

UC Merced
Hazard
Communication
Program



Table of Contents

Section	Page
1.0 PREFACE	1
2.0 PROGRAM ADMINISTRATION	1
2.1 Chancellor	1
2.2 Director Environmental Health & Safety	1
3.0 PROGRAM RESPONSIBILITIES	1
3.1 Schools, Departments and Administrative Units	1
3.2 Environmental Health and Safety	1
3.3 Supervisors, Managers, Administrators, and Faculty	1
3.4 Chemical Handling & Uses – Employees & Students	2
4.0 SCOPE	2
4.1 Labeling Exceptions	2
4.2 Research and Teaching Laboratories	2
4.3 Safety Data Sheets	3
5.0 HAZARDOUS CHEMICAL INVENTORY	3
6.0 SAFETY DATA SHEETS	3
6.1 Access to SDSs	3
6.2 SDSs Not Received for New Purchases	3
6.3 SDSs Received from New Purchases.....	4
6.4 Availability of SDSs	4
7.0 LABELS & OTHER FORMS OF WARNING	4
7.1 Non-Original & Portable Containers	5
7.2 Piping	5
8.0 TRAINING AND INFORMATION	5
8.1 Required Training Topics	5
8.2 New/Revised SDS with New Information	6
9.0 OUTSIDE CONTRACTORS	6
9.1 Information Provided to the Contractor	6
9.2 Information Provided by the Contractor	6
10.0 PROGRAM DOCUMENTATION & RECORDKEEPING	6
10.1 Safety Data Sheets	6
10.2 Training Records	6
11.0 HAZARD COMMUNICATION RESOURCES	6
12.0 SDS - HEALTH & SAFETY GLOSSARY	8
ATTACHMENT A: NFPA & HMIS LABELING SYSTEM.....	19
ATTACHMENT B: TRAINING ATTENDANCE RECORD.....	20

1.0 PREFACE

The Hazard Communication Standard, Title 8 California Code of Regulations Section 5194 (Ref: [T8 CCR §5194](#)) requires employers to provide information and training on hazardous chemicals used in the workplace. It also requires a written hazard communication program to be developed, which describes how the requirements of T8 CCR §5194(f), (g), and (h) will be met for labeling and other forms of warning, safety data sheets (SDS), and employee information and training. This program will include changes required by 29 CFR 1910.1200 which incorporated requirements of United Nations Globally Harmonized System (GHS) of Classification and Labeling of Chemicals in 2012.

This document fulfills the requirement of the regulation for a written program, as well as serving as the overall program and policy document for UC Merced.

2.0 PROGRAM ADMINISTRATION

Reference:

Title 8 California Code of Regulations (T8 CCR) §5194
[Hazard Communication Regulation](#)

2.1 Chancellor

The [Chancellor](#) is responsible for ensuring that the applicable operations of UC Merced are conducted in accordance with the Hazard Communication Program.

2.2 Director Environmental Health & Safety

The UC Merced [Director of Environmental Health & Safety](#) has full authority and responsibility for implementing and maintaining this Program.

3.0 PROGRAM RESPONSIBILITIES

3.1 Schools, Departments and Administrative Units

(Vice Chancellors, Deans, Directors, Department Heads)

Vice Chancellors, Deans, Directors, Department Heads and other senior managers are responsible for fully supporting the Hazard Communication Program in all areas under their scope of responsibility and ensuring that faculty and supervisors comply with the UC Merced Hazard Communication Program elements as part of the Department's health and safety program.

3.2 Environmental Health and Safety

Environmental Health and Safety (EH&S) Office administers and oversees the implementation of the Hazard Communication Program for UC Merced. EH&S provides hazard communication program coordination and technical guidance to Departments, Administrative Units, Directors, Supervisors, Managers, Administrators, Faculty, and employees.

3.3 Supervisors, Managers, Administrators, and Faculty

Supervisors, Managers, Administrators, and Faculty are responsible for ensuring employees under their direction receive the required hazardous chemical information and training required by the UC Merced Hazard Communication Program and T8 CCR §5194, including:

- SDSs are readily accessible either electronically or by hard copy
- Chemical containers are properly labeled (including full name – not formula or hazard)

- Employees who work with or are exposed to hazardous chemicals receive the required documented training prior to working with the hazardous material in question

3.4 Chemical Handling & Uses – Employees & Students

Chemical handlers and users are responsible for:

- Being familiar with the hazards and proper use of a chemical before using it
- Using the hazardous chemical in a safe manner
- Seeking supervisory support/direction before using new hazardous chemicals or using hazardous chemicals in unusual situations

4.0 SCOPE

UC Merced's Hazard Communication Program applies to all hazardous chemicals found at all UC Merced facilities, operations, and leased workspace under normal or reasonably foreseeable emergency conditions (i.e., spill or release of a chemical), with the following exceptions:

- Tobacco products
- Wood products or wood dust
- Articles (manufactured items; not excluded are hazardous substances used in the articles)
- Food, drugs and cosmetics intended for personal consumption by employees while in the workplace
- Retail trade establishments (except for processing and repair work areas)
- Consumer products packaged for distribution to, and use by, the general public, provided that employee exposure to the product is not significantly greater than the consumer exposure occurring during the principal consumer use of the product
- Pesticide use in compliance with the regulations of the Director of the California Department of Food and Agriculture issued pursuant to §12981 of the Food and Agricultural Code
- Pesticide use in compliance with the regulations of the Director of the California Department of Food and Agriculture issued pursuant to §12981 of the Food and Agricultural Code

4.1 Labeling Exceptions

Labeling is not required on hazardous chemicals for:

- Pesticides
- Food, drug and additive products
- Alcoholic beverages
- Consumer products

4.2 Research and Teaching Laboratories

The Lab Standard supersedes the Hazard Communication standard for lab personnel. This Hazard Communication Program does not apply to any hazardous chemical in research and teaching laboratories provided that the laboratory is under the direct supervision and regular observation of an individual who has knowledge of the physical hazards, health hazards, and emergency procedures associated with the particular hazardous chemicals involved, and conveys this knowledge to employees in terms of safe work practices. This exception is allowed under T8 CCR §5194(b)(3).

4.3 Safety Data Sheets

Safety Data Sheets (SDSs) provide information for both workers, students and emergency personnel on the potential hazards of chemical products or hazardous materials. SDSs are available in each department and school. Specific SDSs can also be accessed online from the EH&S website.

<http://ehs.ucmerced.edu/researchers-labs/chemical-safety/safety-data-sheets>

5.0 HAZARDOUS CHEMICAL INVENTORY

Inventory management is the cornerstone of the UC Merced Hazard Communication Program because it is the basis for hazard assessment and training requirements. A complete, accurate and up-to-date chemical inventory is essential to protect the worker from the hazardous properties of the chemical, as well as protect the supervisor from potential liability by failing to warn and train the affected employee. All Principal Investigators, Administrative Units, and Departments are to maintain a current inventory of all hazardous chemicals known to be in the work area. The chemical inventory is to be updated upon receipt or removal of hazardous chemicals from the site. At minimum, the chemical inventory is to be updated annually, or whenever significant changes occur. UC Merced's Hazard Communication Program requires the employee to be trained in the hazards of a chemical, safe work practices, and emergency procedures prior to its use.

6.0 SAFETY DATA SHEETS

SDSs contain information regarding the hazards of the chemicals, control of exposure, and how to respond to emergency situations. The UC system has an online SDS database:

<http://ehs.ucmerced.edu/researchers-labs/chemical-safety/safety-data-sheets>

that provides access to hundreds of thousands of SDSs that are currently being used at UC Merced and other campuses and medical centers in the UC system. The UC online SDS management system can be directly accessed through any UC-recognized computer (through a UC-recognized IP range). If the user is on a non-UC recognized computer, the user can usually just Google the chemical or product and ask for SDS. In the event of a failure of the UC online SDS database or Google search, employees, supervisors, unit heads, or managers should contact the UC Merced EH&S Office so that a hard copy of the SDS can be obtained.

6.1 Access to SDSs

Each department, administrative reporting unit, or shop where hazardous substances are present must have access to the UC online SDS database and/or maintain an MSDS library on every hazardous substance on their chemical inventory or recently received hazardous chemicals. Employees who may work in remote locations or in vehicles may maintain the appropriate SDS in a binder in each vehicle on the jobsite, or have access to SDSs via laptops, tablets, or smart phones. It is responsibility of the Supervisor, Manager, Administrator, or Faculty to ensure that SDSs are accessible to all employees under their direction.

6.2 SDSs Not Received for New Purchases

For new purchases of hazardous substances which SDSs have not been received, it is the responsibility of the purchaser (Purchasing Department, the administrative unit, or shop) to request a copy of the SDS for the new purchase. If a hazardous material is received with no SDS, the

supervisor, manager, administrator, or faculty shall contact the vendor in writing within 7 working days, to request a copy of the necessary SDS. If no SDS is received within 15 calendar days of the request, UC Merced EH&S shall be notified to contact the Division of Occupational Safety and Health regarding the failure of the vendor to provide an SDS.

6.3 SDSs Received from New Purchases

When an SDS for a newly purchased hazardous substance is received, the Department, administrative reporting unit, or shop should maintain a hard copy of the SDS.

6.4 Availability of SDSs

SDSs must be readily available to all employees. Upon request, copies of SDSs shall also be made readily available to representatives of the California Division of Occupational Safety and Health, the National Institute of Occupational Safety and Health (NIOSH), and employee's physician.

7.0 LABELS & OTHER FORMS OF WARNING

Supervisors, Managers, Administrators, and Faculty must ensure hazardous chemicals in their area are properly labeled. Labels must have either the original manufacturer's label or a generic label which includes the product identity (trade, product, or chemical name) and the appropriate hazard warnings (health and physical hazards). Labels are to be legible, in English, and prominently displayed on the container. If employees in an area speak other languages, information on the label may be added in the other language, as long as the information is presented in English as well. Labels must not be removed or defaced until the containers are empty.

In 2016 The Hazard Communication Standard ([T8 CCR §5194](#)) was revised to incorporate the 2012 changes to federal Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200 to be consistent with the United Nations Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Major changes in the revised Hazard Communication Standard include:

- The term material safety data sheets (MSDS) was changed to safety data sheet (SDS)
- SDSs were simplified with 16 required sections in a specific order. For example, Section 2, the Hazard Identification section will use standardized phrases, signal words, and pictograms
- Labeling will have 4 major requirements:
 - GHS Signal Word
 - GHS Hazard and Precautionary Statement
 - GHS Pictogram – because not all languages are universally recognized
 - GHS Precautionary Statement

Labeling hazard rating numbers will change and reflect “Most hazardous” will be 1 and the least hazardous will be 5. The current numbering system is 1 is the least hazardous and 4 is the most hazardous. Effective dates in the revised Hazard Communication Standard. In Process.

7.1 Non-Original & Portable Containers

Labels are required on portable containers into which hazardous chemicals are transferred from labeled containers. The only exception to this rule is when a single user is the sole handler of the container and the entire contents of the container will be used in one shift.

7.2 Piping

All piping shall be labeled with the same information required for any containers containing a hazardous chemical (see the section on Labeling and Other Forms of Warning). Prior to starting work on an unlabeled pipe, the employee shall contact their supervisor to determine the hazardous chemical(s) present in the pipe, the potential chemical and physical hazards, and safe work practices to perform the required task. Only authorized employees who have been properly trained shall be allowed to work on unlabeled piping system.

8.0 TRAINING AND INFORMATION

Supervisors, managers, administrators, and faculty are responsible for ensuring employees and students under their direction receive training and information on hazardous chemicals in their work area. Each employee who works with hazardous chemicals must receive initial training on the safe use of the hazardous chemical and whenever a new hazard is introduced into their work area. The hazardous chemical training may address general classes of hazardous chemicals if appropriate for the exposures of the job. Supervisory personnel must maintain accurate records on all safety training (see [Attachment A - Hazard Communication Training Attendance Record](#)). Records shall include: the employee name, date of training, topics covered, employee signature, and name of instructor.

8.1 Required Training Topics

At minimum, the employee and student training and information will address the following:

- A summary of the hazard communication standard ([T8 CCR §5194](#)) and the UC Merced Hazard Communication Program;
- Operations where hazardous chemicals are present;
- The location and availability of UC Merced's written Hazard Communication Program;
- The location and availability of SDSs in the work areas;
- How to read and understand the content of SDSs;
- Hazardous chemical properties and methods that can be used to detect the presence or release of hazardous chemicals, including visual appearance and warning properties;
- The physical and health hazards of hazardous substances in the work area along with the protective measures which can be taken to protect the employees from the hazards;
- Procedures which UC Merced has implemented to protect employees from exposure to the hazardous substance in the workplace, including work practices, personal protective equipment, and emergency procedures;
- Hazardous chemical spill and leak procedures;
- An explanation of the UC Merced labeling system;
- The procedures for conducting non-routine tasks involving hazardous materials; and,
- Employee rights under T8 CCR §5194(h)(2)(G).

8.2 New/Revised SDS with New Information

Whenever a new or revised SDS is received which contains new information which significantly increases the risk to employees, additional training and information will be provided to employees, but will not exceed 30 calendar days after receipt of the new information.

9.0 OUTSIDE CONTRACTORS

9.1 Information Provided to the Contractor

Project Managers, in coordination with the responsible unit at the project site, are required to advise outside contractors of any chemical hazards that may be encountered in the normal course of their work at UC Merced facilities.

9.2 Information Provided by the Contractor

Outside contractors are to inform the Project Manager of the hazardous chemicals which will be used on the job to which exposure may occur. The contractor must inform the Project Manager of the precautions and appropriate control which will be implemented to lessen the possibility of exposure to UC Merced employees. The outside contractor will provide copies of the SDS for the products used at UC Merced facilities to the Project Manager or the UC Merced representative overseeing the project.

10.0 PROGRAM DOCUMENTATION & RECORDKEEPING

10.1 Safety Data Sheets

Safety data sheets are a record of employee exposure [ref. T8 CCR §3204(c)(1)(C)]. As required by T8 CCR §3204(d)(1)(B)2., safety data sheets will be maintained for the duration of employment, plus 30 years.

10.2 Training Records

Employees attending Hazard Communication Training will have their attendance documented on the UC Merced Hazard Communication Training Attendance Record form ([Attachment A](#)). Course attendance information will then be logged into the UC Learning Management System (LMS).

Employee training records will be maintained for a minimum of 3 years.

11.0 HAZARD COMMUNICATION RESOURCES

A number of UC Merced health and safety program services are available to assist in addressing the UC Merced Hazard Communication Program. Additional state and federal governmental publications and resources are available. A list is provided below:

- **Office of Environmental Health & Safety**
 - For information on various safety topics, including hazard communication information and training call the UC Merced Office of Environmental Health and Safety at 228-4234 or 228-7864.
 - <http://ehs.ucmerced.edu/>
- **University of California Safety Data Sheet System**
 - Access to the University of California SDS Program
 - <http://ehs.ucmerced.edu/researchers-labs/chemical-safety/safety-data-sheets>

- **Title 8 California Code of Regulations §5194**
 - Cal/OSHA Hazard Communication Regulations
 - <http://www.dir.ca.gov/Title8/5194.html>
- **Title 8 California Code of Regulations §3204**
 - Cal/OSHA Access to Medical and Exposure Records Regulations
 - <http://www.dir.ca.gov/Title8/3204.html>
- **Guide to the California Hazard Communication Regulation**
 - Cal/OSHA Hazard Communication Publication (46 page PDF file)
 - http://www.dir.ca.gov/dosh/dosh_publications/hazcom.pdf
- **Hazard Communication Safety Data Sheets**
 - OSHA Quick Card on Safety Data Sheets (2 page PDF file)
 - <http://www.osha.gov/Publications/OSHA3493QuickCardSafetyDataSheet.pdf>
- **Hazard Communication Standard Labels**
 - OSHA Quick Card on Standard Labels (1 page PDF file)
 - <http://www.osha.gov/Publications/OSHA3492QuickCardLabel.pdf>
- **Hazard Communication Pictograms**
 - OSHA Quick Card on Pictograms (1 page PDF file)
 - <http://www.osha.gov/Publications/OSHA3491QuickCardPictogram.pdf>

12.0 SDS - HEALTH & SAFETY GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienist, a professional organization which recommends exposure limits (TLVs & BEIs) for toxic substances.
Acid	A substance which dissolves in water and releases hydrogen ions (H ⁺). Acids cause irritation, burns, or more serious damage to tissue, depending on the strength of the acid, which is measured by the pH (see pH).
Acute	Effects that occur immediately or very soon after one or a few exposures and may be crucial or dangerous. Acute exposures normally run a comparatively short course.
Aerosols	Liquid droplets or solid particles dispersed in air that are of fine enough particle size (0.01 to 100 microns) to remain so dispersed for a period of time.
ALKALI	Same as Base. A substance which dissolves in water and releases a hydroxyl ion (OH ⁻); it has the ability to neutralize an acid and form a salt. Strong alkalis are irritating and may damage tissue (see caustic).
Allergen	A substance that causes an allergy.
Allergy	Hypersensitivity; an allergy is a reaction to a substance that occurs through a change in the immune system caused by the production of antibodies, and is usually experienced by only a small number of people exposed to a substance. Allergic reactions in the workplace tend to affect the skin (see Dermatitis) and lung (see Asthma).
ANSI	American National Standards Institute, a private organization that recommends safe work practices and engineering designs.
Asphyxiant	A vapor or gas that can cause loss of consciousness and death due to lack of oxygen, less than 16%, or chemically block the body's use of oxygen.
Asthma	Constriction of the airways (bronchial tubes) to the lungs, producing symptoms of cough and shortness of breath.
Base	See Alkali.
Boiling Point	The temperature at which a liquid boils and changes rapidly to vapor (gas) state at a given pressure (see Evaporation). Expressed in degrees Fahrenheit (°F) or Centigrade (°C) at sea level pressure.

Cal/OSHA	California Occupational Safety and Health Administration, a state agency in the Department of Industrial Relations which establishes and enforces worker health and safety regulations. Cal/OSHA consists of the Division of Occupational Safety and Health (DOSH), the Consultation Service, the Standards Board, and the Appeals Board.
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Carcinogen	A chemical or physical agent capable of causing cancer. Such an agent is often described as carcinogenic. The ability to cause cancer is termed carcinogenicity. Words with similar meaning include oncogenic and tumorigenic.
CAS Number	The Chemical Abstracts Service Registry Number is a numeric designation which is given to a specific chemical compound. This number may appear on the Material Safety Data Sheet (see MSDS).
Caustic	Something alkaline that strongly irritates, corrodes or destroys living tissue (see Alkali).
Ceiling Limit	The maximum concentration of a material in air that must never be exceeded, even for an instant.
Cell	The structured unit of which tissues are made. There are many types of cells, e.g. nerve cells, muscle cells, blood cells; each type of cell performs a special function.
Chemical Family	A group of single elements or compounds with a common general name, such as "ketones."
Chromosome	The part of a cell that contains genetic material (see Gene).
Chronic Effect	An adverse effect with symptoms which develop slowly over a period of time, or which recur frequently.
Circulatory System	The heart and blood vessels.
Combustible	Able to catch on fire and burn. The National Fire Protection Association and the U.S. Department of Transportation generally define a "combustible liquid" as having a flash point of 100°F (37.8°C) or higher (see Flash Point).
Concentration	The amount of a specific substance mixed into a given volume of air or liquid.

Corrosive	A liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the place where it touches the skin.
Cubic Centimeter	A metric unit of volume. One "cc" is about the size of a small sugar cube. One "cc" is also referred to as a milli-liter (ml). One quart equals 946.358 cubic centimeters.
Cubic Meter	A metric unit of volume commonly used in expressing concentrations of a chemical in a volume of air. One cubic meter equals 35.3 cubic feet or 1.3 cubic yards. One cubic meter also equals 1000 liters or one million cubic centimeters.

Cumulative	Refers to the build of chemicals in the body over time or increasing damage or harmful effects from physical hazards. This occurs when there is an amount of the chemical or its effects left in the body after the preceding exposure.
Decomposition	Breakdown of a chemical into simpler parts, compounds or elements.
Dermal	Referring to the skin.
Dermatitis	Inflammation of the skin-redness (rash) and often swelling, pain, itching, cracking. Dermatitis may be caused by an Irritant, Allergen, or Physical factor.
Dose	The amount of a chemical that enters or is absorbed by the body. Dose is usually expressed in milligrams of chemical per kilogram of body weight (mg/kg).
Dust	Solid particles generated by handling, crushing, grinding, rapid impact or detonation, and decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood and grain. Dusts do not tend to flocculate except under electrostatic forces; they do not diffuse in air, but settle under the influence of gravity.
Edema	A swelling of body tissues due to water or fluid accumulation in tissues.
Epidemiology	The study of the pattern of disease in a population of people.

Evaporation	The process by which a liquid is changed into a vapor and mixed into the surrounding air.
Evaporation Rate	The rate at which a liquid is changed to a vapor under standard conditions, usually compared to the rate of another substance that evaporates very quickly.
Excursion Duration	Maximum time period permitted by Cal/OSHA for an exposure to an airborne chemical above its excursion limit but not exceeding its ceiling limit.
Explosive Limits	The range of concentrations (% by volume in air) of a flammable gas or vapor that can result in an explosion from ignition in a confined space. Usually given as Upper and Lower Explosive Limits (see UEL and LEL).
f/cc	A measure of concentration; fibers per cubic centimeter of air.

Flammable	Catches on fire easily and burns rapidly. The National Fire Protection Agency and the U.S. Department of Transportation define a flammable liquid as having a flash point below 100°F (37.8°C). Same as Inflammable.
Flash Point (F.L.P.)	The lowest temperature at which a liquid gives off enough flammable vapor to ignite and produce a flame when an ignition source is present.
Fumes	Gas-like emanation containing minute solid particles arising from the heating of a solid body such as lead, in distinction to a gas or vapor. The physical change is often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce. Odorous gas and vapor should not be called fumes.
Gas	A state of matter in which the material has very low density and viscosity; can expand and contract greatly in response to changes in temperature and pressure; easily diffuse into other gases; readily and uniformly distributes itself throughout any container. A gas can be changed to the liquid or solid state only by the combined effect of increased pressure and decreased temperature (below the critical temperature).
Gram (g)	A metric unit of mass. One U.S. ounce equals 28.4 grams; one U.S. pound equals 454 grams. There are 1000 milligrams (mg) in one gram.

Hazard Communication	Title 8 California Code of Regulations (CCR), Section 5194; "Worker Right To Know" (sic) chemical hazards in the workplace.
IARC	International Agency for Research on Cancer; Monographs
IDLH	Immediately Dangerous to Life or Health. A term used to describe an environment which is very hazardous due to a high concentration of toxic chemicals or insufficient oxygen or both.
Ignition Temperature	The lowest temperature at which a substance will catch on fire and continue to burn.
Incompatible	A term used to describe materials which could cause dangerous reactions from direct contact with one another.
Inflammable	Same as Flammable.
Ingestion	Taking in and swallowing a substance through the mouth.
Inhalation	Breathing in a substance.

Injection	Chemical substance used or handled under high pressure forced through the intact skin.
Irritant	A substance which can cause an inflammatory response or reaction of the eye, skin or respiratory system.
Kilogram (kg)	A metric unit of mass. Equals 1000 grams. Also equals about 2.2 U.S. pounds.
Latency	The time between exposure and the first appearance of an effect.
LEL	Lower Explosive Limit (see Explosive Limits).
Lethal Concentration-50% (LC50)	A concentration of chemical in air that will kill 50% of the test animals inhaling it.

Lethal Dose-50% (LD50)	The dose of chemical that will kill 50% of the test animals receiving it. The chemical may be given by mouth (oral), applied to the skin (dermal), or injected (parenteral). A given chemical will generally show different LD50 values depending on how it is given to the animals. It is a rough measure of acute toxicity.
LFG	Landfill gas - methane, carbon dioxide, nitrogen, oxygen, trace compounds, aromatic and aliphatic hydrocarbons
Liter	A metric unit of volume. One U.S. quart is about 0.9 liter. One liter equals 1000 cubic centimeters.
Local Exhaust Ventilation	A system for capturing and exhausting contaminants from the air at the point where the contaminants are produced (as in welding, grinding, sanding, laboratory experiments, etc.).
Localized	Restricted to one spot or area in the body and not spread all through it - contrast with systemic.
Melting Point	The temperature at which a solid substance changes to the liquid state.
Micron (μ)	One micrometer -- one one-thousandth of a meter.
mg/kg	A way of expressing dose; milligrams of a substance (mg) per kilogram (kg) of body weight (see Dose).
mg/m³	A measure of concentration: weight of substance (mg) in a volume of air (m), often used to express PELs and TLVs.
Milligram (mg)	A metric unit of mass. One gram equals 1000 mg. One U.S. ounce equals 28,375 mg.

Mists	Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming, or atomizing. Mist is formed when a finely divided liquid is suspended in air.
mmHg	A unit of measurement for pressure, millimeters (mm) of the metal mercury (Hg). At sea level, the earth's atmosphere exerts 760 mmHg of pressure.

mmpcf	A measure of concentration; million particles per cubic foot of air.
Monomer	See Polymerization.
MSDS	Material Safety Data Sheet. A form which lists the properties and hazards of a product or a substance.
MSHA	Mine Safety and Health Administration, an agency in the U.S. Department of Labor which regulates safety and health in the mining industry. This agency also tests and certifies respirators (see NIOSH).
Mutagen	A chemical or physical agent able to change the genetic material in cells.
Nervous System	The nerves, brain, and associated mechanisms in the body which control its processes.
NFPA	National Fire Protection Association. NFPA has developed a scale for rating the severity of fire, reactivity and health hazards of substances. References to these ratings frequently appear on MSDSs.
N.A.	Not Applicable
N.D.	Not Determined
NIOSH	National Institute for Occupational Safety and Health, a federal agency which conducts research on occupational safety and health questions and recommends new standards to Federal OSHA. NIOSH, along with MSHA, tests and certifies respirators.
NTP	National Toxicology Program: Annual Report on Carcinogens
Odor Threshold	The lowest concentration of a substance in air that can be smelled. For a given chemical, different people usually have very different odor thresholds.

OSHA - Federal	Occupational Safety and Health Administration, an agency in the U.S. Department of Labor which establishes workplace safety and health regulations. Many states, including California, have their own OSHA programs. State OSHA programs are monitored by the Federal OSHA to ensure they are "at least as effective as" the Federal OSHA program.
Oxygen Deficiency	An atmosphere having less than 19.5% oxygen content of air; normal is 21% oxygen (percent-by-volume). When the oxygen concentration in air falls to 16%, many people become dizzy, experience a buzzing in the ears, and have rapid heartbeat.
Particles	Particulate - see dusts, fumes, mists and smokes.
PEL	Permissible Exposure Limit, an employee exposure to an airborne contaminant in a workday, expressed as an 8-hour TWA concentration, shall not exceed the adopted PEL; ref. T8 CCR §5155, Table AC.
pH	Expresses how acidic or how alkaline a solution or chemical is, using a scale of 1 to 14. For example, a pH of 1 indicates a strongly acidic solution, a pH of 7 indicates a neutral solution, and pH of 14 indicates a strongly alkaline solution.
Polymerization	A chemical reaction in which small molecules (monomers) combine to form much larger molecules (polymers). A hazardous polymerization is a reaction that occurs at a fast rate, and releases large amounts of energy. Many monomers are hazardous in the liquid and vapor states, but form much less hazardous polymers. An example is vinyl chloride monomer, which causes cancer but forms the relatively nontoxic polyvinyl chloride (PVC) plastic.
ppb	Parts per billion, a measure of concentration, such as parts of chemical per billion parts of air or water; ppb is one thousand times smaller than ppm.
ppm	Parts per million, a measure of concentration, such as parts of chemical per million parts of air. PELs and TLVs are often expressed in ppm.
psi	Pounds per square inch. A unit of pressure. At sea level the earth's atmosphere exerts 14.7 psi.
Pulmonary Edema	Filling of the lungs with fluid, which produces coughing and difficulty breathing.

Reaction	A chemical transformation of change.
Reactivity	The ability of a substance to undergo a chemical reaction (such as combining with another substance). Substances with high reactivity are often quite hazardous.

Reproductive Toxin	A chemical which can interfere with the reproductive system.
Respirator	A device worn to prevent inhalation of hazardous substances.
Respiratory System	The breathing system. Includes lungs (alveoli), bronchial tree (air passages), larynx, mouth, nose, and the associated nerves and blood vessels.
Sensitizer	A substance which on first exposure causes little or no reaction in a person, but which on repeated exposure may cause an intense response, not necessarily limited to the site of initial contact (see Allergy).
Skin Absorption	Assimilation of chemical into the body by cutaneous route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance.
Smog	Irritating haze resulting from the sun's effect on certain pollutants in the air, notably those from automobiles and industrial exhausts.
Smoke	An air suspension (aerosol) of particles, often originating from combustion of sublimation. Carbon or soot particles less than 0.1 micron in size result from the incomplete combustion of carbonaceous materials such as coal or oil. Smoke generally contains droplets as well as dry particles. Tobacco, for instance, produces a wet smoke composed of minute tarry droplets.
Solubility	The degree to which a chemical can dissolve in a solvent, forming a Solution.
Solution	A mixture in which the components are uniformly dispersed. All solutions consist of some kind of a solvent (such as water or other liquid) which dissolves another substance, usually a solid.

Solvent	A substance, usually a liquid, (most commonly water, but often an organic compound) into which another substance is dissolved (usually solids).
Specific Gravity	The ratio of the mass of a volume of material to the mass of an equal volume of water, at a given temperature.
STEL	Short-Term Exposure Limit. A term used by ACGIH to indicate the maximum average concentration allowed for a continuous 15 minute exposure period.

Systemic	Spread throughout the body, affecting all body systems and organs, not localized in one spot or area.
Teratogen	A chemical or physical agent which can lead to malformations in the fetus and birth defects in children (live born offspring). Such an agent is called teratogenic. The ability to cause birth defects is termed teratogenicity.
TLV	Threshold Limit Value, an exposure limit recommended by the ACGIH.
Trade Name	The trademark name or commercial name given to material by the manufacturer or supplier.
TWA	Time Weighted Average. The average concentration of a chemical in air over the total exposure time-usually an 8-hour work day.
UEL	Upper Explosive Limit. See Explosive Limits.
Vapors	The gaseous form of substances which are normally in the solid or liquid state (at room temperature and pressure). The vapor can be changed back to the solid or liquid state either by increasing the pressure or decreasing the temperature alone. Vapors also diffuse. Evaporation is the process by which a liquid is changed into the vapor state and mixed with the surrounding air. Solvents with low boiling points will volatilize readily.
Vapor Density	The density of air of the vapor given off by a substance. The vapor density of a chemical is usually compared to the density of air. Vapors lighter than air will tend to rise, while those heavier than air may remain near the ground.

Vapor Pressure	A measure of the tendency of a liquid to evaporate and become a gas. The pressure exerted by a saturated vapor above its own liquid in a closed container at given conditions of temperature and pressure, usually expressed in mmHg. The lighter the vapor pressure, the greater the tendency of the substance to evaporate (see also Evaporation Rate, mmHg, and Volatility).
Viscosity	A relative measure of how slowly a substance pours or flows. Very viscous substances, like molasses, pour very slowly.
Volatility	A measure of how quickly a substance forms vapors at ordinary temperatures. The more volatile the substance is, the faster it evaporates, and the higher the concentrations of vapor (gas) in the air.

NFPA and HMIS (VM&PA) Labeling Systems

HEALTH HAZARD (Blue)	FIRE HAZARD (Red)	REACTIVITY (Yellow)	SPECIFIC HAZARD (White)
0. Normal Material	0. Will not burn	0. Stable	0. Use no water
1. Slightly Hazardous	1. Fl.P. >100°F	1. Unstable if heated	1. Corrosive
2. Hazardous	2. Fl.P. >100°F; not exceeding 200°F	2. Violent chemical change	2. Alkali
3. Extreme Hazard	3. Fl.P. <73°F (boiling pt. at/above 100°F and/or at/above 73°F not exceeding 100°F)	3. Shock & heat may detonate	3. Acid
4. Deadly	4. Fl.P. <73°F (boiling pt. <100°F)	4. May detonate	4. Oxidizer

Training Attendance Record

Topic of Training Session:

Instructor(s):	Location:	Date:	Time:
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We are legally required to maintain records regarding our safety training activities. Please assist us by providing the information indicated below to document your attendance. Thank you.

Name <i>(Please Print)</i>	Department	Title	Supervisor	Signature
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