

**The University of Southern Indiana**

**HAZARD  
COMMUNICATION  
PROGRAM**

In compliance with OSHA 29 CFR 1910.1200, Hazard Communications Standard.

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# The University of Southern Indiana

## Hazard Communication

### **Policy Purpose:**

The University of Southern Indiana developed the Hazard Communication program to prevent hazardous material injuries while using chemicals in the work place and to assure that information concerning identified hazards and appropriate hazard control mechanisms are provided to individual employees who work with hazardous chemicals. Implementation of a Hazard Communication program will guarantee all employees the "right-to-know" the hazards and identities of the chemicals with which they work and will reduce the occurrences of chemical-related occupational illnesses and injuries. The objectives of this policy are to ensure compliance with the applicable federal standard; safeguard the health and safety of employees of USI; and, create guidelines to follow for implementation and maintenance of a hazard communication program.

### **Policy Statement:**

With this policy, The University of Southern Indiana intends to ensure the transmission of necessary information to employees regarding substances in the workplace, pursuant to OSHA's Hazard Communication Standard, 29 CFR 1910.1200.

## **1.0 INTRODUCTION**

The Occupational Safety and Health Administration (OSHA) established the Hazard Communication Standard (HCS), 29 Code of Federal Regulations 1910.1200, to ensure that chemical manufacturers and suppliers evaluate the hazards of chemicals they produce or supply and that the users of such chemicals institute hazard communication programs which address container labeling, Material Safety Data Sheets (MSDS) and formal employee training to explain hazardous materials to employees.

## **2.0 SCOPE**

### **2.1 Operations Covered**

This policy covers the communication of hazardous chemicals to full-time and part-time University of Southern Indiana employees. All departments are included in the program.

### **2.2 Exempted Operations**

Educational and research laboratory workers are exempted from coverage by this standard. OSHA's occupational exposure to hazardous chemicals in laboratories, 29 CFR 1910.1450, has been created to address the specialized needs of the campus laboratory environment. The USI Chemical Hygiene Plan covers University employees who work in campus laboratories. Contact Environmental Health and Safety for additional information. All research laboratories may be excluded from the hazard communication standard except for the following requirements:

- Complete a chemical inventory list (CIL) and submit a copy to Environmental Health and Safety
- Attend a training and education program that shall be designed to inform employees of appropriate work practices, protective measures and emergency measures regarding hazardous materials in the workplace.
- Supply employees with the chemical names of all hazardous substances in their area.
- Maintain MSDSs and make them readily accessible to employees.
- Ensure that containers of hazardous substances bear a legible manufacturer's label, HMIS label or the NFPA diamond.
- Ensure that a copy of the USI chemical hygiene plan is located in the lab.

## **3.0 RESPONSIBILITIES**

### **3.1 President of the University of Southern Indiana**

The President assumes institutional authority for University compliance with federal and local occupational health and safety standards. Responsibility and authority for the administration of the USI Hazard Communication program is delegated to Environmental Health and Safety.

### **3.2 Environmental Health and Safety**

Environmental Health and Safety shall:

- Develop and distribute a written Hazard Communication Program.
- Provide information about the Hazard Communication program to all employees.
- Provide general training about the Hazard Communication program and basic chemical information to all employees who may reasonably be expected to encounter hazardous chemicals in the course of normal job duties and create a record of employee participation.
- Maintain a central resource file of Material Safety Data Sheets (MSDS) for known hazardous chemicals used in USI workplaces.
- Assist supervisors in accessing MSDSs from chemical manufacturers and distributors.
- Provide technical guidance to personnel at all levels of responsibility concerning the Hazard Communication program, hazard evaluation, hazard control or hazardous chemical information.
- Periodically review the Hazard Communication program and revise as necessary.

### **3.3 University Departments**

The deans and department heads of the University of Southern Indiana shall:

- Assure that all employees who work with hazardous chemicals as part of their normally assigned job duties attend Hazard Communication training provided by Environmental Health and Safety and maintain written certification of this training.
- Assure that employees who request hazard communication training, regardless of hazardous chemicals used in normal job duties, are provided an opportunity to attend.
- Assure that employees are aware of the hazards or potential hazards associated with the chemicals in their work area.
- Submit a chemical inventory list (CIL) annually to Environmental Health and Safety. This list should be submitted no later than August 1<sup>st</sup> of each year and must be in alphabetical order.
- Each time a department receives a new hazardous substance, the substance must be added to the departmental CIL within 30 days. A copy of the CIL, along with the original copy of the MSDS for the new substance, must be sent to Environmental Health and Safety. Develop and implement standard operating procedures (SOP) and engineering controls to promote safe practices in the workplace and to protect the employees.
- Report any problem associated with implementation of the Hazard Communication program in the work area to Environmental Health and Safety.
- Assure that hazardous chemicals used in the workplace are labeled consistent with this program.
- Assure that all employees who are required to perform non-routine tasks are informed of the associated hazards and provided with chemical information before being required to perform such tasks.
- Assure that employees know the "how to access a Material Safety Data Sheet." (see 6.2)
- Inform contractors of hazardous chemicals to which they may be exposed.

### **3.4 Employees**

Individual employees shall:

- Perform his/her work in the safest manner possible. A supervisor may take the appropriate disciplinary action when an employee does not comply with precautionary measures.
- Follow all SOPs developed by the supervisor.
- Comply with all applicable provisions of the hazard communication program to include:
  - Attend required hazard communication training.
  - Do not remove or deface labels on containers, assure that damaged labels are replaced or repaired.
  - Ask for further information about chemicals or procedures not fully understood.
  - Report new chemicals/products discovered in the work place to the supervisor and Environmental Health and Safety, for updates to chemical inventory list and an MSDS acquired.
- Report any existing health or safety hazard to his/her supervisor and Environmental Health and Safety.
- Be familiar with MSDS requesting procedures.

### **3.5 Contractors**

Contractors shall submit copies of MSDS for hazardous chemicals brought onto University property. Refer to Section 9.0, Outside Contractors.

## **4.0 LABELING REQUIREMENTS**

### **4.1 Procurement-Vendor Labels and MSDSs**

The Procurement Department will require that all vendors or suppliers of substances, covered under OSHA 1910.1200, meet the provisions and specific requirements contained under this section in regard to labeling and Material Safety Data Sheets and that a MSDS is provided with the chemical. The Receiving Department

Manager will ensure that all hazardous substances entering the University through their department are properly labeled.

#### **4.2 Permanent Container Labels**

No department or employee shall use, store or allow any other person to use or store, any hazardous substance in a University building or facility if the container does not meet the labeling requirements outlined in OSHA 1910.1200 (f) (4).

- Identity of the chemical and appropriate hazard warnings are shown on the label. The hazard warning may be words, pictures or symbols, which provide an immediate understanding of the primary health and/or physical hazard(s) of the chemical.
- The name and address of the manufacturer, importer or other responsible party should be identified on the label.
- Label hazard message must be legible, permanently displayed and written in English.
- Portable containers are also subject to the labeling requirements under this section if any of the following events occur:
  - The material is not used within the work shift of the employee making the transfer.
  - The employee that made the transfer leaves the work area.
  - The container is moved to another work area and is no longer in the possession of the employee who filled the container.
- For purpose of this section a container shall include bags, barrels, bottles, boxes, cans, cylinders, drums and reaction vessels.

#### **4.3 Replacement Container Label**

The existing label on a container entering the workplace from a supplier shall not be removed, altered or defaced. In the event that a chemical container's original label must be replaced, the new label shall contain the same information as the original. Only labels, ink and markings that are not soluble in the liquid content of the container shall be used.

#### **4.4 HMIS and NFPA Hazard Identification Labeling**

USI recognizes both the Hazardous Materials Information System (HMIS) labeling and the National Fire Protection Association (NFPA) diamond. Refer to **Appendix III** and **IV** for further explanation.

#### **4.5 Pipe Labeling**

Supervisors shall be responsible for providing information on the contents of any pipe containing hazardous chemicals.

#### **4.6 Label Inspection**

An Environmental Health and Safety representative will conduct a laboratory or life safety inspection, to determine that the hazardous substances containers are labeled in accordance with Section 4.0, Labeling Requirements.

### **5.0 CHEMICAL INFORMATION**

#### **5.1 Chemical Inventory List (CIL)**

All University departments must prepare an inventory list, alphabetized by common name, identifying all hazardous chemicals/products in the workplace. This list must be submitted to Environmental Health and Safety no later than August 1<sup>st</sup> of each year. This list must indicate:

- Chemical name (alphabetized).
- Trade name (if applicable).
- Manufacturer name, address and phone number.
- Work area location (lab or rm. #).

Environmental Health and Safety will maintain and manage the chemical inventory-listing database for all of The University of Southern Indiana academic campuses and sites.

#### **5.2 Chemical Inventory Listing Access**

Access to the Chemical Inventory Listing is available through Environmental Health and Safety during normal business hours (8am-4:30pm/Monday-Friday) and through University Security after hours (4:30pm-8am and Saturday-Sunday). Access may be required by the following: fire department, ambulance or rescue services, treating physicians, nurses, OSHA or other regulatory representatives.

## 6.0 MATERIAL SAFETY DATA SHEET (MSDS)

### 6.1 Definition

A Material Safety Data Sheet (MSDS) is a chemical information sheet prepared by the manufacturer or distributor of any chemical mixture that contains a hazardous chemical of 1% or more of its content (or 0.1% if the hazardous chemical is carcinogenic). The manufacturer or distributor is required to supply a MSDS with the initial shipment of each chemical. USI must maintain a copy of the MSDS for each hazardous chemical listed on the Chemical Inventory List.

### 6.2 Access to Material Safety Data Sheets

MSDSs must be made easily accessible to employees whenever requested. USI's Environmental Health and Safety will provide MSDS copies by fax or hand delivered as soon as possible. MSDS information is available from two sources on campus 24 hours a day, 7 days a week.

1.) Environmental Health and Safety.

*Normal business hours 8am-4:30pm, Monday-Friday*

2.) University Security.

*After hours 4:30pm-8am and Saturday-Sunday*

- The master copy of MSDSs will be kept in Environmental Health and Safety Office.
- Faculty, Staff and Students: Material Safety Data Sheets can be located via the Internet through Environmental Health and Safety homepage, [www.usi.edu/riskmgt](http://www.usi.edu/riskmgt). If you are unable to locate the MSDS on the Internet or are having trouble using the Internet, contact Environmental Health and Safety for the MSDS.
- Each of the Facilities Operations Shops has a MSDS binder that contains a MSDS for each hazardous chemical located in that shop. If a particular MSDS cannot be located in this binder, contact Environmental Health and Safety for the MSDS.

### 6.3 MSDS Information

The MSDS should be in the American National Standard Institute (ANSI), standard format.

- Manufacturer name, address, chemical information number and emergency telephone number.
- The identity (chemical and common names, mixtures etc).
- Name of chemical or mixture as listed on the product label.
- Hazardous ingredients or hazardous mixtures.
- Physical hazards (i.e. explosion or fire potentials).
- Health hazards (i.e. inhalation symptoms, medical conditions affected).
- Physical and chemical characteristics (i.e. boiling point, vapor density).
- Routes of entry (How the material may enter the body)
- Available exposure limits (as mandated by OSHA and recommended by the American Conference of Governmental Industrial Hygienists or specific published research).
- Carcinogen status and toxicity information.
- Hazard control information (i.e. personal protective equipment).
- First-aid procedures.
- Date of preparation of MSDS or latest revision date.
- Ecological information.
- Disposal information.

### 6.4 MSDS records

Environmental Health and Safety shall maintain an MSDS database for all substances shown on chemical inventories submitted. MSDSs shall be kept on file for 30 years or as required by law. Each MSDS shall be reviewed to ensure its completeness. No blank spaces are permitted on the MSDS.

## 7.0 EMPLOYEE CHEMICAL EXPOSURE

7.1 Exposure means that an employee is subjected to a hazardous chemical in the course of employment through any route of entry (i.e. inhalation, ingestion, absorption or injection) and includes potential exposure as referenced by the MSDS.

- When the employer discovers that an employee has received a potentially hazardous exposure to any substance or agent, the employer must immediately notify the employee and take the appropriate actions that may be necessary to provide medical evaluation, monitoring or treatment.
- When an employee has received a potentially hazardous exposure to a substance or agent Environmental Health and Safety must be notified immediately.

**7.2** After the appropriate safety and health precautions have been taken, it is the responsibility of the employee's supervisor to fill out an Accident Reporting Form (Appendix I). This form is available from Environmental Health and Safety or via the Internet at: [www.usi.edu/riskmgt/AccidentReporting.asp](http://www.usi.edu/riskmgt/AccidentReporting.asp). The completed accident reporting form should be submitted to Environmental Health and Safety (original copy), with a copy retained at the department and a copy provided to the employee.

**7.3** Environmental Health and Safety will retain the original Accident Reporting Form and send a copy to the Human Resource Services. HR will place the Accident Reporting Form in the employee's permanent personnel file to be retained for the length of employment plus 30 years.

## **8.0 TRAINING**

### **8.1 Training Overview**

The University shall provide all employees, including but not limited to graduate assistants, teaching assistants, part-time and full-time personnel, with information and training about hazardous chemicals in their work area at the time of their initial hire. A new employee must receive hazard communications training within the first 30 days of employment. Training shall also be provided whenever the employee is reassigned to a different work area or when a new hazard is introduced into the work area.

### **8.2 Training Outline**

- General overview of USI Hazard Communication program
- Requirements of the Hazard Communication Standard
- MSDS Requesting Procedures and Locations
- Location and availability of written Hazard Communication program
- Method to detect presence of release
- Interpreting and using MSDS

### **8.3 Training Opportunities**

Training is open to all USI employees, but is required for employees who work with or around hazardous chemicals in the course of normal job duties. All employees shall receive an information newsletter providing basic hazard communication information, including contents of the standard, hazard identification information and information resources. Environmental Health and Safety provides hazard communication training on an annual basis. Training is open to all USI employees, but required for employees who work with or around hazardous chemicals in the course of normal job duties. Environmental Health and Safety also offers a number of other classroom training courses (i.e. lab safety) and video programs available to employees who want to enhance their chemical safety awareness.

### **8.4 Written Training Verification**

All employees who receive the required Hazard Communication training must, upon completion, have a signed and dated training certification form on file with Environmental Health and Safety (**Appendix II**). Employee training records must be kept for three (3) years.

**APPENDIX I**  
**UNIVERSITY OF SOUTHERN INDIANA**  
**INJURY AND ILLNESS REPORT**

Employee  
 Student Worker

Visitor  
 Volunteer

Student

Date of Report: \_\_\_\_\_

Time of Report: \_\_\_\_\_  a.m.  p.m.

Name of Injured: \_\_\_\_\_

Male  Female

Permanent Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone, Home: (\_\_\_\_) \_\_\_\_\_ Work: (\_\_\_\_) \_\_\_\_\_ SSN: \_\_\_\_\_

Name(s) of Witness: \_\_\_\_\_

Telephone, Home: (\_\_\_\_) \_\_\_\_\_ Work: (\_\_\_\_) \_\_\_\_\_

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**A. Statement of Injured Person or Witness**

(If injured person or witness is unavailable, information is to be completed by individual completing report.)

Date of Accident: \_\_\_\_/\_\_\_\_/\_\_\_\_

Time of Accident: \_\_\_\_\_  a.m.  p.m.

Location of Accident: \_\_\_\_\_

Summarize how injury, illness, or exposure occurred: \_\_\_\_\_

Kind of Injury: \_\_\_\_\_

Part of Body Affected (specific part of body, i.e. left wrist, right leg): \_\_\_\_\_

Describe any contributing factors or object(s): \_\_\_\_\_

I authorize the release of any medical information relating to this injury/illness to the University's worker's compensation carrier for review of this claim.

Signature of Injured Person: \_\_\_\_\_

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**B. To Be Completed by First Aid Provider**

Symptoms and complaints of the injured person: \_\_\_\_\_

Describe the nature and extent of injury you observed: \_\_\_\_\_

Treatment, recommendations, and referral: \_\_\_\_\_

Signature of First Aid Provider: \_\_\_\_\_

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**C. To Be Completed by Supervisor for Employee Injury/Illness**  
(Attach additional information if necessary.)

Evaluation of how accident occurred/contributing factors: \_\_\_\_\_

Possible Preventative Actions (actions that have been/will be taken to prevent reoccurrence): \_\_\_\_\_

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**D. For Human Resources Use Only**

Lost Time:  Yes  No

Number of Days: \_\_\_\_\_

Anticipated Release Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Work Restrictions: \_\_\_\_\_

Medical Treatment: \_\_\_\_\_

Send employee and student reports to Human Resources -- Send student, visitor and volunteer reports to Security  
**MUST BE COMPLETED AND RETURN WITHIN 24 HOURS OF ACCIDENT**



## INSTRUCTIONS FOR COMPLETING THE INJURY AND ILLNESS REPORT

### 1. Completion of forms

- a. **Employee and student worker** injury or illness reports should be completed by Security if first aid or additional medical treatment was required. If first aid or additional medical treatment was not required, the form should be completed by the department head or supervisor. The form should be completed and returned to Human Resources within 24 hours of the occurrence.
- b. **Student, visitor, and volunteer** (non-employees) injury and illness reports should be completed by and maintained in Security.

### 2. Timeliness of Reporting

Any accident or injury that is reported late, i.e. not within a few hours of the occurrence, should be reported directly to the department head or supervisor who will be responsible for completing the injury and illness report. The form should then be sent to the appropriate department as described above.

### 3. Distribution of Filed Injury and Illness Reports

- a. Employee and student worker reports, with sections A and B completed should be sent to the Human Resources Department. Human Resources will distribute copies to Security, Procurement and Distribution Services and the Vice President for Business Affairs while retaining a copy in Human Resources.
- b. Student, visitor and volunteer reports are retained in Security (If not originated in Security, the report should be sent to Security). Security will distribute a copy to Procurement and Distribution Services.

## APPENDIX II

### THE UNIVERSITY OF SOUTHERN INDIANA HAZARD COMMUNICATION TRAINING CERTIFICATION

I have received training and information on the Hazard Communication Program **29 CFR 1910.1200**. I understand how to interpret and use the labeling systems, warning labels, Material Safety Data Sheet information and procedures for requesting an MSDS. I agree to observe and follow the safe work practices and standard operating procedures presented to me in this training session.

\_\_\_\_\_  
Employee Name (Please Print)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Department

\_\_\_\_\_  
Trainer

\_\_\_\_\_  
Date

- 
- Which of the following will be found on a Material Safety Data Sheet (MSDS)?
    - Spill and Leak Procedures
    - Health Hazard Information
    - Special Protection Information
    - All of the Above
  - The yellow portion of an NFPA diamond and HMIS label will represent:
    - Health Hazard
    - Flammability Hazard
    - Reactivity Hazard
    - Special Hazard Information
  - Accident Reporting Forms should only be filled out if you have suffered an acute (immediate) chemical injury such as an acid burn.
    - True
    - False
  - A "4" located in the red portion of an HMIS label indicates that a product:
    - is deadly.
    - is extremely flammable.
    - may detonate.
  - Any unattended container with a potentially hazardous substance must have an identifying label of some sort.
    - True
    - False
  - Do you know where the MSDSs for your departments are kept?
    - Yes
    - No

7. \_\_\_\_ is the concentration of a material to which nearly all employees may be exposed for a normal 8-hour workday and 40-hour work week without harmful effects.
- A. OSHA
  - B. NIOSH
  - C. PEL or TLV
8. If you have a question about a chemical or product, you may consult:
- A. its MSDS
  - B. your supervisor
  - C. Environmental Health and Safety
  - D. All of the above

**Using your MSDS find the following information**

9. What is the material name?
10. What kind of personal protective equipment must be worn when handling this material?
11. What is the appearance and odor of this material?
12. In the event of a spill or leak, what do you do?
13. What should you do if this substance contacts your eyes?
14. Is the material flammable?

## Hazardous Materials Information System (HMIS)

<b>Chemical Name</b>	
<b>CAS#</b>	
<b>HEALTH</b>	<input type="checkbox"/>
<b>FLAMMABILITY</b>	<input type="checkbox"/>
<b>REACTIVITY</b>	<input type="checkbox"/>
<b>SPECIFIC</b>	<input type="checkbox"/>

### HEALTH

- 4: **Deadly:** even the slightest exposure to this substance would be life threatening.
- 3: **Extreme Danger:** serious injury would result from exposure to this substance. Do not expose any body surface to these materials.
- 2: **Dangerous:** exposure to this substance would be hazardous to health.
- 1: **Slight Hazard:** irritation or minor injury would result from exposure to this substance.
- 0: **No Hazard:** exposure to this substance offers no significant risk to health.

### FLAMMABILITY

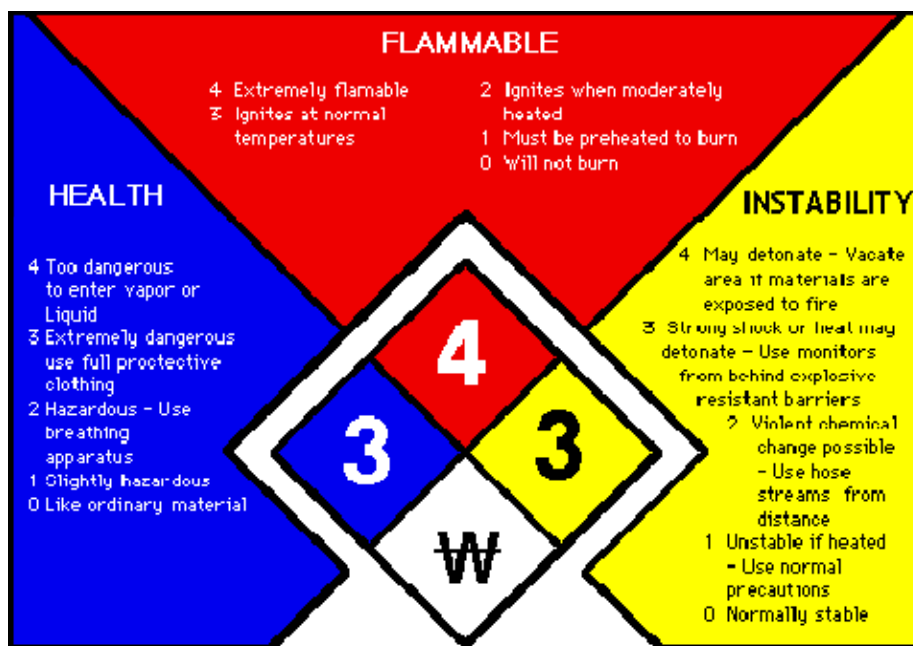
- 4: **Flash Point Below 73°F and Boiling Point Below 100°F:** this substance is very flammable, volatile or explosive depending on its state.
- 3: **Flash Point Below 100°F:** flammable, volatile or explosive under almost all normal temperature conditions.
- 2: **Flash Point Below 200°F:** moderately heated conditions may ignite this substance.
- 1: **Flash Point Below 200°F:** moderately heated conditions may ignite this substance.
- 0: **Will Not Burn:** substances that will not burn.

### REACTIVITY

- 4: **May detonate:** substances that are readily capable of detonation or explosion at normal temperatures and pressures.
- 3: **Explosive:** substances which are readily capable of detonation or explosion by a strong initiating source, such as heat, shock or water.
- 2: **Unstable:** violent chemical changes are possible at normal or elevated temperatures and pressures. Potentially violent or explosive reaction may occur when mixed with water.
- 1: **Normally stable:** substances that may become unstable at elevated temperatures and pressures or when mixed with water.
- 0: **Stable:** substances which will remain stable when exposed to heat, pressure or water.

APPENDIX IV

NFPA Diamond



## APPENDIX V Definitions

### **Absorption**

A mode of entry of a toxic substance into the body in which the substance enters through the unbroken skin

### **Acute**

A health effect that is the result of a short time exposure to a very high concentration of a toxic material - The effect is usually immediately seen, not more than several hours after the exposure.

### **Asphyxiation**

Smothering - A toxic material may cause asphyxiation by diluting the amount of oxygen in the air, paralyzing the lungs or interfering with body's ability to transport oxygen to the cells.

### **Boiling Point**

The temperature at which the vapor pressure of a liquid equals atmospheric pressure or at which the liquid changes to a vapor - The boiling point is usually expressed in degrees Fahrenheit. If a flammable material has a low boiling point, it indicates a special fire hazard.

### **Carcinogen**

A material that can cause cancer

### **C.A.S. Number**

Identifies a particular chemical by the Chemical Abstracts Service, a service of the American Chemical Society that indexes and compiles abstracts of worldwide chemical literature called "Chemical Abstracts."

### **Chronic**

A toxic effect that occurs only after exposure to a material for a long time, usually months or years - The amount of exposure is usually very low and often symptoms are not immediately noticeable.

### **Combustible**

According to the DOT and NFPA, combustible liquids are those having a flash point at or above 100 degrees Fahrenheit (38 degrees Celsius) or liquids that will burn. They do not ignite as easily as flammable liquids. However, combustible liquids can be ignited under certain circumstances and must be handled with caution. Substances, such as wood, paper, etc., are termed "Ordinary Combustibles."

### **Concentration**

The amount of material in the air, e.g., 50 parts per million - May also refer to the amount of a substance in a mixture, e.g., 10% ammonia in water.

### **Cumulative Effect**

An effect of a toxic material that takes place only after a quantity of the material is taken into the body or when damage is caused by the substance over a period of time at a rate faster than the body can repair the damage.

### **Decompose**

Breaking down of a chemical under heat, shock or mixing with other chemicals - The resulting products of decomposition may be more toxic or hazardous than the original substance.

### **Dose**

The amount of a substance that enters the body - The amount depends on the rate at which the substance enters the body and the length of time the substance continues to enter the body, e.g., a worker may inhale 10 milligrams of dust per day for 10 days. The total dose is 100 milligrams. Not all of the substances may remain in the body; some is eliminated, possibly as fast as it enters.

### **Engineering Control**

A change in equipment, materials or process that reduces the hazard from the substance, e.g., ventilation

### **EPA**

The Environmental Protection Agency is the governmental agency responsible for administration of laws to control and/or reduce pollution of air, water and land systems.

### **Evaluation**

The process used by a Safety or Health Professional to determine the extent of hazard presented by the use of a toxic material. It often involves taking air samples to determine total dose.

### **Exposure**

Similar to dose - The combination of concentration of a substance in air and the amount of time a worker is exposed to that concentration gives the total exposure or dose.

### **Flammable Limits**

The range of concentrations in air of flammable vapors of a substance between which the vapors will ignite and continue to burn; possibly resulting in an explosion - The lower limit is the Lower Flammable (or explosive) Limit, LFL and the upper limit is the Upper Flammable (or explosive) Limit, UFL. Below the LFL, there is not enough vapor to support combustion. Above the UFL there is too much vapor. The mixture is too much to burn. NOTE: The MSDS uses Explosive Limit, but the preferred term is Flammable Limit. The terms are synonymous.

### **Flammable Liquid**

According to the DOT and NFPA a flammable liquid is one that has a flash point below 100 Fahrenheit. (See FLASH POINT.)

### **Flash Point**

The temperature at which enough vapor is produced from a flammable liquid to reach a concentration equal to the LFL, (See Flammable Limits). A substance with a high flash point is less hazardous than one with a low flash point.

### **Fume**

A term used by health professionals to mean solid particles in air, usually much smaller than dust and generated by heating a solid material, e.g., a welding rod.

### **Gas**

A substance like air - Nitrogen, oxygen and carbon dioxide are gases.

### **Individual Susceptibility**

The difference in reaction to a given dose of a toxic material by different individuals - Some persons may show a stronger or more noticeable effect from the same dose than others. Such individuals may be allergic or hypersensitive to the material.

### **Incompatible**

Two or more chemicals that will produce an undesirable reaction when mixed, e.g., mixing any acid with sodium cyanide will produce highly toxic hydrogen cyanide gas.

### **Ingestion**

Swallowing - One of the ways a toxic substance can enter the body.

### **Inhalation**

Breathing in - The most common way for a toxic substance to enter the body.

### **Irritant**

A substance that produces an irritating effect when it contacts skin, eyes, nose or respiratory system - A chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original molecules - A hazardous polymerization is the above reaction, with an uncontrolled release of energy.

### **Reactive**

A chemical that will undergo undesirable changes or reactions when heated, shocked, exposed to air or mixed with other substances, (see Incompatible).

**Respirator**

A device worn over the face and used to either mechanically filter dirty air or supply fresh air to the wearer

**Short Term Exposure Limit**

Represented as STEL or TLVSTEL, this is the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. Also the daily TLVTWA must not be exceeded.

**Solvent**

Liquid used to dissolve or clean materials. These materials usually evaporate into the air and can be inhaled into the body.

**Specific Gravity**

The density of a liquid when compared to water which has a specific gravity of 1.0 - A liquid with a specific gravity of less than 1 will float on water; while one with a specific gravity of more than 1 will sink in water.

**Teratogen**

An agent or substance that may cause physical defects in the developing embryo or fetus when a pregnant female is exposed to that substance

**Threshold Limit Value (TLV)**

A number that tells the concentration of a chemical in air that a worker may breathe for a given period of time (a dose) without experiencing adverse effects - The American Conference of Governmental Industrial Hygienists (ACGIH) publishes TLVs for about 500 substances. OSHA uses similar limits called Permissible Exposure Limits, PEL.

**Time Weighted Average**

The average time, over a given work period (e.g., 8 hour work day), of a person's exposure to a chemical or an agent - The average is determined by sampling for the contaminant throughout the time period.  
Represented as TLV-TWA

**Toxic**

Capable of causing damage to the body - A substance is more toxic if a small amount can cause the damage.

**UFL or UEL**

Upper Flammable Limit or Upper Explosive Limit

**Vapor**

A substance in air similar to a gas, but produced by the evaporation of a liquid into the air - Solvents usually enter the body in the form of a liquid.

**Vapor Density**

A measure of how heavy the vapor of a liquid is, compared to air which has a vapor density of 1.0 - When the vapor density is high, the vapors will tend to collect in low spots.

**Vapor Pressure**

A measure of the volatility or ease with which a liquid will evaporate to become a vapor - A high vapor pressure means the liquid evaporates quickly.