



## **Tufts University Chemical Hazard Communication Plan**

TUFTS ENVIRONMENTAL HEALTH AND SAFETY  
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## I. Purpose

The purpose of the Hazard Communication Plan is to describe policies and procedures that promote employee safety through training and communication on the safe use, handling and storage of hazardous chemicals. The plan establishes guidelines for informing employees about the hazards of chemicals in the workplace and the procedures needed to protect themselves from these hazards.

This plan complies with the requirements of the Occupational Safety and Health Administration (OSHA) Hazard Communication regulation, 1910.1200.

## II. Requirements of the Hazard Communication Regulation (HCR)

- Each employee must be made aware that OSHA mandates that he or she is entitled to know of the chemical hazards which exist in their workplace;
- Employers must inventory and evaluate all chemicals used in the workplace to determine whether or not they fall within the scope of the HCR;
- Materials are deemed to be hazardous if they are specifically named in the Federal Regulations, have a Threshold Limit Value assigned by the American Conference of Governmental Industrial Hygienists (ACGIH), have been named by the National Toxicology Program or the International Agency for Research on Cancer as a carcinogen, or if they meet the specific laboratory standards for flammables, corrosives, toxins, and irritants defined in 1910.1000 Subpart Z Air Contaminants;
- Each chemical container containing a regulated chemical must **be labeled** to identify it and the label must also indicate how the material is harmful to a person should he or she be exposed to it without proper protection;
- Supervisors must obtain a **Safety Data Sheet (SDS)** for each hazardous chemical used at the workplace. The SDS must identify the product, explain its nature and the hazards involved in its use, the precautions to be taken for its safe use, and the procedures required in the case of inadvertent contact with the material or accidental release from its container;
- The SDS must be available at all times for use by employees who may be exposed to the hazardous material during the course of their employment. Employees must know how to interpret the technical language used to describe the material and fully understand the precautions required, e.g. **the use of ventilation and personal protective equipment**, and the emergency procedures.

### Exceptions to the Hazard Communication Standard

The Hazard Communication Standard does not apply to chemicals in the following categories:

- any article formed to a specific shape that does not release hazardous chemicals under normal use.
- any food, food additive, drug or cosmetic.

- distilled spirits, wines or malt beverages.
- products intended for personal use and consumption.

Employees using products of this type are exempted from the provisions of the Standard so long as the products are used in the same way and to the same degree that they are used by the general consumer. As an example, housekeepers would not be exempted from the provisions when using a strong industrial cleanser that is available to the general consumer because of the greater time each day that they spend using it.

### III. Definitions

***Hazardous Chemical/Material*** Any element, chemical compound, or mixture of elements which may be physical hazard or a health hazard. Physical hazards include flammability, combustibility, instability, explosiveness, and water reactivity. Health hazards are toxic, poisonous or corrosive causing damage to the eyes, skin, lungs, internal organs, etc.

***Safety Data Sheet (SDS)*** Written information from the manufacturer of a chemical describing the hazardous ingredients, physical and chemical data, fire and explosion hazards, reactivity, health hazards, precautions for safe handling, and special protection information.

***OSHA*** Occupational Safety and Health Administration of the US Department of Labor, the federal agency responsible for regulating and enforcing safety and health requirements in the workplace.

### IV. Responsibilities

#### ***Tufts Environmental Health and Safety***

Tufts Environmental Health and Safety (TEHS) is responsible for the development and maintenance of the Hazard Communication Plan. TEHS provides initial training to all employees that will be exposed to chemicals directly or indirectly while performing their job tasks.

#### ***Supervisors***

Supervisors at all levels, including Principal Investigators, have the primary responsibility for informing and training employees about safe work practices for the specific hazardous chemicals that they will use. This training should be specific to the hazards in their work area. This will be done before the work is started. This training will include the location of a list of chemicals in the work area and the location of Safety Data Sheets for each chemical on the list. Additional training includes information on using the information contained on the Safety Data Sheet to plan every work activity involving chemicals.

#### ***Employees***

It is the responsibility of every employee to adhere to established safety policies and procedures and to conduct operations in a safe manner. Generally, this means following the Safety Data Sheet information and the Standard Operating Procedure for the task involving chemicals. Employees should report any unsafe condition to their supervisor and Tufts Environmental Health and Safety. Tufts EHS is available at all times to advise the supervisor and employee on the Safety Data Sheet, the Chemical Label and the actions required to protect health.

## V. Employee Rights

Employees who may be exposed to hazardous chemicals are guaranteed access to the following:

- Workplace Chemical Inventories
- Safety Data Sheets (SDS's)
- Labels on all containers of chemicals

In addition, employees shall receive training on the hazards of chemicals and on the measures that they can take to protect themselves.

The University must provide employees with appropriate personal protective equipment.

You have the right to file a complaint against the University regarding alleged violations of the Hazard Communication regulation. If you file a complaint, you are protected from:

- discharge
- cause for discharge
- discipline
- discrimination
- loss of pay, position, seniority or benefits

Alleged violations of the Standard should be referred to your supervisor or TEHS. However, you always have the right to file a complaint with the OSHA.

## **VI. Hazard Communication Container Labels**

OSHA has updated the requirements for labeling of hazardous chemicals under its Hazard Communication Standard (HCS). As of June 1, 2015, all labels are required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. A sample revised HCS label, identifying the required label elements, is shown on the right. Supplemental information can also be provided on the label as needed.

### **Labels**

A label is any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

Existing labels on new containers of hazardous chemicals or containers in storage shall not be removed or defaced.

Employees are not required to work with a hazardous chemical from an unlabeled container except for a portable container intended for the immediate use by the employee who performs the transfer. However, hazard information may not be withheld.

Labels or other forms of hazard warnings, such as tags or placards, provide immediate warning of potential danger. They may be used to warn of a variety of potential physical hazards or health hazards.

### **Unlabeled Pipes**

It is the responsibility of the supervisor to be aware of any potential chemical hazard, including unlabeled pipes or ducts, in the work area. The supervisor should convey this information to employees along with any precautions which must be taken. It is the policy of Tufts University that all pipes transporting hazardous chemicals be labeled. It is the responsibility of Facilities Services to ensure that all utility pipes are labeled properly.

**SAMPLE LABEL****PRODUCT IDENTIFIER**

CODE \_\_\_\_\_

Product Name \_\_\_\_\_

**SUPPLIER IDENTIFICATION**

Company Name \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Postal Code \_\_\_\_\_ Country \_\_\_\_\_

Emergency Phone Number \_\_\_\_\_

**PRECAUTIONARY STATEMENTS**

Keep container tightly closed. Store in 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 measure 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.

**In Case of Fire:** use dry chemical (BC) or Carbon dioxide (CO<sub>2</sub>) fire extinguisher to extinguish.

**First Aid**

If exposed call Poison Center.

If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.

**HAZARD PICTOGRAMS****SIGNAL WORD**

**Danger**

**HAZARD STATEMENT**

**Highly flammable liquid and vapor.  
May cause liver and kidney damage.**

**SUPPLEMENTAL INFORMATION****Directions for use**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Fill weight: \_\_\_\_\_ Lot Number \_\_\_\_\_

Gross weight: \_\_\_\_\_ Fill Date: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

For more information: [www.osha.gov](http://www.osha.gov)



(800) 321-OSHA (6742)

## VII. Hazard Communication Pictograms

As of June 1, 2015, the Hazard Communication Standard (HCS) required 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.

### HCS Pictograms and Hazards

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

For more information: [www.osha.gov](http://www.osha.gov)

**OSHA**  
(800) 321-OSHA (6742)

## VIII. Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDS) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products to the employer, supervisor and employee.

A Safety Data Sheet (SDS) is a document containing chemical hazard and safe handling information and is prepared in accordance with the OSHA Hazard Communication Standard.

Chemical manufacturers and distributors must provide purchasers of hazardous chemicals with the appropriate SDS for each hazardous chemical purchased.

If an SDS was not provided with the shipment of a hazardous chemical, the purchaser must request one in writing from the manufacturer or distributor in a timely manner.

The University must make SDSs accessible to employees or designated representatives.

As of June 1, 2015, the HCS will require new SDSs 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** list 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 through 15(29 CFR 1910.1200(g)(2)).

**Employers must ensure that SDSs are readily accessible to employees.**

See Appendix D of 1910.1200 for a detailed description of SDS contents.

For more information: [www.osha.gov](http://www.osha.gov)

## Availability

All manufacturers are required to provide SDS sheets. Links to obtain SDS sheets are also available on line at <http://publicsafety.tufts.edu/ehs/informational-links/>. SDS sheets specific to the chemicals used in each work area should be on file within that area. If a department has problems getting an SDS for a particular chemical, contact TEHS and we will assist in acquiring the SDS for that product.

Safety Data Sheets may be stored in paper form, electronically in a file on a computer or server, or both. However, all employees must be able to access the SDS for each chemical at all times that they may handle or be exposed to the chemical.

All employees should be aware of the location of the SDS's for chemicals they use and assist the supervisor with keeping the chemical and SDS inventory up-to-day.

## Requirements

- Employees should be familiar with the information contained in the SDS before a chemical is used. Questions should be directed to the supervisor or Tufts Environmental Health and Safety.
- Chemicals without an SDS should not be used in the work area. These materials should be returned to the vendor or held until an SDS is received and evaluated.
- Employees should not accept samples of chemicals without first obtaining an SDS.

## Understanding the Safety Data Sheet

### Toxicity and Health Hazards

Toxicology is the study of the nature and action of poisons. Toxicity is the ability of a chemical molecule or compound to produce injury once it reaches a susceptible site in or on the body. Descriptions of toxicity (e.g. low, moderate, severe, etc.) depend on the amount needed to cause an effect or the severity of the effect. Toxicity hazard is the probability that injury will occur considering the manner in which the substance is used.

## **Dose-Response Relationships**

The potential toxicity (harmful action) inherent in a substance is manifest only when that substance comes in contact with a living biological system. A chemical normally thought of as “harmless” will evoke a toxic response if added to a biological system in a sufficient amount. The toxic potency of a chemical is thus ultimately defined by the relationship between the dose (the amount) of the chemical and the response that is produced in a biological system.

## **Routes of Entry into the Body**

There are three main routes of entry by which hazardous chemicals enter the body.

### **Absorption through the respiratory tract via inhalation.**

Most important in terms of severity

### **Absorption through the skin.**

Major cause of occupational disease (dermatitis).

### **Absorption through the digestive tract.**

Can occur through eating or smoking with contaminated hands or in contaminated work areas.

Most exposure standards, Threshold Limit Values (TLVs) and Permissible Exposure Limits (PELs), are based on the exposure by inhalation. They are normally expressed in terms of parts per million (ppm) or milligrams per cubic meter (mg/m<sup>3</sup>) concentration in air.

If a significant route of exposure for a substance is through skin contact, the SDS will have a “skin” notation. Examples: pesticides, carbon disulfide, carbon tetrachloride, dioxane, mercury, thallium compounds, xylene, hydrogen cyanide.

## IX. Chemical Inventory

Any location that uses or stores chemicals at Tufts must have a chemical inventory with NFPA ratings listed for each chemical. These inventories must be maintained within that location. It is the responsibility of the supervisor or an individual that they appointment to update these inventories on an annual basis. Copies of inventories should be sent electronically to TEHS where they are used for compliance with regulatory requirements.

Supervisors are required to compile and maintain a Chemical Inventory for each work area or room in which hazardous chemicals are stored or used.

The Chemical Inventory contains the following information:

- Chemical name of the common name.
- Work area where the chemical is normally used or stored.
- Typical amount of the chemical that is generally on hand.
- NFPA Hazard Rating of the chemical (generally identified on SDS)

The Chemical Inventory provides you with information regarding hazardous chemicals in the work area. New or newly assigned employees will be made aware of the Workplace Chemical Inventory before working with hazardous chemicals or in a work area containing large quantities of hazardous chemicals. Laboratories, shops, studios and other chemical use areas must update the inventory at least annually.

## X. Employee Information and Training

### General Training

Employees will be provided with information and training on chemicals in their work area before an assignment is begun, and whenever a new chemical with a new hazardous property is planned to be used.

Training is conducted through a joint effort between Tufts Environmental Health and Safety and the workplace supervisors.

Tufts Environmental Health and Safety provides information to employees through training, new employee orientation, safety bulletins, and a variety of other communications. Specialized training for the hazards and protective measures associated with a particular job is provided by the supervisor or designee.

### Specific training at the laboratory, shop, studio, kitchen, clinic or other chemical use area

Supervisors play a key role in hazard communication and training. Although methods of training vary from department to department, employees should be trained overall in the following areas:

- Location and availability of written procedures, specifications, operator manuals, and SDS's and how they relate to chemicals the employees will use.
- Labeling and where to obtain in-house labels if needed
- Operations in the work area where chemicals are present

- Methods which can be used to detect the presence or release of a chemical and what to do if such a release occurs
- The hazards of the chemicals in the work area and why the employee must take appropriate precautions
- Measures employees can take to protect themselves from these hazards; these measures may include personal protective equipment, ventilation and containment systems, monitoring devices, and safe work practices.
- Protective equipment and clothing required, where to obtain it, and how to use it.
- Proper storage of chemicals.
- Emergency procedures specific to the work area

This training should be repeated as necessary and **whenever a new hazard is introduced** into the work area.

### **Non-routine Tasks**

Information on the hazards of non-routine tasks is the responsibility of the supervisor, with assistance from TEHS as required. This information should be provided prior to the start of the task. Training should include the requirements listed above as they relate to the task.

### **Contractor Information**

It is the responsibility of the individual who brings in the contractor to provide information on potential exposures. This should be done in conjunction with the supervisor of the work area as required. SDS's should be made available for contractor review. Requests for further information required by a contractor should be directed through the individual who brought in the contractor. TEHS is available to assist upon request. Contractors will also be expected to provide Safety Data Sheets for materials they bring to Tufts and which may expose the Tufts community.

## XI. Other Factors Affecting Exposure

**Rate of entry and route of exposure;** that is, how fast the toxic dose is delivered and by what means.

**Age** can affect the capacity to repair tissue damage.

**Previous exposure** can lead to tolerance, increased sensitivity or make no difference.

**Host factors**, including genetic predisposition and the gender of the exposed individual.

**State of health**, physical condition and lifestyle can affect the toxic response. Preexisting disease can result in increased sensitivity.

**Environmental factors** such as temperature and pressure.

### Types of Effects

- Acute poisoning normally is the result of a single large exposure; there is rapid absorption of the substance and the reaction is sudden and severe.
- Chronic poisoning is characterized by prolonged or repeated low level exposures measured in days, months or years; symptoms may not be readily apparent. Cumulative poisons are characterized by materials that tend to build up in the body as a result of numerous chronic exposures; the effects are not seen until a critical body burden is reached.
- Local refers to the site of action of an agent and means that the action takes place at the point or area of contact. The site could be skin, mucous membrane, respiratory tract, etc. Absorption does not necessarily occur.
- Systemic refers to a site of action other than the point of contact and presupposes absorption has taken place. For example, an inhaled material may act on the liver.

### Health Hazards

**Carcinogenic** – exposure, usually in low levels, for extended periods of time has been determined to cause cancer in humans. Suspect carcinogens should be handled as carefully as carcinogens.

**Toxic** – exposure to the chemical may result in damage to organs, tissues, or vital body fluids. For example, a substance may be nephrotoxic (causes kidney damage), hematotoxic (poisonous to blood), neurotoxic (affecting the central nervous system), or a reproductive toxic (damages fetal tissue or causes chromosomal damage).

**Corrosive** – damages mucous membrane or skin as a result of burning or chemical reactions.

**Sensitizers** – exposure may cause allergic reactions.

**Irritants** – produce reversible inflammation of tissues (rashes, blisters, dermatitis) as a result of chronic exposure.

## **Physical Hazards**

Physical hazards include fire, explosion and reactivity based on the chemical and on the particular type of containment equipment and handling conditions necessary to maintain the chemical in an inert state. A chemical is a physical hazard if there is statistically significant evidence that it is a combustible liquid, a compressed gas, an explosive, a flammable, an organic peroxide, an oxidizer, pyrophoric compound, an unstable material or water reactive substance.

## **Appendix A - “Top 10” chemical safety practices to follow in chemical storage or use areas:**

1. No eating, drinking or use of cosmetics.
2. Do not store chemicals and food in the same refrigerator or freezer.
3. Do not reuse food containers to store chemicals.
4. Read the Safety Data Sheet before handling any chemical.
5. Wear eye protection to prevent contact with splashed material when pouring chemicals.
6. Read the label and plan the work accordingly.
7. Label any secondary container of chemicals unless it will be completely used by you during the workday.
8. Wear the correct gloves to prevent skin contact with chemicals - refer to the label, the Safety Data Sheet, the manufacturers’ webpage or Tufts Environmental Health and Safety for advice on the selection of personal protective equipment. See TU Personal Protective Equipment Plan.
9. Immediately flush any skin or eye for 15-20 minutes under flowing water after contact with a hazardous chemical using an emergency eye wash station.
10. Immediately remove any clothing contaminated with dust or liquid to minimize skin contact

## **Appendix B - Background of the Hazard Communication Standard**

The U.S. Occupational Safety and Health Administration (OSHA) adopted a Hazard Communication Standard (HCS) in 1988 which was aimed at reducing hazardous materials injuries in the workplace.

In addition to the regulations promulgated by OSHA, the Superfund Amendments and Reauthorization Act of 1986 (SARA) became law in 1987. Title III of this Act describes each local community's Right-To-Know about the hazards involving materials located within that community's jurisdiction. SARA specifically mandates that employers who are required to maintain Safety Data Sheets (SDSs) to comply with OSHA's rules must also provide copies of the SDSs (or an inventory of materials requiring SDSs) to the local community for use by emergency personnel.