

Risk Management Services

Hazard Communication

Page

Introduction

Purpose	1
Background	1
Who's Covered?	2
Responsibilities	2
Explanation of Key Terms	3

How It Works

List of Hazardous Chemicals	4
Labels and Other Forms of Warning	4
(Material) Safety Data Sheets	4
Employee Information and Training	5
Hazardous, Non-Routine Tasks	6
Chemicals in Unlabeled Pipes	6
Informing Contractors	6
Contractors Informing Employees	6

Appendices

Appendix 1 – Hazardous Chemical Definitions	7
Appendix 2 – Sample GHS Label	11
Appendix 3 – GHS Pictograms and Hazards	12
Appendix 4 - Safety Data Sheet (SDS) Format	13

INTRODUCTION

PURPOSE

The purpose of this Health and Safety Instruction (HSI) is to reduce chemically-related illnesses and injuries at work.

BACKGROUND

Chemical exposure may cause or contribute to many serious health effects such as heart ailments, kidney and lung damage, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and have the potential to cause fires, explosions and/or other serious accidents.

To ensure that employees know about the hazards of chemicals to which they are exposed and how to protect themselves, the Occupational Safety and Health Administration (OSHA) issued the [Hazard Communication Standard \(29 CFR 1910.1200\)](#), also known as "The Right to Know" or "The Need to Know" standard.

Under OSHA's Hazard Communication Standard, chemical manufacturers and importers are required to evaluate and classify the hazards of each chemical they produce or import and communicate this hazard information to the user through labels and material safety data sheets (MSDSs) or safety data sheets (SDSs). The **University** is required to:

- Identify and list the hazardous chemicals in the workplace;
- Ensure that all containers of hazardous chemicals are labeled and that (M)SDSs are available for each chemical;
- Communicate hazard information to employees through labels, (M)SDSs and formal training programs, and
- Provide an up-to-date written Hazard Communication Program.

This HSI, developed by **Risk Management Services**, serves as the University of Arizona's (U of A's) written Hazard Communication Program. It provides guidance for reducing chemically-related illnesses and injuries at work and achieving compliance with OSHA's Hazard Communication standard.

WHO'S COVERED?

Employees are covered by this HSI if they:

- Work in a non-laboratory workplace where any known hazardous chemical is kept or used, and
- May be exposed to any hazardous chemical under normal working conditions or in a foreseeable emergency

Employees who work with hazardous chemicals in laboratories are governed by a different OSHA standard written specifically for laboratory workers ([29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in Laboratories](#)). University compliance with this standard is managed by the [Office of Radiological, Chemical and Biological Safety \(ORCBS\)](#). Laboratory workers are advised to consult with ORCBS for training and compliance assistance.

RESPONSIBILITIES

Safety is a line-management function. The core of the document is color-coded as below to clearly identify who is responsible for the various aspects of the Program:

- **Management** is ultimately responsible for implementation of the Hazard Communication Program, including ensuring that those under their control have the authority and resources to implement the Program, and for ensuring that areas under their charge are in compliance with the Program.
- **Supervision** is operationally responsible for implementation of the Program, and
- **Employees** are responsible for following rules and working safely.
- **Risk Management Services** is a technical resource to line-management.

EXPLANATION OF KEY TERMS

A **Hazardous chemical** means any chemical which is classified as a *physical hazard* or a *health hazard*.

Physical hazard means a chemical that is classified as posing one of the following hazardous effects: *explosive; flammable (gases, aerosols, liquids, or solids); combustible dust; oxidizer (liquid, solid or gas); self-reactive; pyrophoric (gas, liquid or solid); self-heating; organic peroxide; corrosive to metals; gas under pressure; or in contact with water emits flammable gas* (see Appendix 1 for detailed explanations of these hazards).

Health hazard means a chemical which is classified as posing one of the following hazardous effects: *acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); aspiration hazard, or simple asphyxiant* (see Appendix 1 for detailed explanations of these hazards).

HOW IT WORKS

LIST OF HAZARDOUS CHEMICALS

First-line supervisors are responsible for keeping a current list of all hazardous chemicals present in their work area of charge. The list must include the product identifiers for the hazardous chemicals as they appear on the labels and (M)SDSs.

LABELS AND OTHER FORMS OF WARNING

Currently, all hazardous chemicals received from manufacturers, importers, or distributors must be labeled, tagged, or marked with at least the identity, appropriate hazard warning and name and address of the chemical manufacturer, importer, or other responsible party. Effective June 1, 2015, labels must be consistent with the [Globally Harmonized System of Classification of Labeling of Chemicals \(GHS\)](#) and include: product identifier; signal word; hazard statement(s); pictogram; precautionary statement(s), and name, address, and telephone number of the chemical manufacturer, importer, or other responsible party (see Sample GHS Label in Appendix 2). **Employees receiving hazardous chemical shipments** must verify proper labels before releasing any container for use.

In the workplace, **First-line supervisors** are responsible for ensuring that all hazardous chemicals remain properly labeled while in their work area of charge. Hazardous chemicals must be labeled, tagged or marked with their original label, as shipped, OR with product identifier and words, pictures or symbols, or combination thereof, which provide at least the general information regarding the hazards of the chemical, which in conjunction with the (M)SDS and other information and training, provide employees with the specific hazards of the chemicals.

Potable containers into which hazardous chemicals are transferred from labeled containers, and which are under the control, and intended only for the immediate use, of only the employee who performs the transfer, are not required to be labeled.

(MATERIAL) SAFETY DATA SHEETS

Material Safety Data Sheets (MSDSs) and Safety Data Sheets (SDSs) explain in detail the hazards of chemicals and how they can be used safely. The information in the two documents is largely the same except SDSs are required to be presented in a consistent, user-friendly format (see Appendix 4 for more information). Currently, chemical manufacturers, importers, or distributors are required to provide either an MSDS or SDS for each hazardous chemical to downstream users. Effective June 1, 2015, MSDS will no longer be allowed and SDSs must be consistent with the [\(GHS\)](#).

First-line supervisors are responsible for ensuring that (M)SDSs, for all hazardous chemicals present in their work area of charge, are available for review by all employees during each work shift (electronic access and other alternatives to maintaining paper copies of the (M)SDSs is permitted as long as no barriers to immediate employee access in the workplace are created by such options).

EMPLOYEE TRAINING AND INFORMATION

First-line supervisors are responsible for ensuring that hazard communication training is provided to their employees before they are assigned to work in areas where the possibility of exposure to hazardous chemicals exist, and whenever a new hazardous material is introduced into their workplace.

Risk Management Services has developed a Hazard Communication training, which is available on DVD or through the internet in a narrated, PowerPoint format. It provides information and training on categories of hazards (e.g., flammability, carcinogenicity); details of the University of Arizona Hazard Communication Program, including its availability, an explanation of the labeling requirements, SDSs, how to obtain and use the appropriate hazard information, and the methods and observations that may be used to detect the presence or release of hazardous chemicals.

In addition to providing Risk Management Services' Hazard Communication training to their employees, **First-line supervisors** are also responsible for providing the following additional information and training:

Additional **information** for employees must include:

- All operations and locations in the work area where hazardous chemicals are present, and
- The location and availability of the list of hazardous chemicals used in the area and (M)SDSs.

Additional **training** for employees must include:

- The chemicals hazards in the assigned work area;
- How to protect against such hazards. Included must be specific University of Arizona rules and procedures concerning work practices, emergencies, and care and use of protective equipment.

First-line supervisors must keep adequate documentation to show that information and training has been provided. Meeting minutes, training evaluations, certification sheets, memoranda, sign-in sheets and training tests are a few documentation schemes that can be employed. **Risk Management Services** maintains records for supervisors of employees who complete their Hazard Communication training and provide the required documentation.

HAZARDOUS, NON-ROUTINE TASKS

First-line supervisors planning to do non-routine tasks involving the use of hazardous chemicals (jobs that are not routine for an employee because of infrequency, location, or type, for example, the cleaning of tanks) must consult with **Risk Management Services** (621-1790) prior to the commencement of work to discuss the hazards associated with the tasks and the planned hazard controls. **First-line supervisors** must ensure that employees are informed of the hazards and required control measures, including safe work practices and proper personal protective equipment.

CHEMICALS IN UNLABELED PIPES

Piping systems containing hazardous chemicals are not required to be labeled under the Hazard Communication standard. However, **first-line supervisors** are responsible for informing their employees of the hazards associated with chemicals in unlabeled pipes in their work area.

If piping systems are labeled, they should be labeled in accordance with: *ASME A13.1-2007, Scheme for the Identification of Piping Systems*. Contact Risk Management Services for details.

INFORMING CONTRACTORS

U of A employees who oversee outside servicing personnel (i.e. contractors) are responsible for ensuring that the contractors are provided with the following information:

- A list of hazardous chemicals to which contractor employees are likely to be exposed to while on the job site;
- Measures that contractor employees may take to lessen the risk of exposure;
- Steps the U of A has taken to lessen the risks;
- The location and availability of (M)SDSs for hazardous chemicals to which contractor employees are likely to be exposed, and
- Procedures to follow if contractor employees are exposed.

CONTRACTORS INFORMING U OF A EMPLOYEES

U of A employees who oversee outside servicing personnel are responsible for ensuring that contractors entering the University of Arizona with hazardous materials, supply (M)SDSs for those products the contractor may expose U of A employees to while working on site. (M)SDSs must be retained in the project file.

APPENDIX 1 – HAZARDOUS CHEMICAL DEFINITIONS

PHYSICAL HAZARDS

Explosive: An *explosive* chemical is a solid or liquid chemical which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings (e.g., black powder, nitroglycerin, trinitrotoluene or TNT, lead azide, potassium picrate).

Flammable Gases: A *flammable gas* means a gas having a flammable range with air at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi) (e.g., propane, acetylene, natural gas hydrogen).

Flammable Aerosols: *Aerosol* means any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, and fitted with a release device allowing the contents to be ejected as particles in suspensions in a gas, or as a foam, paste, powder, liquid or gas. Aerosols are considered flammable if they contain flammable liquids, flammable liquids or flammable solids (e.g., spray paints, lubricants, solvent-based cleaners).

Flammable Liquids: A *flammable liquid* means a liquid having a flash point of not more than 93°F (199.4°F) (e.g., diesel, acetone, lacquer thinner, petroleum distillates, kerosene, oils, gasoline).

Flammable Solids: *Flammable solid* means a solid which is a readily combustible solid, or which may cause or contribute to fire through friction (e.g., zinc powder, sulfur, benzoyl peroxide, picric acid, paraformaldehyde).

Combustible Dust: *Combustible dust* means a combustible particulate solid that presents a fire or deflagration hazard when suspended in air or some other oxidizing medium over a range of concentrations, regardless of particle size, shape or chemical composition (e.g., flour, grain dust, metal dust, sugar, wood dust).

Oxidizing Gases: *Oxidizing gas* means any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does (e.g., oxygen, chlorine, nitrous oxide).

Oxidizing Liquids: *Oxidizing liquid* means a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material (e.g., nitric acid, bromine, hydrogen peroxide).

Oxidizing Solids: *Oxidizing solid* means a solid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material (e.g., ammonium nitrate, calcium hypochlorite, potassium dichromate).

Self-Reactive Chemicals: *Self-reactive chemicals* are thermally unstable liquid or solid chemicals liable to undergo a strongly exothermic decomposition even without participation of oxygen (air) (e.g., methyl acrylate, vinyl acetate, epoxides, organic peroxides).

Pyrophoric Gas: *Pyrophoric gas* means chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130°F (54.4°C) or below (e.g., silane, arsine, diborane).

Pyrophoric Liquids: *Pyrophoric liquid* means a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air (e.g., tert-butyllithium, triethylaluminum).

Pyrophoric Solids: *Pyrophoric solid* means a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air (e.g., white phosphorus, lithium, potassium).

Self-Heating Chemicals: A *self-heating chemical* is a solid or liquid chemical, other than a *pyrophoric liquid or solid*, which, by reaction with air and without energy supply, is liable to self-heat (e.g., linseed oil, other seed oils, rosewood oil).

Organic Peroxides: *Organic peroxide* means a liquid or solid organic chemical which contains the bivalent –O–O– structure and as such is considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals (e.g., methyl ethyl ketone peroxide, benzoyl peroxide).

Corrosive to Metals: A chemical which is *corrosive to metals* means a chemical which by chemical action will materially damage, or even destroy, metals (e.g., hydrochloric acid, nitric acid, potassium hydroxide).

Gases Under Pressure: *Gases under pressure* are gases which are contained in a receptacle at a pressure of 200 kPa (29 psi) (gauge) or more, or which are liquefied or liquefied and refrigerated (e.g., nitrogen argon, oxygen ammonia, liquid nitrogen, hydrogen, Freon, air).

Chemicals Which in Contact with Water, Emit Flammable Gases: *Chemicals which, in contact with water, emit flammable gases* are solid or liquid chemicals which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities (e.g., calcium carbide, sodium metal).

HEALTH HAZARDS

Acute Toxicity: *Acute toxicity* refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or inhalation exposure of 4 hours (e.g., paint thinner, xylene, phenol, sodium cyanide).

Skin Corrosion/Irritation: *Skin corrosion* is the production of irreversible damage to the skin (e.g., strong acids such as sulfuric acid and muriatic acid, strong alkalis such as sodium hydroxide and cement, phenol). *Skin irritation* is the production of reversible damage to the skin (e.g., weak acids, weak alkalis, solvents, detergents, disinfectants, oils).

Serious Eye Damage/Eye Irritation: *Serious eye damage* is the production of irreversible tissue damage in the eye, or serious physical decay of vision (e.g., strong acids such as sulfuric acid and muriatic acid, strong alkalis such as sodium hydroxide and cement, phenol). *Eye irritation* is the production of reversible damage in the eye (e.g., weak acids, weak alkalis, solvents, detergents, disinfectants, oils).

Respiratory or Skin Sensitization: *Respiratory sensitizer* means a chemical that will lead to hypersensitivity of the airways following inhalation of the chemical (e.g., isocyanate paints, soldering resins, formaldehyde). *Skin sensitizer* means a chemical that will lead to an allergic response following skin contact (e.g., isocyanate paints, epoxies, formaldehyde, quaternary ammonium disinfectants, chromium).

Germ Cell Mutagenicity: A *germ cell mutagen* is a chemical that may cause permanent changes in the amount or structure of the genetic material (i.e., genetic defects), which can be passed on to offspring (i.e., heritable changes) (e.g., formaldehyde, coal tars and pitches).

Carcinogenicity: *Carcinogen* means a substance or a mixture of substances which induce cancer or increase its incidence (e.g., silica or sand and asbestos, which cause lung cancer, some wood dusts, such as oak and beech, which cause nasal cancer, and benzene, which causes leukemia).

Reproductive Toxicity: *Reproductive toxicity* includes adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on development of the offspring (e.g., lead, mercury, chlorinated solvents and pesticides, polychlorinated biphenyls or PCBs, toluene).

Specific Target Organ Toxicity (Single Exposure): *Specific target organ toxicity – single exposure*, means specific, non-lethal target organ toxicity arising from a single exposure to a chemical (e.g., solvents, which affect the central nervous system).

Specific Target Organ Toxicity (Repeated Exposure): *Specific target organ toxicity – repeated exposure*, means specific, non-lethal target organ toxicity arising from a single exposure to a chemical (e.g., silica or sand, asbestos and chromium, which affect the lungs, and lead, which affect blood forming cells, the central nervous system and kidneys).

Aspiration Hazard: *Aspiration hazard* means the danger of drawing liquid or solid chemical into the lungs leading to severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death. Aspiration can occur through the mouth or nose, or indirectly from vomiting (e.g., gasoline, kerosene, turpentine).

Simple Asphyxiant: *Simple asphyxiant* means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death (e.g., argon, nitrogen, helium).

HAZARDS NOT OTHERWISE CLASSIFIED

Hazards not otherwise classified means an adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes.

APPENDIX 2 – SAMPLE GHS LABEL

As of June 1, 2015, all hazardous chemical labels will be required to have the product identifier and supplier information and GHS-standardized: pictograms (see Appendix 3 GHS-Standardized Pictograms and Hazards); a signal word, and hazard and precautionary statements. Supplemental information can also be provided on the label, as needed.

SAMPLE LABEL

<p>CODE _____ Product Name _____</p>	}	<p>Product Identifier</p>	
<p>Company Name _____ Street Address _____ City _____ State _____ Postal Code _____ Country _____ Emergency Phone Number _____</p>	}	<p>Supplier Identification</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>Precautionary Statements</p>
			<p>Hazard Pictograms</p> <div style="display: flex; justify-content: space-around;"></div> <p style="text-align: center;">Signal Word Danger</p> <p>Hazard Statements</p> <p>Highly flammable liquid and vapor. May cause liver and kidney damage.</p>
			<p>Supplemental Information</p> <p>Directions for Use</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Fill weight: _____ Lot Number: _____ Gross weight: _____ Fill Date: _____ Expiration Date: _____</p>

APPENDIX 3 – GHS PICTOGRAMS AND HAZARDS

<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)

APPENDIX 4 – SAFETY DATA SHEET (SDS) FORMAT

As of June 1, 2015, Safety Data Sheets will be required to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below.

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*

Section 13, Disposal considerations*

Section 14, Transport information*

Section 15, Regulatory information*

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

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12–15.