



CALIFORNIA STATE UNIVERSITY
Stanislaus
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Hazard Communication Program

*This document is a subsection to the University Injury & Illness Prevention Plan
Per California Code of Regulations Title 8 §337 – 340, §3203 and §5194(e)
Code of Federal Regulations Title 29 §1910.1200*

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PLAN REVIEW

This sheet should be completed each time the Hazard Communication Program is reviewed and/or modified. The Director for Safety & Risk Management is responsible to review and approve this plan annually or more frequently as needed per California Code of Regulations Title 8 §337 - 340, §3203 and §5194(e) and Code of Federal Regulations Title 29 §1910.1200.

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1.0 Regulatory Authority

The United States Department of Labor, Occupational Health and Safety Administration, Code of Federal Regulations, Title 29 §1200 and Title 22 §12000 (Proposition 65) and California Code of Regulations, Title 8 §337-340.2, §3203, §3204(e), and §5194.

2.0 Administrative Agency

California Division of Occupational Safety and Health (DOSH), Department of Industrial Relations (Cal/OSHA)

3.0 Background

The purpose of this program is to improve the detection, treatment, and prevention of occupational illness and disease and to support a workers' right to know. It is also intended to ensure that departments and workers have the information necessary to know when they are working with or may be exposed to hazardous substances. Furthermore, it is to ensure that departments provide their employees with training in how to avoid exposure to hazardous substances and what to do if they are accidentally exposed to such substances.

4.0 Scope

- 4.1** This program shall apply to all departments and persons that use, handle, or store hazardous substances as defined in the Hazard Communication Program (HCP) Definitions (Section 6.0). Disposal activities involving hazardous wastes are covered by the California Code of Regulations, Title 22, Div 4.5, Chapter 10, Article 1.
- 4.2** This program applies to any hazardous substance which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.
- 4.3** This program does not apply to:
- a. Any hazardous waste regulated by the EPA Solid Waste Disposal Act, amended by the Resource Conservation and Recovery Act of 1976
 - b. Tobacco or tobacco products
 - c. Wood or wood products
 - d. Articles (manufactured products)
 - e. Food, drugs, or cosmetics intended for personal consumption by employees while in the workplace
 - f. Any product sold at retail which is incidentally sold to the University or an employee, in the same form, approximate amount, concentration, and manner as it is sold to consumers

5.0 Policy

It is the policy of California State University, Stanislaus, to ensure that employees know the properties and potential safety and health hazards of the materials in which they use or to which they are exposed.

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Employees who use or may be exposed to potentially hazardous substances or harmful physical agents shall be informed about the hazards of those substances or physical agents and shall be trained in the precautions to take to prevent exposure and what to do if they are accidentally exposed.

6.0 Definitions

- **Access:** The right and opportunity to examine and copy.
- **Article:** Manufactured item: (1) Which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (3) which does not release, or otherwise result in exposure to, a hazardous substance under normal conditions of use or in reasonably foreseeable emergency resulting from workplace operations.
- **CAS Number:** The unique identification number assigned to specific chemical substances.
- **Chemical Name:** The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) other Chemical Abstracts Services (CAS) rules of nomenclature, or a name which will clearly identify the substance for the purpose of conducting a hazard evaluation.
- **Combustible Liquid:** Any liquid having a flashpoint at or above 100F (37.8C), but below 200F (93.3C), except any mixture having components with flash points of 200F (93.3C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.
- **Common Name:** Any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a substance other than by its chemical name.
- **Compressed Gas :**(a) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70F (21.1 C); or (b) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130F (54.4C) regardless of the pressure at 70F (21.1 C); or (c) A liquid having a vapor pressure exceeding 40 psi at 100F (37.8C).
- **Container:** Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous substance. For purpose of this program pipes or piping systems are not considered to be containers.
- **Designated Representative:** Any individual or organization to which an employee gives written authorization to exercise such employee's rights under this program. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization, except that access to records requires the employee's written consent.
- **Distributor:** A business, other than a manufacturer or importer, which supplies hazardous substances to the University.

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- **Employee:** Employee shall mean any current University employee, former employee, student assistant, graduate assistant, or volunteer.
- **Explosive:** A substance that causes a sudden, almost instantaneous release of pressure, gas, and heat when subject to sudden shock, pressure, or high temperature.
- **Exposure or Exposed:** Any situation arising from a work operation where an employee may ingest, inhale, absorb through the skin or eyes, or otherwise come into contact with a hazardous substance.
- **Flammable:** A substance that falls into one of the following categories: (a) "Aerosol, flammable" means an aerosol that, when tested yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening; (b) "Gas, flammable" means a gas that, at ambient temperature and pressure, forms a flammable mixture with air. (c) "Liquid, flammable" means any liquid having a flashpoint below 100F (37.8C). (d) "Solid, flammable" means a solid, other than blasting agent or explosive, that is liable to cause fire through friction, absorption or moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.
- **Flashpoint:** The minimum temperature at which a liquid gives off vapor in sufficient concentration to ignite.
- **Foreseeable Emergency:** Any potential occurrence such as, but not limited to, spills, fires, explosions, equipment failure, rupture of containers, or failure of control equipment which may or do result in a release of hazardous substance into the workplace.
- **Hazard Warning:** Any words, pictures, symbols, or combination thereof appears on a label or other appropriate form of warning which convey the health hazards and physical hazards of the substance(s) in the container(s).
- **Hazardous Substance:** Any substance which is a physical hazard or a health hazard or is included in the list of Hazardous Substances published by Cal/OSHA.
- **Health Hazard:** A substance for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes substances which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendices B and C provide further definitions and explanations of the scope of health hazards covered by this program, describe the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this program.
- **Immediate Use:** The hazardous substance will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- **Label:** Any written, printed, or graphic material displayed or affixed to containers or hazardous substances.

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- **Manufacturer:** A person, who produces, synthesizes, extracts, or otherwise makes a hazardous substance.
- **Oxidizer:** A substance other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire, either to itself or through the release of oxygen or other gases.
- **Physical Hazard:** A substance for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.
- **Pyrophoric:** A substance that will ignite spontaneously in air at a temperature of 130F (54.4C) or below. Substance: Any element, chemical compound or mixture of elements and/or compounds.
- **Safety Data Sheet:** Required written or printed material to communicate the hazards of hazardous chemical products (see 29 CFR 1910.1200 Appendix D for a detailed description). Employers shall have a safety data sheet for each hazardous chemical which they use.
- **Unstable (reactive):** A substance which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure or temperature.
- **Use:** To package, handle, react, or transfer.
- **Water-reactive:** A substance that reacts with water to release a gas that is either flammable or presents a health hazard.

7.0 Responsibilities

7.1 Safety & Risk Management (S&RM)

- Develop, implement, and monitor the University HCP
- Assist departments in complying with program requirements including labeling, Safety Data Sheets (SDSs), employee information and training, and record keeping
- Maintain a master file of SDSs in the S&RM office
- Train the trainers of the HCP, upon request

7.2 Deans/Department Chairs/Supervisors

- Develop written departmental procedures to ensure effective compliance with the hazard communication requirements of T8 CCR §5194
- Ensure that all requirements of the HCP have been met before employees are exposed to hazardous substances under normal conditions of use or in a foreseeable emergency
- Ensure that employees receive HCP awareness training [T8 CCR §5194 (h)]
- Maintains training records for 3 years

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- Develop and maintain an inventory of hazardous substances present in all work areas within the department
- When ordering suspected hazardous substances, request an SDS where one is not currently present in the department
- Ensure chemical procurement policies are followed by faculty, staff, principal investigators, and students, including ordering particularly hazardous materials or equipment
- Maintain a file of SDSs in a location readily accessible to department employees, and provide directions for electronic SDS database
- Provide any contract worker copies or access to SDSs if working in that department
- Periodically inspect original and secondary containers to ensure they are properly labeled

7.3 Department Safety Coordinators (DSCs)

- Ensure an SDS is available for all hazardous materials
- Ensure all department chemical and hazardous material procurement requests follow procurement policies
- Review requests to procure unauthorized hazardous chemicals and substances with the Dean and S&RM to ensure appropriate action is taken
- Coordinate the collection and disposal of the department's hazardous waste
- Ensure the inventory of current hazardous substances present are updated regularly using the Risk & Safety Solutions (RSS) Chemical Inventory module

7.4 Employees

Due to the number of potential hazards that may exist or be created in the work environment, employees must first use common sense and good judgment at all times. Each employee assigned to work with a hazardous substance shall read and comply with all hazard communication procedures, whether written or oral, before performing assigned duties. Although no single set of safety procedures can guarantee accident free employment or place of employment, the minimum safety standards are listed in Sections 8.0 through 11.0.

8.0 Labeling and Other Forms of Warning [T8 CCR §5194 (F)]

The University is required to use legible labels and other forms of warning to clearly and quickly communicate the identity and hazard(s) of chemicals on campus.

8.1 Each department shall ensure that each storage container of hazardous substances in the workplace is labeled, tagged or marked with the following information:

<i>Label Information</i>	<i>Primary Container</i>	<i>Secondary Container</i>
Identity of the hazardous substance(s)	<input type="checkbox"/>	<input type="checkbox"/>
Applicable hazard warnings	<input type="checkbox"/>	<input type="checkbox"/>
Name and address of the manufacturer	<input type="checkbox"/>	

8.2 All labels are required to have pictograms, a signal word, hazard and precautionary statements,

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the product identifier, and supplier identification (See Appendix A).

8.3 Departments may use alternative signs, placards, or operating procedures in lieu of affixing labels as long as the information in Section 8.1 is conveyed to the employees.

8.4 Departments must re-label containers whenever labels are damaged or defaced.

8.5 Departments are not required to label portable containers into which hazardous substances are transferred from labeled containers if intended only for immediate use by the employee who performs the transfer and not stored in that container between work periods.

8.6 Employees shall not remove or deface existing labels on incoming containers of hazardous substances.

9.0 Safety Data Sheets (SDSs) [T8 CCR §5294 (G)]

On each hazardous chemical, an SDS must provide the same basic information, broken into sections. Each chemical producer can design its own SDS form, and the sections may be in different order. But, the information on any SDS will be the same. The sections include:

Section 1. Identification

Section 2. Hazard(s) identification

Section 3. Composition/information on ingredients

Section 4. First-aid measures

Section 5. Fire-fighting measures

Section 6. Accidental release measures

Section 7. Handling and storage

Section 8. Exposure controls/personal protection

Section 9. Physical and chemical properties

Section 10. Stability and reactivity

Section 11. Toxicological information

Section 12. Ecological information

Section 13. Disposal considerations

Section 14. Transport information

Section 15. Regulatory information

Section 16. Other information, including date of preparation or last revision.

The information contained in SDSs should be used to educate employees and students on hazards associated with chemical found in campus labs and workspaces.

9.1 All SDS information shall be forwarded to the department that ordered it when delivered to campus from the manufacturer or supplier of the hazardous substances.

9.2 Each SDS shall be in English and shall contain specific information as listed above.

9.3 S&RM shall maintain an inventory of SDSs for known hazardous substances on campus.

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9.4 Departments shall obtain the manufacturer or distributor SDS information. Departments shall maintain access to the most current SDS for each hazardous substance used in the department. Departments shall ensure that this information is readily accessible during each work shift to employees when they are in their work area(s).

9.5 If an SDS is not provided by a manufacturer, the department can, with assistance from S&RM:

- Obtain the SDS from the [MSDS Online](#) electronic database
- Send a written request to the manufacturer within seven (7) working days from the date of the employee request
- Provide a copy of the written request to the employee requesting the SDS
- Notify the employee within fifteen (15) days of receipt of the SDS
- Notify the Director of the State Department of Industrial Relations if a response has not been received from the manufacturer within twenty-five (25) working days from the date of the request

10.0 Employee Information and Training [T8 CCR §5194 (h)]

10.1 Departments shall provide all new employees to the University, hazard communication training if their work involves use, transportation, or storage of Chemical Hazards.

10.2 Departments shall provide employees with information and training on specific hazardous substances in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area, and when required to perform hazardous non-routine tasks.

10.3 When training employees who may be exposed to hazardous substances, the department shall ensure that each of the following hazard communication training requirements are covered.

a. Safety Data Sheet (SDS)

When training employees who may be exposed to hazardous substances, each department shall ensure the following information is explained, as outlined in the SDS:

- Any health hazards associated with the use of the substance or mixture.
- Proper precautions for handling, necessary personal protective equipment or other safety precautions necessary to prevent or minimize exposure to the hazardous substance.
- Emergency procedures for spills, fire, disposals, and first aid. This information may relate to an entire class of hazardous substances to the extent appropriate and related to the job.
- Significant revisions in the SDS shall be provided to employees within thirty (30) days.

b. Employee Rights

Each department shall inform employees of the right:

- To personally receive information regarding hazardous substances to which they may be exposed.

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- For their physician or collective bargaining agent to receive such information.
- Against dismissal or other discrimination due to the employee's exercise of their rights afforded by State law.

c. Hazard Communication Information

Departments shall ensure that employees (and students as appropriate) receive training in, and are informed of:

- The requirements of the HCP and hazard communication regulation.
- Any operations in their work area where hazardous substances, or Proposition 65 carcinogens/reproductive toxins, are present.
- The location and availability of the written HCP and SDSs.
- The existence of and instructions for access to the electronic SDS database.
- The methods and observations that may be used to detect the presence or release of hazardous substances in the work area (such as monitoring conducted by the University, continuous monitoring devices, visual appearance or odor of hazardous substances when being released, etc.)
- The physical and health hazards of the substances in the work area, and the measures they can take to protect themselves from these hazards. These measures shall include specific procedures the department has implemented to protect employees from exposure to hazardous substances, such as appropriate work practices, emergency procedures, and personal protective equipment (PPE) to be used.
- The details of the HCP developed by the University, including an explanation of the labeling system and the SDS, and how employees can obtain and use the appropriate hazard information.

11.0 Manufacturer Trade Secret Protection Notice [T8 CCR §5194 (i)]

Under certain circumstances, the manufacturer may withhold (while stating so) the specific chemical identity, including the chemical name and other specific identification of a hazardous substance, from the SDS. However, when a treating physician determines that a medical emergency exists and the chemical identity is required for first-aid treatment, the manufacturer must disclose the trade secret information to the physician.

12.0 Access to Hazardous Areas

- 12.1** Due to the potential for exposure to hazardous substances, designated areas on campus shall have limited access to University employees.
- 12.2** Hazardous areas should be identified by signage on the location door with emergency contact person(s) identified along with their phone number.
- 12.3** If campus employees respond to an emergency call to a hazardous location during off hours, University Police must notify the listed emergency contact person, Department Chair, or S&RM. If an emergency requires the room be entered without clearance, rescue personnel must

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use personal protective equipment (PPE) or do not enter without clearance.

- 12.4** Work should not begin until the area is determined safe to enter by persons with authority and knowledge of the hazards. If there are further questions about the safety of the area, notify S&RM at (209) 667-3057.
- 12.5** If the area cannot be cleared of hazardous material, the space should be closed until cleared for safe entry. Authorized personnel may enter with appropriate PPE. Consult S&RM for proper procedures and clothing.
- 12.6** Custodians should be in contact with persons who have authority and knowledge of the hazards and locations to determine what areas can safely be cleaned.
- 12.7** In the event of a large spill:
- a. Confine the spill, leak, fumes or fire by shutting the room door. Do not touch and avoid contact with the material. If time permits, locate the SDS for any identifiable materials.
 - b. Sound the building fire alarm so evacuation can begin.
 - c. Call Emergency Response at 9-1-1 from any campus phone, or use an emergency blue light call box. Give your name, department, location of the emergency, nature of the incident, description of the material.
 - d. Safely walk to the nearest exit and go to an evacuation gathering area away from the building (Appendix D) then wait for further instructions. Do not return to the building until instructed that it is safe to do so.
- 12.8** Report breakage of any equipment or glassware to the responsible emergency contact person for the Department.

13.0 Hazardous Substance Inventory List

A complete, accurate and up-to-date inventory of hazardous substances used and/or stored on campus is a required element of the HCP. Where possible, elimination of hazardous substances is to be promoted at every opportunity by those conducting the inventory. It is necessary to ensure any hazardous waste generated by reducing inventories is handled correctly. Departments should contact the Campus Hazardous Materials Management Program for hazardous substance and hazardous material disposal information.

13.1 Continuous Inventory

It is essential that departments establish procedures for acquiring SDSs for new hazardous substances and training employee(s) on the hazards of such materials prior to their use. For this purpose,

- a. University department supervisors are responsible for monitoring the existence of hazardous substances in the workplace.
- b. Departments that use hazardous materials should maintain a comprehensive inventory of all hazardous substances that workers may be exposed to.

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- c. Departments that use hazardous materials should maintain a comprehensive inventory of all hazardous substances that workers may be exposed to. Chemical inventory shall be maintained within the Risk & Safety Solutions (RSS) Chemicals module.
- d. All inventoried materials should have a corresponding SDS on file and readily accessible for emergency access, including but not limited to those areas where chemicals and hazardous substances are stored.
- e. Departments shall update their inventory of hazardous materials within RSS Chemicals when shipments are received.
- f. Departments shall have a complete inventory within RSS Chemicals by August 31st annually.

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APPENDICES

Appendix A – Hazard Symbols and Labels

Appendix B – Health Hazard Definitions

Appendix C – Hazard Determination

Appendix D - Evacuation Location Map

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Appendix A – Hazard Symbols and Labels

The Hazard Communication Standard (HCS) requires pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed

within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification. Hazard Symbols used:

<p>Health Hazard</p>  <ul style="list-style-type: none"> • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> • Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> • Explosives • Self-Reactives • Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> • Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> • Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> • Acute Toxicity (fatal or toxic)

Labels may include:

The **Hazardous Materials Identification System (HMIS)** is a numerical hazard rating that incorporates the use of labels with color developed by the American Coatings Association as a compliance aid for the OSHA Hazard Communication (HazCom) Standard.

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The following numbering system is used to rate the hazard:
BLUE = Health Hazard, Ranges 0 (no health risk) to 4 (life threatening)

RED = Flammability, Ranges 0 (will not burn) to 4 (highly flammable)

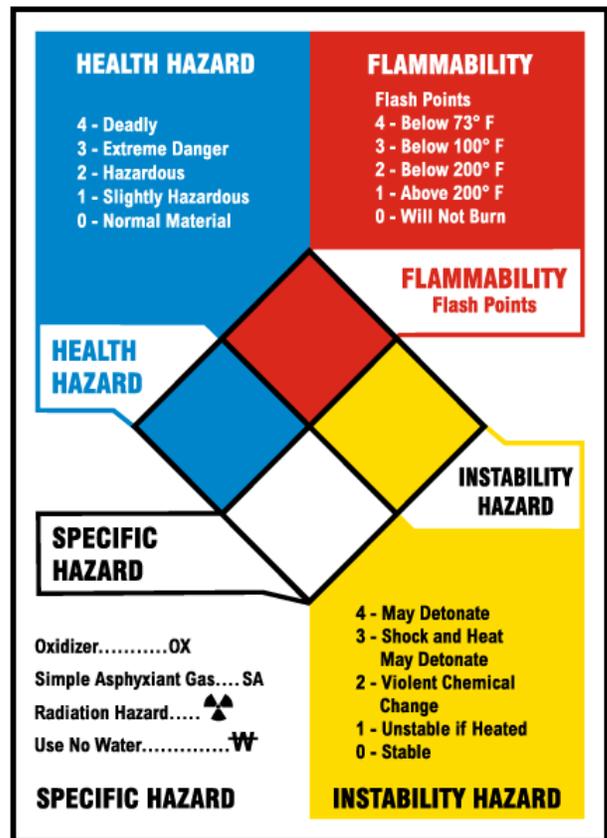
YELLOW = Reactivity, Ranges 0 (normally stable) to 4 (may detonate)

WHITE = Personal Protection Equipment (PPE) to use



- 4. Severe Hazard
- 3. Serious Hazard
- 2. Moderate Hazard
- 1. Slight Hazard
- 0. Minimal Hazard

The **NFPA diamond** provides a quick visual representation of the health hazard, flammability, reactivity, and special hazards that a chemical may pose during a fire. The National Fire Protection Association (NFPA) developed this hazard identification system for emergency responders. The **NFPA diamond** consists of four color-coded fields: blue, red, yellow, and white. The blue, red, and yellow fields—which represent health hazard, flammability, and reactivity, respectively—use a numbering scale ranging from 0 to 4. A value of 0 means that the material poses essentially no hazard, whereas a rating of 4 indicates extreme danger. The white field is used to convey special hazards.



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The GHS labeling system differs from NFPA and HMIS by the hazard rating/category and the expanded GHS hazard classification. Training is required as implementation of the new regulation and labeling systems are “harmonized”. Employees are likely to encounter the GHS label on products, and SDSs, provided by manufacturers and/or distributors. A sample revised HCS label, identifying the required label elements, for secondary containers is shown below:

SAMPLE LABEL

<p>CODE _____ Product Name _____</p>	}	<p>Product Identifier</p>	<p>Hazard Pictograms</p> 
<p>Company Name _____ Street Address _____ City _____ State _____ Postal Code _____ Country _____ Emergency Phone Number _____</p>	}	<p>Supplier Identification</p>	<p>Signal Word Danger</p>
<p>Keep container tightly closed. Store in a cool, well-ventilated place that is locked. Keep away from heat/sparks/open flame. No smoking. Only use non-sparking tools. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Ground and bond container and receiving equipment. Do not breathe vapors. Wear protective gloves. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Dispose of in accordance with local, regional, national, international regulations as specified.</p> <p>In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO₂) fire extinguisher to extinguish.</p> <p>First Aid If exposed call Poison Center. If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.</p>			<p>Hazard Statements</p> <p>Highly flammable liquid and vapor. May cause liver and kidney damage.</p>
<p>Precautionary Statements</p>			<p>Supplemental Information</p> <p>Directions for Use _____ _____</p> <p>Fill weight: _____ Lot Number: _____ Gross weight: _____ Fill Date: _____ Expiration Date: _____</p>

Appendix B – Health Hazard Definitions

Although safety hazards related to the physical characteristics of a substance can be objectively defined in terms of testing requirements (e.g. flammability), health hazard definitions are less precise and more subjective. Health hazards may cause measurable changes in the body such as decreased pulmonary function. These changes are generally indicated by the occurrence of signs and symptoms in the exposed employees such as shortness of breath, a non-measurable, subjective feeling.

Employees exposed to such hazards must be apprised of both the change in body function and the signs and symptoms that may occur to signal that change.

The determination of occupational health hazards is complicated by the fact that many of the effects or signs and symptoms occur commonly in non-occupationally exposed populations, so that effects of exposure are difficult to separate from normally occurring illnesses. Occasionally, a substance causes an effect that is rarely seen in the population at large, such as angiosarcomas caused by vinyl chloride exposure, thus making it easier to ascertain that the occupational exposure was the primary causative factor. More often, however, the effects are common, such as lung cancer. The situation is further complicated by the fact that most substances have not been adequately tested to determine their health hazard potential, and data do not exist to substantiate these effects.

There have been many attempts to categorize effects and to define them in various ways. Generally, the terms acute and chronic are used to delineate between effects on the basis of severity or duration. Acute effects usually occur rapidly as a result of short-term exposures, and are of short duration. Chronic effects generally occur as a result of long-term exposure, and are of long duration.

The acute effects referred to most frequently are those defined by the American National Standards Institute (ANSI) standard for Precautionary Labeling of Hazardous Industrial Chemicals (Z129.1-1982)-irritation, corrosivity, sensitization and lethal dose. Although these are important health effects, they do not adequately cover the considerable range of acute effects which may occur as a result of occupational exposure, such as, for example, narcosis.

Similarly, the term chronic effect is often used to cover only carcinogenicity, teratogenicity, and mutagenicity. These effects are obviously a concern in the workplace, but again, do not adequately cover the area of chronic effects, excluding, for example, blood dyscrasias (such as anemia), chronic bronchitis and liver atrophy.

The goal of defining precisely, in measurable terms, every possible health effect that may occur in the workplace as a result of chemical exposures cannot realistically be accomplished. This does not negate the need for employees to be informed of such effects and protected from them.

Appendix B, which is also mandatory, outlines the principles and procedures of hazard assessment. For purposes of this section, any substances which meet any of the following definitions, as determined by the criteria set forth in Appendix B are health hazards:

1. **Carcinogen:** A substance is considered to be a carcinogen if:
 - a. It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or

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- b. It is listed as a carcinogen or potential carcinogen in the Annual Report and Carcinogens published by the National Toxicology Program (NTP); or,
 - c. It is regulated by OSHA as a carcinogen.
2. **Corrosive:** A substance that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a substance is considered to be corrosive if, when tested on the intact skin of albino rabbits by the method described by the U.S. Department of Transportation in Appendix A to 49 CFR Part 173, it destroys or changes irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.
3. **Highly toxic:** A substance falling within any of the following categories:
- a. A substance that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
 - b. A substance that has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
 - c. A substance that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.
4. **Irritant:** A substance, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A substance is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41 for four hours' exposure or by other appropriate techniques, it results in an empirical score of five or more. A substance is an eye irritant if so determined under the procedure listed in 16 CFR 1500.42 or other appropriate techniques.
5. **Sensitizer:** A substance that causes a substantial proportion of exposed people or animal to develop an allergic reaction in normal tissue after repeated exposure to the substance.
6. **Toxic:** A substance falling within any of the following categories:
- a. A substance that has a median lethal dose (LD50) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
 - b. A substance that has a median lethal dose (LD50) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
 - c. A substance that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

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7. **Target organ effects:** The following is a target organ categorization of effects which may occur, including examples of signs and symptoms and substances which have been found to cause such effects. These examples are presented to illustrate the range and diversity of effects and hazards found in the workplace, and the broad scope employers must consider in this area, but are not intended to be all inclusive.
- a. **Hepatotoxins:** Substances which produce liver damage. Signs and Symptoms: Jaundice; liver enlargement. Substances: Carbon tetrachloride; nitrosamines.
 - b. **Nephrotoxins:** Substances which produce kidney damage. Signs and Symptoms: Edema; proteinuria. Substances: Halogenated hydrocarbons; uranium.
 - c. **Neurotoxins:** Substances which produce their primary toxic effects on the nervous system. Signs and Symptoms: Narcosis behavioral changes; decrease in motor functions. Substances: Mercury; carbon disulfide.
 - d. **Agents which act on the blood or hematopoietic system:** Decrease hemoglobin function; deprive the body tissues of oxygen. Signs and Symptoms: Cyanosis; loss of consciousness. Substances: Carbon monoxide; cyanides.
 - e. **Agents which damage the lung:** Substances which irritate or damage the pulmonary tissue. Signs and Symptoms: Cough; tightness in chest; shortness of breath. Substances: Silica; asbestos.
 - f. **Reproductive toxins:** Substances which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis). Signs and Symptoms: Birth defects; sterility. Substances: Lead; dibromochloropropane (DBCP)-a pesticide.
 - g. **Cutaneous hazards:** Substances which affect the dermal layer of the body. Signs and Symptoms: Defatting of the skin; rashes; irritation. Substances: ketones chlorinated compounds.

Appendix C - Hazard Determination

The quality of a HCP is largely dependent upon the adequacy and accuracy of the hazard determination. The hazard determination requirement of this standard is performance-oriented. Manufacturers, importers, and employers evaluating substances are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the substances produced or imported in accordance with the criteria set forth in this Appendix.

Hazard evaluation is a process, which relies heavily on the professional judgment of the evaluator, particularly in the area of chronic hazards. The performance orientation of the hazard determination does not diminish the duty of the manufacturer, importer or employer to conduct a thorough evaluation, examining all relevant data and producing a scientifically defensible evaluation. For purposes of this standard, the following criteria shall be used in making hazard determinations that meet the requirements of this standard.

1. **Carcinogenicity:** As described in subsection §5194 (d) (4) and Section 1, a determination by the National Toxicology Program, the International Agency for Research on Cancer, or OSHA that substances subject to regulation as a carcinogen or potential carcinogen will be considered conclusive evidence for purposes of this section.
2. **Human data:** Where available, epidemiological studies and case reports of adverse health effects shall be considered in the evaluation.
3. **Animal data:** Human evidence of health effects in exposed populations is generally not available for the majority of substances produced or used in the workplace. Therefore, the available results of toxicological testing in animal populations shall be used to predict the health effects that may be experienced by exposed workers. In particular, the definitions of certain acute hazards refer to specific animal testing results (see Appendix B).
4. **Adequacy and reporting of data:** The results of any studies which are designed and conducted according to established scientific principles, and which report statistically significant conclusions regarding the health effects of a substance shall be a sufficient basis for a hazard determination and reported on any safety data sheet. The manufacturer, importer, or employer may also report the results of other scientifically valid studies, which tend to refute the findings of hazard.

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Appendix D – Evacuation Location Map

