustained flame at a rate greater than $1/10^{th}$ in/sec along its major axis. Flammable solids include pyrophorics, dry explosives and combustible materials.

2.0 Potential Hazards

Fire	Material is flammable and can cause fires
Explosion	The substance is easily ignited (especially when dried) by ignition sources
Health	Can cause burns and toxicity if inhaled or absorbed through skin. Corrosive gases may also be produced from the burning.

3.0 Storage and Handling

- The stored area of the substance must be free from all potential ignition sources.
- Can react with moisture in the air and should be used in anoxic conditions if necessary.
- Store in dry, cool and appropriate temperatures
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles to prevent eye contact
- Lab coat (cotton material for pyrophorics) or appropriate protective gear
- Wear appropriate gloves to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Aluminum metals
- Barium metals

- Calcium metals
- Magnesium metals
- Lithium metals
- Potassium metals
- Sodium metals

6.0 First Aid

Eye	Wash immediately with large amounts of water and seek professional attention immediately
Skin	Immediately wash affected area with soap and water and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

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1.0 Definition and Characteristics

Materials other than blasting or explosives that can cause or enhance fire through release of oxygen or other gases. Also includes peroxides which are organic compounds containing oxygen in a bivalent O-O structure.

2.0 Potential Hazards

Fire	Accelerates burning of fire
Explosion	Some may react explosively
Health	Inhalation, ingestion or contact may cause injury or irritation.

3.0 Storage and Handling

- Store in dry, cool and appropriate temperatures
- Keep away from any ignition sources
- Keep away from combustible materials
- Keep away from reducing agents
- Peroxide chemicals kept in dark and dry areas and away from reactive chemicals
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles or eye protection to prevent eye contact
- Wear appropriate lab coat or appropriate protective gear

- Use appropriate resistant gloves
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Chlorites
- Chlorates
- Nitrites
- Nitrates

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for at least 15min and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

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1.0 Definition and Characteristics

A material that is known to be toxic and hazardous to human health. Can be in the form of solids, liquids or gas.

2.0 Potential Hazards

Health	Can cause health problems or be fatal if inhaled or absorbed

3.0 Storage and Handling

- Store in dry nonreactive environment
- Should be handled in well ventilated fume hoods
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles or eye protection to prevent eye contact
- Wear lab coat or appropriate protective gear to prevent skin contact

- If material contains vapors that can potentially be hazardous, wear appropriate protection
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Calcium oxide
- Iodine
- Oxalic acid
- Phenol
- Phosphorus
- Potassium
- Silver nitrate

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for at least 15min and remove any contaminated clothing. Apply chemical specific solution to skin if required
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention immediately
Swallowed	Seek medical attention immediately

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1.0 Definition and Characteristics

An acidic liquid or solid capable of causing severe or irreversible alterations after contact with human skin. If inhaled, the substance may damage internal organs and tissues as well.

2.0 Potential Hazards

Health	Can be damaging (especially on tissue) or fatal if inhaled or absorbed

3.0 Storage and Handling

- Avoid contact if possible and store in appropriate storage cabinets
- Know neutralizing agents or compounds
- Be familiar with spill kit locations and have proper training to use them
- Separate organic acids from oxidizing acids
- Add acids to water (not the other way around)

- Store below eye level if possible
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles or eye protection to prevent eye contact
- Wear lab coat or appropriate protective gear to prevent skin contact
- Wear gloves to protect against chemical contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Acetic acid
- Nitric acid
- Sulfuric acid

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for at least 15min and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

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1.0 Definition and Characteristics

A basic liquid or solid causing severe or irreversible alterations after contact with human skin. Most commonly contacted through splashes and spills. If inhaled, the substance may damage internal organs and tissues as well.

2.0 Potential Hazards

Health	Can be damaging (especially on tissue) or fatal if inhaled or absorbed

3.0 Storage and Handling

- Avoid contact if possible and store in appropriate storage cabinets
- Know neutralizing agents or compounds

- Add bases to water (not the other way around)
- Store below eye level if possible
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles or eye protection to prevent eye contact
- Wear lab coat or appropriate protective gear to prevent skin contact
- Wear gloves to protect against chemical contacts
- Refer to MSDS or chemical chart for equipment type on specific chemicals

5.0 Common Examples

- Phenol
- Sodium Hydroxide
- Sodium amide

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for at least 15min and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

CAL POLY POMONA

[**Pyrophorics (Solids)**]

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6.0 Definition and Characteristics

Substances which can ignite when in the presence of air. Pyrophorics can also be water reactive and must be handled under special conditions.

7.0 Potential Hazards

Fire	Material is flammable and can cause fires
Explosion	The substance is easily ignited on contact with air and other ignition sources
Health	Can cause burns and metal fume fever if inhaled substance is a pyrophoric metal

8.0 Storage and Handling

- The stored area of the substance must be free from all potential ignition sources.
- Can react with moisture in the air and should be used in anoxic conditions.
- Store in dry, cool and appropriate temperatures
- Obtain approval prior to use
- Work under fume hood to avoid breathing in hazardous vapors
- Refer to MSDS for specific handling procedures

9.0 Personal Protection Equipment

- Wear appropriate goggles or face shield to prevent eye and face contact
- Lab coat (fire resistant cotton or Nomex) or appropriate protective gear
- Wear appropriate gloves to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

10.0 Common Examples

- Alkali metals
- Grignard reagents
- Iron sulfide
- Lead powders
- Uranium
- Plutonium

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

[**Pyrophorics (Liquids)**]

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11.0 Definition and Characteristics

Substances which can ignite when in the presence of air. Pyrophorics can also be water reactive and must be handled under special conditions.

12.0 Potential Hazards

Fire	Material is flammable and can cause fires
Explosion	The substance is easily ignited on contact with air and other ignition sources
Health	Can cause burns and metal fume fever if inhaled substance is a pyrophoric metal

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13.0 Storage and Handling

- The stored area of the substance must be free from all potential ignition sources.
- Can react with moisture in the air and should be stored under an inert gas (i.e. argon) environment
- Store in dry, cool and appropriate temperatures
- Obtain approval prior to use
- Work under fume hood to avoid breathing in hazardous vapors
- Understand syringe transfer procedures prior to handling
- Refer to MSDS for specific handling procedures

14.0 Personal Protection Equipment

- Wear chemical splash goggles or face shield to prevent eye and face contact
- Lab coat (fire resistant cotton or Nomex) or appropriate protective gear
- Wear appropriate gloves to prevent skin contact
- Refer to MSDS or chemical chart for equipment type on specific chemicals

15.0 Common Examples

- Metalorganics
- Triethylborane

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention immediately
Skin	Immediately wash affected area with water for 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required
Swallowed	Seek medical attention immediately

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STANDARD OPERATING PROCEDURE (SOP)

[**Extremely Hazardous (Cryogenics)**]

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1.0 Definition and Characteristics

Any type of substance used to produce low temperatures (below 153 °C). In liquid form, cryogens produce large amounts of vapors and can potentially be explosive due to their pressure.

2.0 Potential Hazards

Explosion	Explosions can result due to pressure or chemical reaction
Health	Can cause burns in the skin upon contact and can also be toxic

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3.0 Storage and Handling

- Avoid exposure of material to skin
- Keep in well ventilated areas
- Handle and store in a appropriate containers to ensure they do not break as a result of pressure
- Transfers done slowly in ventilated areas
- Include several pressure relief devices or methods to prevent explosions from rapid vaporization
- Fill cylinders to a maximum of 80% to prevent pressure from expansion of the cryogen
- Cryogenic materials should have regularly maintenance
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate face shields or goggles
- Wear a loose fitting lab coat or appropriate protective gear to prevent skin contact
- Wear loose fitting safety gloves
- Recommended material: Cryogenic resistant leather
- Refer to MSDS or chemical chart for equipment type for specific cryogenics

5.0 Common Examples

- LN_2
- LH_2

6.0 First Aid

Eye	If frozen, seek medical attention, if not, wash immediately with large amounts of water for 15mins and seek professional attention after washing
Skin	If frostbite occurs, Do NOT wash with water or remove clothing. Seek medical attention immediately. If not frozen, wash with water.
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention
Swallowed	Seek medical attention immediately

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STANDARD OPERATING PROCEDURE (SOP)

[**Extremely Hazardous (Carcinogens)**]

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1.0 Definition and Characteristics

Any type of substance that can potentially cause or is associated with the cause of cancer. These substances can either damage or cause alterations to the genome.

2.0 Potential Hazards

Health	Potential damage to DNA resulting in some form of cancer

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3.0 Storage and Handling

- Warning signs of carcinogens should be labeled clearly
- Store in appropriate environments
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate face shields or goggles
- Wear lab coat or appropriate protective gear to prevent skin contact
- Wear appropriate safety gloves
- Refer to MSDS or chemical chart for equipment type on specific carcinogens

5.0 Common Examples

- Ethidium bromide
- Formaldehyde
- Carbon monoxide

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention if required
Skin	Was with water for 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention
Swallowed	Seek medical attention immediately

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STANDARD OPERATING PROCEDURE (SOP)

[**Extremely Hazardous (Teratogens)**]

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1.0 Definition and Characteristics

Any type of substance or reproductive toxins that is associated with causing birth abnormalities. These substances can also have an effect on males by altering their sperm production or structure.

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2.0 Potential Hazards

Health	Highly toxic and can cause birth defects if exposed to a certain degree

3.0 Storage and Handling

- Pregnant women should avoid exposure if possible
- Store in appropriate environments
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles
- Wear lab coat or appropriate protective gear to prevent skin contact
- Wear appropriate safety gloves
- Depending on the substance, a mask or SCBA may be required
- Refer to MSDS or chemical chart for equipment type on specific teratogens

5.0 Common Examples

- Lead
- Ethylene oxide

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention if required
Skin	Was with water for 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention
Swallowed	Seek medical attention immediately

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STANDARD OPERATING PROCEDURE (SOP)

[**Extremely Hazardous (Mutagens)**]

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1.0 Definition and Characteristics

Any type of substance that can potentially cause mutations in the genome. Since the end

result is usually cancer, many mutagens are associated with carcinogens.

2.0 Potential Hazards

Health	Can increase mutation rates causing DNA damage

3.0 Storage and Handling

- Store in appropriate environments
- Refer to MSDS for specific chemical storage conditions
- Refer to MSDS for specific handling procedures

4.0 Personal Protection Equipment

- Wear appropriate goggles
- Wear lab coat or appropriate protective gear to prevent skin contact
- Wear appropriate safety gloves
- Depending on the substance, a mask or SCBA may be required
- Refer to MSDS or chemical chart for equipment type on specific mutagens

5.0 Common Examples

- Benzene
- Bromine
- Sodium azide

6.0 First Aid

Eye	Wash immediately with large amounts of water for 15mins and seek professional attention if required
Skin	Was with water for 15mins and remove any contaminated clothing
Inhaled	Acquire fresh air immediately and perform artificial respiration if required. Seek medical attention
Swallowed	Seek medical attention immediately

DATE: February 13, 2002

TO: Distribution COPY: Mr. Ray Inge

FROM: David L. Patterson File: M02:027
Director, Environmental Health & Safety

SUBJECT: **Emergency Eyewash and Shower Equipment**

Richard West, Executive Vice Chancellor and Chief Financial Officer, originally issued this memorandum to reiterate the CSU policy of full compliance with the applicable regulations/requirements for emergency eyewash and shower equipment as contained in California Code of Regulations, Title 8, §5162. Some minor editorial modifications have been made by Environmental Health & Safety. Please share this information with the employees in your department who handle hazardous substances on a regular basis.

Federal and state laws and regulations require employers to provide employees (faculty and staff) with emergency eyewash and shower equipment at all work areas where, during routine operations or foreseeable emergencies, the eyes of an employee may come into contact with a substance which can cause corrosion, severe irritation or permanent tissue damage or which is toxic by absorption (California Code of Regulations, Title 8, §5162).

Water hoses, sink faucets or showers are not acceptable eyewash facilities. Personal eyewash units or drench hoses which meet the requirement of ANSI Z358.1-1981, §6 or 8, may support plumbed or self-contained units but shall not be used in lieu of them.

An emergency shower which meets the requirements of ANSI Z358.1-1981, §4 or 9, shall be provided at all work areas where, during routine operations or foreseeable emergencies, areas of the body may come into contact with a substance which is corrosive or severely irritating to the skin or which is toxic by skin absorption.

Emergency eyewash facilities and deluge showers shall be in accessible locations that require no more than 10 seconds for the injured person to reach. Plumbed and self-contained eyewash and shower equipment shall supply potable water at the flow rates and time durations specified in ANSI Z358.1-1981. Plumbed eyewash and shower equipment shall be activated at least monthly to flush the line and to verify proper operation. This test shall be documented.

All requirements and regulations for emergency eyewash and shower equipment as defined in the California Code of Regulations, Title 8, §5162 and ANSI Z358.1-1981 shall be followed. **Non-compliance with this regulation is not a risk to be assumed by any campus or department.**

If you have any questions, feel free to call me at extension 3695.

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Ms. Kathleen H. Waln, Chair, Theatre
Dr. Douglas R. Freer, Interim Director, University Housing

DATE: February 13, 2002

TO: Distribution COPY: Mr. Ray Inge

FROM: David L. Patterson File: M02:025
Director, Environmental Health & Safety

SUBJECT: **Hazardous Substances – Minimization, Storage and Labeling**

Richard West, Executive Vice Chancellor and Chief Financial Officer, originally issued this memorandum. The purpose was to emphasize the need for minimization of hazardous waste that is generated and the importance of compliance with hazardous substances labeling and storage regulations. Some minor editorial modifications have been made by Environmental Health & Safety. Please share this information with the employees in your department who handle hazardous substances on a regular basis.

Economics, liability and environmental concerns are three incentives to encourage each department to consider waste minimization. By minimizing our hazardous waste production we compensate for increasing disposal costs, increasing land disposal restrictions and bans, savings in raw materials and reduce potential liability for environmental problems onsite and offsite as well as reduction in potential liability for employee and student safety.

The most desirable methods of waste minimization are source reduction. While it may appear to acquire the best price by ordering in volume, often the cost for disposal exceeds the original savings. Waste minimization can further be realized through efficient material management, when possible substitution of less hazardous materials, good laboratory procedures and the migration to micro techniques (i.e. microchemistry) when performing research or classroom laboratory experiments.

Specific requirements applicable to the storage of hazardous substances are (California Code of Regulations, Title 8, §5164):

a) Substances which, when mixed, react violently, or evolve toxic vapors or gases, or which in combination become hazardous by reason of toxicity, oxidizing power, flammability, explosibility, or other properties, shall be separated from each other in storage by distance, by partitions, or otherwise, so as to preclude accidental contact between them.
b) Hazardous substances shall be stored in containers which are chemically inert to and appropriate for the type and quantity of the hazardous substance.
c) Containers of hazardous substances shall not be stored in such locations or manner as to result in damage to the container. Containers shall not be stored where they are exposed to heat sufficient to rupture the containers or to cause leakage.
d) Containers used to package a substance which gives off toxic asphyxiation, suffocation, or anesthetic fumes in hazardous amounts shall not be stored in locations where it could be reasonably anticipated that employees would be exposed. This requirement shall not apply to small quantities of such materials kept in closed containers, or to tank cars or trucks.

Along with utilizing the correct storage containers for hazardous substances, each department shall ensure that each container of hazardous substances in the workplace is labeled, tagged or marked with the following information.

a) Identification of the hazardous substance(s) contained therein
b) Appropriate hazards warnings; and
c) Name and address of manufacturer, importer or other responsible party.

Labeling of portable containers into which hazardous substances are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer is not required. However, Environmental Health & Safety recommends that you label all containers.

Each department shall insure that employees do not remove or deface existing labels on incoming containers of hazardous substances unless the container is immediately marked with the required information.

Each department shall ensure that labels or other forms of warnings are legible, in English, and prominently displayed on the container or readily available in the work area throughout each work shift.

All requirements and regulations for the storage and labeling of hazardous substances as defined in the California Code of Regulations, Title 8, §5164, §5194(f) shall be followed.

Additionally, resources are available on the Environmental Health & Safety Web Page at http://www.csupomona.edu/~ehs/. Some specific documents are as follows:

- Cal Poly Pomona's Environmental Health & Safety's MSDS Web Page at http://www.csupomona.edu/~ehs/msds.html
- Cal Poly Pomona's Hazard Communication Manual on the Web at http://www.csupomona.edu/~ehs/ftp/HazardCommunicationManual/HazcomManual.doc
- Cal Poly Pomona's Hazardous Waste Manual at http://www.csupomona.edu/~ehs/ftp/HazWasteManual.doc

If you have any questions, please feel free to call me at extension 3695.

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