

# **APPENDIX A**

# Hazard Communication Program – Model Plan

(Customize the *red, italicized* portions within each particular section of this Model Plan.)

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## PURPOSE

The purpose of this Hazard Communication (“HazCom”) Program is to inform employees working for the *Name of Department* of the chemical hazards present in their work environment and ways to protect themselves during normal operations and during foreseeable emergencies. The program identifies departmental responsibilities for ensuring a safe and healthful work environment for all employees located in *Building Name(s) or Area*.

## DESIGNATED RESPONSIBILITIES

The person responsible for the implementation of the Hazard Communication Program for *Department Name* is *Responsible Individual*. Responsibilities include compliance with the components of this document, including completion, review and maintenance of the specific written HazCom program.

*Other responsibilities that need to be addressed include; general employee training, specific task training, obtaining and maintaining Safety Data Sheets (SDS), assuring proper labeling of chemical products. This can be written out in text or table format.*

## WRITTEN HAZARD COMMUNICATION PROGRAM

All of the following items must be included in the written program:

1. [Hazardous Chemical List](#)

A list of hazardous chemicals used in the workplace and location(s) in building(s) where they are present.

*State how this list will be maintained and updated, who is responsible, and how it will be made available. Arrangement of the list could be alphabetically by product or manufacturer or both.*

2. [Labels and Hazard Warnings](#)

Proper labeling of hazardous chemical containers must be assured at the time of receipt and periodically thereafter. Proper labeling will include the identity of the chemical, pictograms/pictures and the hazard warnings appropriate for employee protection. Portable, secondary or in-house workplace containers must be labeled with the same label that would be on shipped containers for the chemical or with a product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the physical & health hazards of the chemicals.

Alternative labeling systems such as the National Fire Protection Association (NFPA) 704 Hazard Rating and the Hazardous Material Information System (HMIS) are permitted for workplace containers. However, the information supplied on these labels must be consistent with the revised HCS, e.g., *no conflicting hazard warnings or pictograms*.

The labels must be legible, in English, and prominently displayed. All pipes and piping that contain hazardous contents must be labeled according to the [U-M Design Guidelines](#) developed and maintained by Architecture, Engineering and Construction (AEC). Information can be found in AEC's Design Guideline, Section 220553: [Mechanical Identification and Painting](#).

*State who will be responsible for this, what type of system will assure that this procedure is followed at the time of receipt and periodically thereafter.*

### 3. [Safety Data Sheets \(SDS\)](#)

SDS must be obtained for all hazardous chemicals that are brought into the facility. SDS must be maintained for employee access. SDS for new chemicals must be posted no later than five (5) days after receipt and remain in place for ten (10) days. SDS are considered to be a part of employee medical records and therefore **must be maintained for at least 30 years**. SDS for materials no longer used or stored should be kept in an "archived" section of each facility's SDS binder.

Methods for obtaining SDS include contacting the manufacturer or supplier of the chemical directly or utilizing various SDS databases noted on EHS's [Safety Data Sheet](#) webpage. Refer to the instructions for accessing these SDS databases in [Appendix B](#).

In lieu of maintaining hard copies of SDS, electronic versions of a Department's SDS can also be obtained within ChemWatch's [ChemGold III](#) (CG3) SDS repository program. Instructions for using this program as well as for creating Departmental SDS folders can also be found in EHS's [Safety Data Sheet](#) webpage.

Users of the [MI Safety Portal](#) system can also associate (link-to) on-line SDS location information for the chemicals they are tracking with this system. Refer to the information provided within EHS's [Chemical Inventory](#) webpage or contact EHS at (734) 763-3594 ([rwasalas@umich.edu](mailto:rwasalas@umich.edu)) or Elizabeth O'Jack at (734) 418-0532 ([lojack@umich.edu](mailto:lojack@umich.edu)) for more information.

*Describe specifically who will be responsible for collecting and maintaining the SDS, the location of the SDS, and how employees can access them.*

### 4. [Non-Routine Tasks and Unlabeled Piping](#) (*Delete this Section if not applicable.*)

Whenever hazardous chemicals are to be used in a non-routine manner (a manner other than what it was intended) or when performing non-routine tasks associated to the operation, e.g., cleaning reactor vessels, entering confined spaces, etc., knowledgeable Departmental staff should be consulted for overall safety considerations prior to performing the operation(s).

The hazards associated with these non-routine tasks must be reviewed with the employee prior to beginning the task. EHS staff is available to evaluate non-routine tasks and provide hazard information to the department and employee.

Non-routine hazard information to provide employees will include (as applicable):

- Specific chemical hazards.
- Personal protection and safety measures the employee can take to lessen risks of performing the task.
- Measures that have been taken to eliminate or control the hazard, including, but not limited to:
  - air monitoring,
  - ventilation requirements,
  - use of respirators,
  - use of attendants to observe procedures, and
  - emergency procedures.

Additional details regarding confined spaces can be found on EHS's [Physical Hazards](#) webpage.

Employees working in areas that contain hazardous chemicals in piping must be informed of the contents and provided with appropriate hazard information.

***State how the above items will be addressed.***

5. Departments Preparing Specifications for Contracted Work or Hiring Contractors

When contractors are working for the University, they must be informed of any hazardous chemical they may come into contact within the project area. The contractor, in turn, must inform the University of any hazardous chemicals they intend to use while on University property and provide the appropriate SDS. Both parties must be aware of the necessary measures to be taken during normal operations and foreseeable emergencies.

***State the procedures that will be followed to assure that contractors are informed of the presence of hazardous chemicals in their work areas and the necessary measures to be taken during normal operations and foreseeable emergencies. State what mechanisms will be utilized to assure that the University is informed of any hazardous chemicals the contractor brings on-site and that the SDS(s) are available.***

6. Postings

Signs must be posted in the workplace to notify employees of the following:

- a) The location of the SDS and the name of the person from whom to obtain the sheets.
- b) The employer is prohibited from discharging or discriminating against an employee who exercises the rights regarding information about hazardous chemicals in the workplace.
- c) The Michigan Occupational Safety and Health Administration ([MIOSHA](#)), part of Michigan's Department of Licensing and Regulatory Affairs, can be contacted for assistance in obtaining SDS.

The SDS locator poster and the poster that notifies employees of new or revised SDS are posted at ***Note the location(s) of these posters.***

The blank [MIOSHA SDS locator poster](#) can be downloaded from the and also found on EHS's [Hazard Communication \(Hazcom\)](#) webpage.

## 7. Employee Information and Training

*Consider what methods of information and training would be best suited for the needs of the department, who will be responsible for and conduct the training, how will this be implemented and maintained for new hires and/or new chemical usage, and who will be responsible for maintaining documentation of the process.*

The contents of the Hazard Communication training must be documented in the **written program** and contain at a minimum the following information:

- a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area. Examples include, air monitoring devices, visual appearance or odor.
- b. Physical and health hazards of the chemicals present in the work area.
- c. Measures employees can take to protect themselves from these hazards. Examples include, appropriate work practices, emergency procedures, and personal protective equipment ([PPE](#)).
- d. Details of the HazCom Program, including identifying operations where hazardous chemicals are present, the location and availability of the written program with the list of hazardous chemicals present and the SDS, an explanation of the labeling system, and how employees can use the hazard information.

For additional compliance assistance, a guidance document is available on the MIOSHA website: [Right to Know \(RTK\) Hazard Communication Compliance Guideline \(SP #22\)](#).

A HazCom review/revision sheet is also included below that should be used to document the regular, i.e., annual, reviews of the written program.



# Glossary of Common SDS Terms

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## A

### **ABSOLUTE:**

Chemical substance that is relatively free of impurities.

### **ABSOLUTE PRESSURE:**

The total pressure within a vessel, pipe, etc., not offset by external atmospheric pressure.

### **ABSORPTION:**

To take in and make a part of an existing whole. The penetration of a solid substance by a liquid as by capillary, osmotic, solvent or chemical action.

### **ACGIH:**

American Conference of Governmental Industrial Hygienists. An organization of professionals in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH develops and publishes recommended occupational exposure limits for chemical substances and physical agents.  
(6500 Glenway Ave., Bldg. D-7, Cincinnati, OH. 45211; [513] 661-7881.)

### **ACID:**

Any chemical which undergoes dissociation in water with the formation of hydrogen ions. Acids have a sour taste and may cause severe burns. They turn litmus paper red and have pH values of 0 to 6. Acids will neutralize bases or alkaline media. Acids will react with a base to form a salt.

### **ACIDOSIS:**

Condition of decreased alkalinity of the blood and tissues marked by sickly sweet breath, headache, nausea, vomiting, and visual disturbances; usually the result of excessive acid production.

### **ACRID:**

Irritating and bitter.

### **ACTION LEVEL:**

Exposure level at which OSHA regulations to protect employees takes effect. Exposure at or above the action level is termed occupational exposure. Exposure below this level can also be harmful.

### **ACTIVE INGREDIENT:**

Ingredient of a product that actually does what the product is designed to do. The remaining ingredients may be inert.

### **ACUTE EFFECT:**

Adverse effect on a human or animal body, that takes place soon after exposure.

### **ACUTE LETHALITY:**

Death of animals immediately or within 14 days after a single dose of or exposure to a toxic substance.

### **ACUTE TOXICITY:**

Adverse effects resulting from a single dose of or exposure to a substance.

### **ADSORB:**

Collect gas or liquid molecules on the surface of another material.

### **ADENOCARCINOMA:**

A tumor with glandular (secreting) elements.

### **ADENOSIS:**

Any disease of a gland.

### **ADHESION:**

A union of two surfaces that are normally separate.

### **AEROSOL:**

Fine aerial suspension of liquid (mist, fog) or solid (dust, fume, smoke) particles small enough to be stable.

**AGENT:**

Any substance, force, radiation, organism, or influence that affects the body. Effects may be beneficial or injurious.

**AIR-LINE RESPIRATOR:**

A respirator that is connected to a compressed breathable air source by a hose of small diameter. The air is delivered continuously or intermittently in a sufficient volume to meet the wearer's breathing requirements.

**AIR-PURIFYING RESPIRATOR (APR):**

A respirator that uses chemicals to remove specific gases and vapors from the air or that uses a mechanical filter to remove particulate matter. An air-purifying respirator must only be used when there is sufficient oxygen to sustain life and the air contaminant level is below the concentration limits of the device.

**ALARA:**

Acronym for "as low as reasonably achievable."

**ALKALI:**

Any chemical substance which forms soluble soaps with fatty acids. Alkalis are also referred to as bases. May cause severe burns to the skin. Alkalis turn litmus paper blue and have pH values from 8 to 14.

**ALLERGIC REACTION:**

Abnormal physiological response to a chemical stimuli by a sensitive person.

**ALLERGIC RESPIRATORY REACTION:**

Labored breathing, coughing, or gasping caused by inhaling a particular substance.

**ALLERGIC SKIN REACTION:**

Reddening, swelling and/or itching of the skin following contact with a substance to which a person has become sensitized due to previous skin contact or natural body conditions.

**ALOPECIA:**

Loss of hair.

**AMBIENT:**

Usual or surrounding conditions.

**AMENORRHEA:**

Absence of menstruation.

**AMES TEST:**

Short term test commonly used for preliminary screening of chemicals to see if they cause mutations in a special type of bacterial cell.

**ANALGESIA:**

Loss of sensitivity to pain.

**ANESTHETIC:**

Chemical that causes a total or partial loss of sensation. Overexposure to anesthetics can cause impaired judgment, dizziness, drowsiness, headache, unconsciousness, and even death.

**ANHYDRIDE:**

Compound derived from other compound by removing elements composing water (hydrogen and oxygen).

**ANHYDROUS:**

No water. Substance in which no water molecules are present as hydrate or as water crystallization.

**ANOREXIA:**

Loss of appetite.

**ANOSMIA:**

Loss of the sense of smell.

**ANOXIA:**

Lack of oxygen from inspired air.

**ANSI:**

American National Standards Institute. A privately funded organization that identifies industrial/public national consensus standards and coordinates their development.



**ANTIDOTE:**

Remedy to relieve, prevent, or counteract the effects of a poison.

**ANURIA:**

Absence or defective excretion of urine.

**API:**

American Petroleum Institute is an organization of the petroleum industry.

**APNEA:**

Breathing temporarily stopped.

**APPEARANCE:**

Physical state of a material.

**AQUATIC TOXICITY (AQTX):**

Adverse effects on marine life that result from their being exposed to a toxic substance.

**AQUEOUS:**

Water-based solution or suspension. Frequently, a gaseous compound dissolved in water.

**ARGYRIA:**

Local or generalized gray/blue-colored impregnation of the body tissue with silver.

**ARTICLE:**

Manufactured item specifically shaped or formed with function dependent on shape or design. Does not release or result in exposure to a hazardous material in normal use. Excluded from Hazard Communication Laws unless it gives off dust or fumes.

**ASBESTOSIS:**

Chronic lung disease caused by inhaling airborne asbestos fibers.

**ASPHYXIA:**

Lack of oxygen and interference with the oxygenation of the blood. Can lead to unconsciousness.

**ASPHYXIAN:**

Vapor or gas which causes unconsciousness or death by suffocation. Most simple asphyxiants are harmful to the body only when they become so concentrated that they reduce oxygen in air (normally 21%) to dangerous levels (16% or lower). Asphyxiation is a potential hazard of working in confined spaces. Some examples of asphyxiants are Carbon Dioxide, Carbon Monoxide, Argon, etc. They function as asphyxiants by reducing the blood's ability to carry oxygen.

**ASPIRATION HAZARD:**

Danger of drawing material into the lungs leading to an inflammatory response.

**ASTHMA:**

Disease characterized by recurrent attacks of dyspnea, wheezing, and perhaps coughing caused by spasmodic contraction of the bronchiole in the lungs.

**ASTM:**

American Society for Testing and Materials.

**ASYMPTOMATIC:**

Neither causing nor exhibiting symptoms.

**ATAXIA:**

Loss of muscular coordination.

**ATMOSPHERE (atm.):**

Pressure measurement. One atmosphere (atm) = 14.7 lbs/sq in.

**ATROPHY:**

Wasting or diminution in the size of tissue, organs, or the entire body caused by lack of use.

**AUTOIGNITION TEMPERATURE:**

Minimum temperature which a substance must be heated without application of flame or spark to cause substance to ignite. Materials should not be heated to greater than 80% of this temperature.

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**B****BAL:**

British Anti-Lewisite. A name for the drug dimecaprol--a treatment for toxic inhalations.

**BASE:**

Substances that (usually) liberate  $\text{OH}^-$  anions when dissolved in water. Bases react with acids to form salts and water. Bases have a pH greater than 7, turn litmus paper blue, and may be corrosive to human tissue. A strong base is called alkaline or caustic.

**BAUME:**

Arbitrary scale of specific gravities; used to determine specific gravities and in graduation of hydrometers.

**BCM:**

Blood-clotting mechanism effects.

**BENIGN:**

Not recurrent or not tending to progress. Not cancerous.

**BIOLOGICAL EXPOSURE INDEXES (BEI):**

Numerical values based on procedures to determine the amount of a material absorbed into the human body by measuring it or its metabolic products in tissue, fluid or exhaled air.

**BIODEGRADABLE:**

Organic material's capacity for decomposition as a result of attack by microorganisms.

**BIOLOGICAL MONITORING:**

Periodic examination of body substances, such as blood or urine, to determine the extent of hazardous material absorption as opposed to mere exposure.

**BIOPSY:**

Removal and examination of tissue from the living body.

**BOILING LIQUID EXPANDING VAPOR EXPLOSION (BLEVE):**

Condition in which liquids are excessively heated, which may result in the violent rupture of a container, and the rapid vaporization of the material. The possibility of a BLEVE increases with the volatility of the material.

**BODY BURDEN:**

Total amount of a toxic material that a person has ingested or inhaled from all sources over time.

**BOILING POINT (BP):**

Temperature at which a liquid changes to a vapor state at a given pressure. Flammable materials with low boiling points generally present special fire hazards.

**BOM, or BuMINES:**

Bureau of Mines, U.S. Department of Interior.

**BONDING:**

Safety practice where two objects are interconnected with clamps and bare wire. This equalizes electrical potential between the objects and helps prevent static sparks that could ignite flammable materials.

**BRADYCARDIA:**

A slow heartbeat with pulse rate below 60/minute.

**BRONCHITIS:**

Inflammation of the bronchial tubes in the lungs.

**BRITISH THERMAL UNIT (BTU):**

Quantity of heat required to raise the temperature of 1 pound of water,  $1^\circ\text{F}$  at  $39.2^\circ\text{F}$ , its temperature of maximum density.

**BUFFER:**

Substance that reduces the change in hydrogen ion concentration (pH) that otherwise would be produced by adding acids or bases to a solution.

**BULK DENSITY:**

The mass (weight) per unit volume of a solid particulate material as it is normally packed, with voids between particulates containing air. Usually expressed as  $\text{lb/ft}^3$  or  $\text{g/cm}^3$ .

**BUNA:**

Trademark for synthetic rubber and rubberlike materials such as Buna-N (Nitrile) or Buna-S (Styrene).

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# C

**°C:**

Centigrade, a unit of temperature.

**CALORIE:**

Standard unit of heat. A calorie is the amount of heat required to raise 1 gram of water 1°C.

**CARBON DIOXIDE (CO<sub>2</sub>):**

A heavy, colorless gas produced by combustion and decomposition of organic substances and as by-product of chemical processes. Will not burn, relatively non-toxic, and unreactive. Can cause oxygen deficient environments in large concentrations. Is useful as fire-extinguishing agent to block oxygen and smother fire.

**CARBON MONOXIDE (CO):**

A colorless, odorless, flammable, and very toxic gas produced by the incomplete combustion of carbon compounds and as a by-product of many chemical processes. A chemical asphyxiant, it reduces the blood's ability to carry oxygen.

**CARCINOGEN:**

Substance or agent capable of causing or producing cancer in mammals.

**CARCINOMA:**

Malignant tumor or cancer; a new growth made up of epithelial cells tending to grow rapidly, infiltrate other cells, and give rise to metastasis (spreading).

**(CAS) CHEMICAL ABSTRACTS SERVICE NUMBER:**

An assigned number used to identify a chemical. CAS stands for Chemical Abstracts Service, an organization that indexes information published in Chemical Abstracts by the American Chemical Society and that provides index guides by which information about particular substances may be located in the abstracts. Sequentially assigned CAS numbers identify specific chemicals, except when followed by an asterisk (\*) which signifies a compound (often naturally occurring) of variable composition. The numbers have no chemical significance. The CAS number is a concise, unique means of material identification.

**CATALYST:**

Substance that modifies a chemical reaction (makes it faster or slower) without being consumed.

**CATARACT:**

Loss of transparency of the crystalline lens of the eye or its capsule.

**CAUSTIC:**

See Alkali.

**CC:**

Closed cup. Identifies one of the methods used to measure flash points of flammable liquids.

**cc , cm<sup>3</sup>**

Cubic centimeter.

**CEILING:**

Maximum allowable human exposure limit for airborne substances; not to be exceeded even momentarily.

**CENTIPOISE:**

cgs unit of the measure of viscosity equal to 1/100 poise. Viscosity of water at 20°C is approximately 1 centipose.

**CENTIMETER, cm:**

1/100 meter. One cm = approximately 0.4 in.

**CERCLA:**

Comprehensive Environmental Response, Compensation, and Liability Act. The Superfund Law, Public Law PL 96-510, found at 40 CFR 300. The EPA has jurisdiction.

**CFC:**

Chlorofluorocarbon. Associated with damage to the Earth's ozone layer.

**CFR:**

Code of Federal Regulations. A collection of the regulations established by law.

**cgs:**

Metric units of measure based upon centimeter, gram, and second.

**CHELATING AGENT:**

Chemical compound capable of forming multiple chemical bonds to a metal ion. Used to treat metal poisoning.

**CHEMICAL:**

Any element, chemical compound, or mixture of elements and/or compounds.

**CHEMICAL CARTRIDGE RESPIRATOR:**

Respirator using various chemical substances to purify inhaled air of certain contaminative gases or vapors. Typically effective for concentrations no more than 10-times the TLV of the contaminant if it has warning properties (odor or irritation) below the TLV.

**CHEMICAL FAMILY:**

Group of single elements or compounds with a common general name.

**CHEMICAL FORMULA:**

Gives the number and kinds of atoms that comprise a molecule of a material.

**CHEMICAL NAME:**

Scientific designation of name that clearly identifies chemical for hazard evaluation purposes.

**CHEMICAL PNEUMONITIS:**

Inflammation of the lungs caused by accumulation of fluids due to chemical irritation.

**CHEMICAL REACTIVITY:**

Ability of a material to chemically change. Undesirable and dangerous effects such as heat, explosions, or the production of noxious substances can result.

**CHEMTREC:**

24-hour toll free telephone number (800-424-9300), intended primarily for use by those who respond to chemical transportation emergencies. Established by the Chemical Manufacturer's Association.

**CHEMILUMINESCENCE:**

Emission of light during a non-combustible chemical reaction.

**CHLORACNE:**

Acne-like eruption caused by excessive contact with certain compounds.

**CHEMICAL HYGIENE PLAN (CHP):**

Per 29 CFR 1910.1450, OSHA standard; "Occupational Exposures to Hazardous Chemicals in Laboratories." Effective 5/1/90. A written plan that includes specific work practices, standard operating procedures, equipment, engineering controls, and policies to ensure that employees are protected from hazardous exposure levels to all potentially hazardous chemicals in use in their work areas. The OSHA standard provides for training, employee access to information, medical consultations, examinations, hazard identification procedures, respirator use, and record keeping practices.

**CHRONIC EFFECT:**

Adverse effect on a human or animal body with symptoms that develop slowly over a long period of time or that recur frequently.

**CHRONIC EXPOSURE:**

Long-term contact with a substance.

**CHRONIC TOXICITY:**

Adverse effects resulting from repeated doses of or exposures to a material over a relatively prolonged period of time. Ordinarily used to denote effects noted in experimental animals.

**CNS:**

Central Nervous System, the brain and spinal cord.

**COEFFICIENT OF WATER/OIL DISTRIBUTION:**

Also called the partition coefficient, it is the ratio of the solubility of a chemical in water to its solubility in oil. Used to indicate how easily human or other organisms can absorb or store a material. Sometimes abbreviated  $K_o/w$ ; may also be expressed as its logarithm,  $\log K_o/w$ .

**COMBUSTIBLE LIQUIDS:**

Term used by NFPA and DOT to classify certain liquids that will burn, on the basis of flash points. NFPA and DOT generally define "combustible liquids" as having a flash point of 100°F or higher. They do not ignite as easily as flammable liquids; however, they can be ignited under certain conditions, and must be handled with caution.

**COMMON NAME:**

Designation for material other than chemical name, such as code, trade, brand, or generic name.

**COMPRESSED GAS:**

Material contained under pressure (dissolved gas, liquefied by compression or refrigeration).

**CONCENTRATION:**

Relative amount of a substance when combined or mixed with other substances.

**CONDITIONS TO AVOID:**

Conditions encountered during handling or storage that could cause a substance to become unstable.

**CONFINED SPACE:**

Any area that has limited openings for entry and exit that would make escape difficult in an emergency, has a lack of ventilation, contains known and potential hazards, and is not intended nor designated for continuous human occupancy.

**CONJUNCTIVITIS:**

Inflammation of conjunctiva, the delicate membrane that lines eyelid and covers the eyeball.

**CONTAINER:**

Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. Under the Hazard Communication Standard pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle are not considered to be containers.

**CORNEA:**

Transparent structure of the external layer of the eyeball.

**CORROSION RATE:**

Expressed in inches per year; accompanied by temperature.

**CORROSIVE:**

Liquid or solid that causes visible destruction or irreversible alterations in skin tissue at site of contact, or, in the case of leakage from its packaging, liquid that has severe corrosion rate on steel.

**CRITICAL PRESSURE/TEMPERATURE:**

Temperature above which a gas cannot be liquefied by pressure. The critical pressure is that pressure required to liquefy a gas at its critical temperature.

**CRYOGENIC:**

Relating to extremely low temperature as for refrigerated gases.

**cu ft, ft<sup>3</sup>:**

Cubic foot. Cu ft is more usual.

**cu m, m<sup>3</sup>:**

Cubic meter. m<sup>3</sup> is preferred.

**CURETTAGE:**

Cleansing of a diseased surface.

**CUTANEOUS:**

Pertaining to the skin.

**CYANOSIS:**

Dark purplish coloration of skin and mucous membrane caused by deficient oxygenation of the blood.

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# D

**DANGEROUSLY REACTIVE MATERIAL:**

Material that can react by itself or with water/air producing hazardous condition.

**DECOMPOSITION:**

Breakdown of a material or substance into parts or elements or simpler compounds.

**DEFATTING:**

Removal of natural oils from the skin by fat-dissolving solvents or other chemicals.

**DELIQUESCENT:**

Water soluble salts (usually powdered) absorb moisture from air and to soften or dissolve as a result.

**DEMULCENT:**

Material capable of soothing or protecting inflamed, irritated mucous membranes.

**DENSITY:**

Ratio of weight to volume of a material, usually in grams per cubic centimeter.

**DEPRESSANT:**

A substance that reduces a bodily functional activity or an instinctive desire, such as appetite.

**DERMAL:**

Used on or applied to the skin.

**DERMAL TOXICITY:**

Ratings corresponding to the following definitions are derived from data obtained from the test methods as described in 16 CFR 1500.40 and categories of toxicity as described in 16 CFR 1500.3.

**NON-TOXIC:**

The probable lethal dose of undiluted product to 50% of the test animals determined from dermal toxicity studies ( $LD_{50}$ ) is greater than 2 grams per kilogram of body weight.

**TOXIC:**

The probable lethal dose of undiluted product to 50% of the test animals determined from dermal toxicity studies ( $LD_{50}$ ) is greater than 200 milligrams and less than or equal to 2 grams per kilogram of body weight.

**HIGHLY TOXIC:**

The probable lethal dose of undiluted product to 50% of the test animals determined from dermal toxicity studies ( $LD_{50}$ ) is less than or equal to 200 milligrams per kilogram of body weight.

**DERMATITIS:**

Inflammation of the skin.

**DESIGNATED REPRESENTATIVE:**

Any individual or organization to whom an employee gives written authorization to exercise such employee's rights under the Hazard Communication Standard.

**DESIGNATED AREA:**

An area of (or device within) a lab to be used for work with "select carcinogens", reproductive toxins, and other materials which have a high degree of acute toxicity. An administrative control intended to minimize the potential for employee exposure to hazardous chemicals.

**DIAPHORESIS:**

Perspiration, especially profuse.

**DIKE:**

A barrier constructed to control or confine hazardous substances and prevent them from entering sewers, ditches, streams, or other flowing waters.

**DILUTION VENTILATION:**

Air flow designed to dilute contaminants to acceptable levels.

**DISTRIBUTOR:**

A business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

**DRY CHEMICAL:**

Powdered fire extinguishing agent, usually composed of sodium bicarbonate, potassium bicarbonate, etc.

**DUST:**

Solid particles suspended in air produced by some mechanical process, such as crushing, grinding, abrading, or blasting. Most dusts are an inhalation, fire, and dust explosion hazard.

**DYSPLASIA:**

An abnormality of development.

**DYSPNEA:**

Sense of difficulty in breathing; shortness of breath.

**DYSURIA:**

Difficult or painful urination.

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## E

**EDEMA:**

Abnormal accumulation of clear, watery fluid in body tissue.

**EFFECTIVE CONCENTRATION (EC<sub>50</sub>):**

Concentration of a material in water, a single dose which is expected to cause a biological effect on 50% of a group of test animals.

**ELECTROLYTE:**

Non-metallic substance that conducts electric current in solution by moving ions rather than electrons.

**EMBOLISM:**

Obstruction of a blood vessel by a transported clot, a mass of bacteria, etc.

**EMBRYO:**

Organism in the early stages of development before birth.

**EMBRYOTOXIN:**

Material harmful to a developing embryo at a concentration that has no adverse effect on the pregnant female.

**EMETIC:**

Agent that induces vomiting.

**EMPHYSEMA:**

Irreversibly diseased lung condition in which the alveolar walls have lost their resiliency, resulting in an excessive reduction in the lungs' capacity.

**EMPLOYEE:**

A worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies.

**EMPLOYER:**

A person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

**ENDOTHERMIC:**

A chemical reaction that absorbs heat.

**ENGINEERING CONTROLS:**

Systems that reduce potential hazards by isolating the worker from the hazard or by removing the hazard from the work environment. Methods include ventilation, isolation, and enclosure.

**EPIDEMIOLOGY:**

Science that deals with the study of disease in a general population.

**EPIPHORA:**

Excessive flow of tears.

**EPISTAXIS:**

Nosebleed.

**ERGONOMICS:**

Study of human characteristics for the appropriate design of living and work environments.

**ERYTHEMA:**

Abnormally red skin from capillary congestion.

**ETIOLOGY:**

All of the factors that contribute to the cause of a disease or an abnormal condition.

**EVAPORATION RATE:**

Rate at which a particular material will vaporize when compared to the rate of vaporization of a known material. Evaporation rate can be useful in evaluating the health and fire hazards of a material.

**EXPLOSIVE:**

Material that produces a sudden, almost instantaneous release of pressure, gas, and heat when subjected to abrupt shock, pressure, or high temperature.

**EXPOSURE OR EXPOSED:**

State of being open and vulnerable to a hazardous chemical by inhalation, ingestion, skin contact, absorption, or any other course; includes potential (accidental or possible) exposure.

**EXPOSURE LIMITS:**

Concentration in air of a chemical that is thought to be acceptable.

**EXTINGUISHING MEDIA:**

Fire extinguisher or extinguishing method appropriate for use on specific material.

**EYE IRRITATION:**

Ratings corresponding to the following definitions are derived from data obtained from test methods described in the 16 CFR 1500.42 graded pursuant to the Draize Scale for scoring ocular lesions and temporal reversibility criteria as set forth in NAS Publication 1138.

**1. PRACTICALLY NON-IRRITATING:**

The undiluted product, when instilled into the eyes of rabbits produces no noticeable irritation, or slight transient conjunctiva irritation. (Average Draize score 0.00-15.0).

**2. SLIGHTLY IRRITATING:**

The undiluted product, when instilled into the eyes of rabbits, produces slight to moderate conjunctiva irritation, slight corneal involvement, and/or slight iritis. (Average Draize score 15.1-25.0).

**3. MODERATELY IRRITATING:**

The undiluted product, when instilled into the eyes of rabbits, produces moderate corneal involvement with or without severe iritis. (Average Draize score range 25.1-50.0). The effects clear within 21 days.

**4. SEVERELY IRRITATING (OR CORROSIVE):**

The undiluted product, when instilled into the eyes of rabbits, produces severe corneal involvement with or without severe iritis. (Average Draize score range 50.1-110.0). The effects persist for 21 days or more.

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## F

**FASCICULATION:**

Muscular twitching.

**FEDERAL REGISTER:**

Daily publication that lists and discusses the regulations of Federal agencies.

**FIBER:**

Basic form of matter, usually crystalline, with a high ratio of length to diameter.

**FIBROSIS:**

Formation of fibrous tissue, as in reparative or reactive process to particulates, in excess of amounts normally present in lung tissue walls. This reduces the oxygen and carbon dioxide exchange efficiency.



**FIFRA:**

Federal Insecticide, Fungicide, and Rodenticide Act requires that certain useful poisons, such as chemical pesticides, sold to the public contain labels that carry health hazard warnings to protect users. It is administered by EPA.

**FINES:**

Finely crushed or powdered material or fibers; especially those smaller than the average in a mix of various sizes.

**FIRE DIAMOND:**

Symbol designed by the NFPA to give a quick number rating for the particular material's degree of health (blue), flammability (red), reactivity (yellow), and specific (white) hazard.

**FIRE POINT:**

Lowest temperature at which liquid will produce sufficient vapor to flash near its surface and continue to burn.

**FLAMMABLE:**

Defined by DOT and NFPA as a liquid with a flash point below 100 degrees F. Flammable liquids are: *Class 1 Liquids and may be subdivided as follows:*

- Class 1A  
Flash point below 73°F and boiling point below 100°F.
- Class 1B  
Flash point below 73°F and boiling point at or above 100°F.
- Class 1C  
Flash point at or above 73°F and below 100°F.

**FLAMMABLE AEROSOL:**

Product packaged in an aerosol container and can release a flammable material.

**FLAMMABLE GAS:**

Gas that at ambient temperature and pressure forms a flammable mixture with air at a concentration of 13% by volume or less; or a gas that at ambient temperature and pressure forms a range of flammable mixtures with air greater than 12% by volume, regardless of the lower limit.

**FLAMMABLE LIMITS:**

Minimum and maximum concentrations of flammable gas or vapor between which ignition occurs.

**FLAMMABLE LIQUID:**

Liquid that gives off vapors that can be ignited at room temperature; liquid with flash point below 100°F.

**FLAMMABLE SOLID:**

Solid that will ignite readily and continue to burn or is liable to cause fires under ordinary conditions or during transportation through friction or retained heat from manufacturing or processing and that burns so vigorously and persistently as to create a serious transportation hazard.

**FLASH BACK:**

Occurs when a trail of flammable material is ignited by a distant spark or ignition source. The flame then travels along the trail of the material back to its source.

**FLASH POINT:**

Temperature at which a liquid will give off enough flammable vapor to ignite. There are several flash point test methods, and flash points may vary for the same material depending on the method used, so the test method is indicated when the flash point is given.

**FOAM:**

Fire fighting material consisting of small bubbles of air, water, and concentrating agents. Foam will put out a fire by blanketing it, excluding air and blocking the escape of volatile vapor.

**FOG:**

Visible suspension of fine droplets in a gas.

**FORESEEABLE EMERGENCY:**

Potential occurrence such as equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical.

**FORMULA:**

The scientific expression of the chemical composition of a material, e.g., water is (H<sub>2</sub>O), sulfuric acid is (H<sub>2</sub>SO<sub>4</sub>), sulfur dioxide is (SO<sub>2</sub>).

**FREEZING POINT:**

Temperature at which a material changes its physical state from liquid to solid. This information is important because a frozen material may burst its container or the hazards could change.

**FROSTBITE:**

Damage to tissue from exposure to extreme cold or contact with extremely cold liquids or solids.

**FUGITIVE EMISSION:**

Gas, liquid, solid, vapor, fume, mist, fog, or dust that escapes from process equipment or a product.

**FULL PROTECTIVE CLOTHING:**

Fully protective gear that keeps gases, vapor, liquid, and solids from any contact with skin and prevents them from being inhaled or ingested.

**FUME:**

Airborne suspension consisting of minute solid particles arising from the heating of a solid. This heating is often accompanied by a chemical reaction where the particles react with oxygen to form an oxide.

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## G

**g:**

Gram. Metric unit of weight.

**GANGRENE:**

Death of tissue combined with putrefaction.

**GAS:**

Formless fluid that occupies the space of its enclosure. Can settle to the bottom or top of an enclosure when mixed with other materials. Can be changed to its liquid or solid state only by increased pressure and decreased temperature.

**GASTRIC LAVAGE:**

Washing out of the stomach using a tube and fluids.

**GASTRITIS:**

Irritation of lining of stomach which may be evident as stomach pains, vomiting, or diarrhea, etc.

**GASTROENTERITIS:**

Inflammation of the stomach and intestine.

**GASTROINTESTINAL TRACT:**

Stomach and intestine as a functional unit.

**GAVAGE:**

Feeding by means of a stomach tube.

**GENERAL VENTILATION:**

Removal of contaminated air and its replacement with clean air from general workplace area as opposed to local ventilation, which is specific air changing in immediate air of a contamination source.

**GENERIC NAME:**

Designation or identification to identify a chemical by other than its chemical name.

**GENETIC:**

Pertaining to or carried by genes. Hereditary.

**GINGIVITIS:**

Inflammation of the gums.

**GRAM:**

Metric unit of mass weight. One U.S. ounce is about 28 grams and one pound is 454 grams.

**GRAM/KILOGRAM:**

Expression of dose used in oral and dermal toxicology testing to indicate the grams of substance dosed per kilogram of animal body weight.

**GROUNDING:**

Safety practice to conduct electrical charge to ground, preventing igniting sparks of a material.

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## H

**HAZARDOUS DECOMPOSITION:**

Breaking down or separation of a substance into its constituent parts, elements, or into simpler compounds accompanied by the release of heat, gas, or hazardous materials.

**HAZARDOUS CHEMICAL:**

Any chemical whose presence or use is a physical hazard or a health hazard.

**HAZARDOUS INGREDIENTS:**

Hazardous substances that make up a mixture.

**HAZARDOUS MATERIAL:**

Any substance or mixture of substances having properties capable of producing adverse effects on the health or safety of a human being.

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS):**

Developed by the NPCA to provide information on health, flammability, and reactivity hazards that are encountered in the workplace. A number is assigned to a material indicating the degree of hazard, from 0 for the least up to 4 for the most severe. Letters are used to designate personal protective equipment.

**HAZARDOUS WASTE NUMBER:**

Identification number assigned by the EPA, per RCRA law, to identify and track hazardous wastes.

**HEALTH HAZARD:**

Chemical from which acute or chronic health effects may occur in exposed individuals.

**HEMATOPOIETIC SYSTEM:**

The blood-forming mechanism of the human body.

**HEMATURIA:**

Presence of blood in the urine.

**HEMOLYSIS:**

Separation of the hemoglobin from red blood corpuscles.

**HEPATIC:**

Pertaining to the liver.

**HEPATOTOXIN:**

A substance that causes injury to the liver.

**HIGHLY TOXIC:**

A chemical in any of the following categories:

- A chemical with a median lethal dose (LD<sub>50</sub>) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats between 200 and 300 grams each.
- A chemical with a median lethal dose (LD<sub>50</sub>) 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 2 and 3 kilograms each.
- A chemical that has a median lethal concentration (LC<sub>50</sub>) 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 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

**HYDROCARBON:**

Organic compound composed only of carbon and hydrogen. Petroleum, natural gas, and coal are the main sources of hydrocarbons for industry.

**HYDROPHILIC:**

Materials having large molecules that absorb and retain water, causing them to swell and frequently to gel.

**HYGROSCOPIC:**

Readily adsorbing available moisture in any form.

**HYPEREMIA:**

Congestion of blood in a body part.

**HYPERGOLIC:**

Self-igniting upon contact of its components without a spark or external aid.

**HYPOCALCEMIA:**

Calcium deficiency of the blood.

**HYPOXIA:**

Insufficient oxygen, especially applied to body cells.

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**I****IGNITION TEMPERATURE:**

Lowest temperature at which a combustible material will catch fire in air and will continue to burn independently of the source of heat when heated.

**INHALATION TOXICITY:**

Ratings corresponding to the following definitions are derived from the test methods and categories of toxicity described in 16 CFR 1500.3.

**1. NON-TOXIC:**

The probable lethal concentration of the undiluted product to 50% of the test animals (LC<sub>50</sub>) is greater than 200 milligrams per liter by volume when inhaled continuously for one hour or less.

**2. TOXIC:**

The probable lethal concentration of the undiluted product to 50% of the test animals (LC<sub>50</sub>) is greater than 2 milligrams and less than or equal to 200 milligrams per liter by volume when inhaled continuously for one hour or less.

**3. HIGHLY TOXIC:**

The probable lethal concentration of the undiluted product to 50% of the test animals (LC<sub>50</sub>) is less than or equal to 2 milligrams per liter by volume when inhaled continuously for one hour or less.

**IMMEDIATE USE:**

The hazardous chemical 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.

**IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):**

Maximum concentration from which one could escape within 30-minutes without any escape-impairing symptoms or any irreversible health effects.

**IMPORTER:**

First business with employees within the Customs Territory of U.S. which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within U.S.

**IMPERVIOUS:**

Material that does not allow another substance to pass through or penetrate it.

**INCOMPATIBLE:**

Materials which could cause dangerous reactions from direct contact with one another.

**INERT INGREDIENTS:**

Anything other than the active ingredient in a product; not having active properties.

**INFLAMMABLE:**

Capable of being easily set on fire and continuing to burn, especially violently.

**INFLAMMATION:**

Series of reactions produced in tissue by an irritant, injury, or infection. Characterized by swelling and redness caused by an influx of blood and fluids.

**INGESTION:**

Taking in of a substance through the mouth.

**INHALATION:**

Breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.

**INHIBITOR:**

Chemical which is added to another substance to prevent an unwanted chemical change from occurring.

**INORGANIC MATERIALS:**

Compounds derived from other than vegetable or animal sources; generally do not contain carbon atoms.

**INSOLUBLE:**

Incapable of being dissolved in a liquid.

**INTERSTITIAL FIBROSIS:**

Scarring of the lungs.

**IRIDAL:**

Pertaining to the iris of the eye.

**IRIDOCYCLITIS:**

Inflammation of both the iris and the ciliary body of the eye.

**IRRITANT:**

Substance which, by contact in sufficient concentration for a sufficient period of time, will cause an inflammatory response or reaction of the eye, skin, or respiratory system.

**ISOMERS:**

Compounds that have same molecular weight and atomic composition but differ in molecular structure.

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**J****JAUNDICE:**

Yellowish discoloration of tissue, whites of the eyes, and bodily fluids with bile pigment caused by any of several pathological conditions that interrupt the liver's normal production and discharge of bile.

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**K****KETOSIS:**

Condition marked by excessive production or accumulation of ketone bodies in the body caused by disturbed carbohydrate metabolism.

**KILOGRAM:**

Metric unit of weight; about 2.2 pounds.

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**L****LABEL:**

Any written, printed, or graphic sign or symbol displayed on or affixed to containers of hazardous chemicals. Should contain identity of the material, appropriate hazard warnings, and name and address of the chemical manufacturer, importer, or other responsible party.

**LABORATORY SCALE (ACTIVITY):**

The work involves containers of substances used for reactions and transfers that are designed for easy and safe handling by one person. Workplaces that produce commercial quantities of materials are excluded from the definition of "Laboratory."

**LACRIMATION:**

Secretion and discharge of tears.

**LACRIMATOR:**

Material that produces tears.

**LANDFILL:**

Disposal of trash and waste products at controlled location that is sealed and buried under earth.

**LATENCY PERIOD:**

Time that elapses between exposure and the first manifestations of disease or illness.

**LAVAGE:**

Washing of a hollow organ, such as the stomach, using a tube and fluids.

**LC<sub>50</sub>:**

Lethal concentration 50, median lethal concentration. The concentration of a material in air that on the basis of laboratory tests (respiratory route) is expected to kill 50% of a group of test animals when administered as a single exposure in a specific time period, usually 1 hour LC<sub>50</sub> is expressed as parts of material per million parts of air, by volume (ppm) for gases and vapors, as micrograms of material per liter of air ( $\mu\text{g/l}$ ), or milligrams of material per cubic meter of air ( $\text{mg/m}^3$ ) for dusts and mists, as well as for gases and vapors.

**LCLO:**

Lethal concentration low. The lowest concentration of a substance in air reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure that are less than 24-hr. (acute) or greater than 24-hr. (subacute and chronic).

**LD<sub>50</sub>:**

Lethal dose 50. The single dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route other than inhalation. LD<sub>50</sub> is usually expressed as milligrams or grams of material per kilogram of animal weight ( $\text{mg/kg}$  or  $\text{g/kg}$ ). The animal species and means of administering the dose (oral, intravenous, etc.) should also be stated.

**LDLO:**

Lethal dose low. The lowest dose of a substance introduced by any route, other than inhalation, reported to have caused death in humans or animals.

**LESION:**

Abnormal change, injury, or damage to tissue or to an organ.

**LEUKEMIA:**

Progressive, malignant disease of the blood-forming organs.

**LIPID GRANULOMA:**

Mass of chronically inflamed tissue that is usually infective.

**LIPID PNEUMONIA:**

Chronic condition caused by the aspiration of oily substances into the lungs.

**LOCAL EFFECTS:**

Toxic or irritation effects which occur at the site of contact with a chemical or substance.

**LOCAL VENTILATION:**

Drawing off and replacement of contaminated air directly from its source.

**LOWER EXPLOSIVE (FLAMMABLE) LIMIT (LEL):**

Lowest concentration (lowest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, electric arc, or flame) is present.

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## M

**MALAISE:**

Feeling of general discomfort, distress, or uneasiness.

**MELTING POINT:**

Temperature at which a solid substance changes to a liquid state. For mixtures, a melting range may be given.

**METABOLISM:**

Chemical and physical processes whereby the body functions.

**METASTASIS:**

Transmission of a disease from one part of the body to another.

**METHEMOGLOBINEMIA:**

Presence of methemoglobin in the bloodstream caused by the reaction of materials with the hemoglobin in red blood cells that reduces their oxygen-carrying capacity.

**mg:**

Milligram (1/1000,  $10^{-3}$ , of a gram).

**mg/kg:**

Milligram per kilogram. Dosage used in toxicology testing to indicate a dose administered per kg of body weight.

**mg/m<sup>3</sup>:**

Milligram per cubic meter of air.  $\text{mg/m}^3 = \text{ppm} \times \text{MW}/24.45$  at 25 C.

**Microgram ( $\mu\text{g}$ ):**

One-millionth ( $10^{-6}$ ) of a gram.

**Micrometer ( $\mu\text{m}$ ):**

One-millionth ( $10^{-6}$ ) of a meter; often referred to as a micron.

**Millimeter (mm):**

1/1000 of a meter.

**MISCIBLE:**

Extent to which liquids or gases can be mixed or blended.

**MIST:**

Suspended liquid droplets in the air generated by condensation from the gaseous to the liquid state or by mechanically breaking up the liquid by splashing or atomizing.

**MIXTURE:**

Heterogeneous association of materials that cannot be represented by a chemical formula and that does not undergo chemical change as a result of interaction among the mixed materials.

**ml:**

Milliliter. 1/1000 of a liter. A metric unit of capacity, for all practical purposes equal to 1 cubic centimeter. One cubic inch is about 16 ml.

**mm Hg:**

A measure of pressure in millimeters of a mercury column above a reservoir, or difference of level in a U-tube.

**MOLE:**

Quantity of a chemical substance that has a weight in a unit numerically equal to the molecular weight.

**MOLECULAR WEIGHT:**

The sum of the atomic weights of the atoms in a molecule.

**mppcf:**

Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques (OSHA).

**MUCOUS MEMBRANE:**

The mucous-secreting lining that lines the hollow organs of the body.

**MUTAGEN:**

Substance or agent capable of altering the genetic material in a living cell.

---

## N

**n-:**

Normal. Used as a prefix in chemical names signifying a straight-chain structure.

**NARCOSIS:**

Stupor or unconsciousness produced by narcotics or other materials.

**NAUSEA:**

Tendency to vomit, a feeling of sickness at the stomach.

**NECROSIS:**

Localized death of tissue.

**NEOPLASM:**

New or abnormal tissue growth that is uncontrollable and progressive.

**NEPHROTOXIC:**

Poisonous to the kidney.

**NEURITIS:**

Inflammation of the nerves.

**NEUTRALIZE:**

To render chemically harmless; to return the pH to the neutral level of 7.

**NON-FLAMMABLE:**

Incapable of being easily ignited or burning with extreme rapidity when lighted. Also, a DOT hazard class for any compressed gas other than a flammable one.

**NO<sub>x</sub>:**

A general formula for oxides of nitrogen (NO,NO<sub>2</sub>). They react with moisture in the respiratory tract to produce acids that corrode and irritate tissue, causing congestion and pulmonary edema. Symptoms of acute exposure can develop over 6 to 24 hours. Chronic exposure to low levels can cause irritation, cough, headache, and tooth corrosion. Exposure to 5 to 50 ppm of NO<sub>2</sub> can cause slowly evolving pulmonary edema. Commonly produced by combustion processes, including motor vehicle engines.

**NUISANCE PARTICULATES:**

Dusts that do not produce significant organic disease or toxic effect from "reasonable" concentrations and exposures.

**NYSTAGMUS:**

Spastic, involuntary motion of the eyeballs.

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**O****ODOR:**

Description of the smell of the substance.

**ODOR THRESHOLD:**

Lowest concentration of a substance's vapor, in air, that can be smelled.

**OLFACTORY:**

Relating to the sense of smell.

**OLIGURIA:**

Scanty or low volume of urine.

**OPAQUE:**

Impervious to light rays.

**OPEN TRANSFER:**

Any transfer that at any time involves contact of a moving fluid with the atmosphere, air, or oxygen. Open transfer of flammable liquids, especially Class IA liquids, is dangerous due to the release of flammable vapors into the work area. Since there is a risk of fire or explosion if an ignition source is present, do these transfers only in a hood.

**ORAL:**

Used in or taken into the body through the mouth.

**ORAL TOXICITY:**

Ratings corresponding to the following definitions are derived from data obtained from the test methods and categories of toxicity as described in 16 CFR 1500.3.

**1. NON TOXIC:**

The probable lethal dose of undiluted product to 50% of the test animals determined from ingestion studies (LD<sub>50</sub>) is greater than 5 grams per kilogram of body weight.



2. **TOXIC:**  
The probable lethal dose of undiluted product to 50% of the test animals determined from ingestion studies (LD<sub>50</sub>) is greater than 50 milligrams and less than or equal to 5 grams per kilogram of body weight.
3. **HIGHLY TOXIC:**  
The probable lethal dose of undiluted product to 50% of the test animals determined from ingestion studies (LD<sub>50</sub>) is less than or equal to 50 milligrams per kilogram of body weight.

**ORGANIC MATERIALS:**

Compounds composed of carbon, hydrogen, and other elements with chain or ring structures.

**OVEREXPOSURE:**

Exposure to a hazardous material beyond the allowable exposure levels.

**OXIDATION:**

Reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent. An oxidation reaction is always accompanied by an offsetting reduction reaction in which (1) oxygen is removed from a compound; or (2) atoms, molecules, or ions gain electrons.

**OXIDE POX:**

Dermatitis caused by contact with oxides under poor personal hygienic conditions.

**OXIDIZER:**

Substance that yields oxygen readily to stimulate the combustion of organic matter.

**OXIDIZING AGENT:**

Chemical or substance that brings about an oxidation reaction.

---

## P

**PALPITATION:**

Irregular, rapid heartbeat.

**PARATHESIA:**

Sensation of pricking, tinkling, or creeping on the skin that has no objective cause.

**PARTICULATE:**

Small, separate pieces of an airborne material. Generally, anything that is not a fiber and has an aspect ratio of 3 to 1.

**PARTS PER MILLION (PPM):**

Unit for measuring concentration of a gas or vapor in air. Parts of the gas or vapor in a million parts of air. Also used to indicate the concentration of a particular substance in a liquid or solid.

**PERCENT VOLATILE:**

Percent volatile by volume is the percentage of a liquid or solid (by volume) that will evaporate at an ambient temperature of 70°F (unless some other temperature is specified). Examples: butane, gasoline, and paint thinner (mineral spirits) are 100 percent volatile; their individual evaporation rates vary, but in time, each will evaporate completely.

**PERMISSIBLE EXPOSURE LIMIT (PEL):**

Legally enforced exposure limit for a substance established by OSHA. The PEL indicates the permissible concentration of air contaminants to which nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, over a working lifetime (40 years), without adverse effects.

**PERSONAL HYGIENE:**

Precautionary measures taken to maintain good health when exposed to harmful materials.

**PERSONAL PROTECTIVE EQUIPMENT (PPE):**

Devices or clothing worn to help isolate a worker from direct exposure to hazardous materials.

**PETROLEUM DISTILLATE:**

Complex mixture of hydrocarbons, liquid at normal ambient conditions, separated from crude oil and other refinery process streams by distillation.

**pH:**

Scale of 0 to 14 representing acidity or alkalinity of aqueous solution. Pure water has pH of 7 (neutral), while acidic materials have pHs less than 7 & alkaline (basic) materials have pHs greater than 7. Substance in aqueous solution will ionize to various extent giving different concentrations of H<sup>+</sup> and OH<sup>-</sup> ions.

**PHLEGM:**

Thick mucous from the respiratory passage.

**PHOTOPHOBIA:**

Intolerance to light.

**PHYSICAL HAZARD:**

Means a chemical 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.

**PHYSICAL STATE:**

Condition of a material (solid, liquid, or gas) at room temperature.

**POISON:**

Any substance that is injurious to health and may lead to death when relatively small amounts are taken either internally or externally.

**PRODUCT IDENTIFICATION NUMBER:**

Four-digit number, prefaced by UN or NA, used in Canada under the Transportation of Dangerous Goods Regulation for use by emergency personnel to identify a material in the event of an accident.

**PNEUMOCONIOSIS:**

Respiratory tract and lung condition caused by inhalation and retention of irritant mineral or metallic particles. An X-ray can detect changes, which include fibrosis.

**POISON, CLASS A:**

DOT term for an extremely dangerous poison such as a poisonous gas or liquid of such a nature that a very small amount of the gas or vapor of the liquid mixed with air is dangerous to life.

**POISON, CLASS B:**

Term for liquid, solid, paste, or semisolid substances other than class A poisons or irritating materials known or presumed by animal tests to be so toxic to man to be a health hazard during transportation.

**POISON CONTROL CENTER:**

Provides medical information on a 24-hour basis for accidents involving ingestion of potentially poisonous materials.

**POLYCHLORINATED BIPHENYL (PCB):**

Pathogenic and teratogenic compound used as a heat transfer medium. It accumulates in tissue.

**POLYMERIZATION:**

Chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is such a reaction that takes place at a rate that releases large amounts of energy that can cause fires or explosions or burst containers. Materials that can polymerize usually contain inhibitors that can delay the reaction.

**POUR POINT:**

Temperature at which a liquid ceases or begins to flow or at which it congeals.

**POx:**

A general term for the several oxides of phosphorus.

**PPE:**

Personal protective equipment. Devices or clothing worn to help insulate a worker from direct exposure to hazardous materials. Examples include gloves and respirators.

**PRECORDIAL:**

In front of the heart, stomach.

**PRIMARY SKIN IRRITANT:**

A non-corrosive substance which produces severe skin irritation.

**PRODUCE:**

To manufacture, process, formulate, or repackage.

**PROSTRATION:**

Physical exhaustion, incapacitation.

**PROTEINURIA:**

Presence of protein in the urine.

**psia:**

Pounds per square inch absolute.

**psig:**

Pounds per square inch gauge (i.e., above atmospheric pressure).

**PSYCHOTROPIC:**

Acting on the mind.

**PULMONARY EDEMA:**

Fluid in the lungs.

**PYOLYSIS:**

Chemical decomposition or breaking apart of molecules produced by heating.

**PYROPHORIC:**

Materials that ignite spontaneously in air below 130°F. Occasionally friction will ignite them.

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## R

**REACTION:**

Chemical transformation or change; interaction of two or more substances to form new substance.

**REACTIVE MATERIAL:**

Chemical substance or mixture that will vigorously polymerize, decompose, condense, or become self-reactive due to shock, pressure, or temperature. Includes explosive materials, organic peroxides, pressure-generating materials, and water-reactive materials.

**REACTIVITY:**

Tendency of a substance to undergo chemical reaction with the release of energy.

**REAGENT:**

Substance used in a chemical reaction to produce another substance or to detect its composition.

**RECOMMENDED EXPOSURE LIMIT:**

The highest allowable airborne concentration that is not expected to injure a worker. Expressed as a ceiling limit or as a time weighted average, usually for 10-hour work shift.

**REDUCING AGENT:**

Substance that (1) combines with oxygen or (2) loses electrons to the reaction during a reduction reaction.

**REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES:**

Published by NIOSH. Presents basic toxicity data on thousands of materials. Objective is to identify "all known toxic substances" and to reference original studies.

**RENAL:**

Pertaining to the kidney.

**REPORTABLE QUANTITY (RQ):**

Amount of material that when spilled must be reported to the Federal, State, and local authorities under CERCLA, EPCRA, and the CWA.

**REPRODUCTIVE HEALTH HAZARD:**

Any agent that has a harmful effect on the adult male or female reproductive system or the developing fetus or child.

**RESPIRATORY SYSTEM:**

Breathing system, including the lungs and air passages, as well as the associated system of nerves and circulatory supply.

**RESPIRATORY PROTECTION:**

Devices that will protect the wearer's respiratory system from overexposure by inhalation to airborne contaminants. Respiratory protection is used when a worker must work in an area where he/she might be exposed to concentration in excess of the allowable exposure limit.

**RESPONSIBLE PARTY:**

Someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

**ROUTES OF ENTRY:**

Means by which material may gain access to the body (inhalation, ingestion, skin contact).

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## S

**SAINT ANDREW'S CROSS (X):**

Used in packaging for transport; It means harmful--stow away from foodstuffs.

**SARCOMA:**

A tumor that is often malignant.

**SARA:**

Superfund Amendments and Reauthorization Act. Signed into law October 17, 1986. Title III of SARA is known as the Emergency Planning and Community Right-to-Know Act of 1986. A revision and extension of CERCLA, SARA is intended to encourage and support local and state emergency planning efforts. It provides citizens and local governments with information about potential chemical hazards in their communities. SARA calls for facilities that store hazardous materials to provide officials and citizens with data on the types (flammables, corrosives, etc.); amounts on hand (daily, yearly); and their specific locations. Facilities are to prepare and submit inventory lists, SDSs, and tier 1 and 2 inventory forms. The disaster in Bhopal, India in 1987 added impetus to the passage of this law.

**SCBA:**

Self-contained breathing apparatus.

**SCLERAE:**

Tough, white, fibrous covering of the eyeball.

**SENSITIZATION:**

State of immune-response reaction in which further exposure elicits an immune or allergic response. A person previously exposed to a certain material is more sensitive when he experiences further contact with it.

**SENSITIZER:**

Substance which, on first exposure, causes little or no reaction in man or test animals but which, on repeated exposure, may cause a marked response not necessarily limited to the contact site.

**SIDEROSIS:**

Pneumoconiosis caused by the inhalation of iron particles. Also, tissue pigmentation caused by contact with iron.

**SIGN:**

Abnormality in the body indicating poisoning or disease which is observable by another person.

**SIGNAL WORDS:**

Distinctive words on a SDS which serves to alert the reader to the existence and relative degree of a hazard. Signal words are limited to:

- **Danger:**  
Materials that are: highly toxic; corrosive to living tissue; extremely flammable; or are suspected human carcinogens.
- **Warning:**  
Materials that are: moderately toxic; have severe skin irritation potential; cause allergic skin reactions; or are flammable.
- **Caution:**  
Materials that: have a low order of toxicity; produce only slight to moderate skin irritation; or are combustible.

**SILICOSIS:**

Condition of massive fibrosis of the lungs causing shortness of breath because of prolonged inhalation of silica dusts.

**SKIN IRRITATION:**

Ratings corresponding to the following definitions are derived from data obtained from the test methods as described in the CFR 16 1500.41 and or NAS publication 1138 and categories of toxicity as described in 16 CFR 1500.3.

- **PRACTICALLY NON-IRRITATING:**  
The undiluted product causes no noticeable irritation or causes slight inflammation (edema and erythema skin reaction values of 0 to 1) of intact or abraded skin of rabbits during the study period. Primary irritation index of 0 - 1.9.
- **MODERATELY IRRITATING:**  
The undiluted product causes well-defined inflammation (edema and erythema skin reaction values of 2) during the study period. Primary irritation index of 2 - 4.9.
- **PRIMARY SKIN IRRITANT:**  
The undiluted product cause moderate to severe inflammation (edema and erythema skin reaction values of 3 or 4) of the intact or abraded skin of rabbits during the study period. Primary irritation index of 5 or more.
- **CORROSIVE:**  
The undiluted product causes visible destruction or irreversible alterations of the tissue structure at the site of contact on intact or abraded skin of rabbits during the study period.

**SLURRY:**

Pourable mixture of solid and liquid.

**SMOKE:**

Dry particles and droplets generated by incomplete combustion of an organic material combined with and suspended in the gases from combustion.

**SOLUBILITY IN WATER:**

Percentage of a material (by weight) that will dissolve in water at ambient temperature.

**SOLUTION:**

Uniformly dispersed mixture. Composed of a solvent and a dissolved substance, called the solute.

**SOLVENT:**

Substance, usually liquid, in which other substances are dissolved. Water is the most common solvent.

**SOOT:**

Fine particles, usually black, formed by combustion consisting chiefly of carbon. Gives smoke color.

**SO<sub>x</sub>:**

Oxides of sulfur where x equals the number of oxygen atoms.

**SPASM:**

Involuntary, convulsive muscular contraction.

**SPECIFIC CHEMICAL IDENTITY:**

Chemical name, CAS number, or other information that reveals the precise chemical designation of the substance.

**SPECIFIC GRAVITY:**

Weight of material compared to equal volume of water: expression of density of material.

**STABILITY:**

Ability of a material to remain unchanged. A material is stable if it remains in the same form under expected and reasonable conditions of storage or use.

**STEL:**

Short-term (15-minute) exposure limit.

**STEV:**

Short-term exposure value.

**STOMATITIS:**

Inflammation of the mucous membrane of the mouth.

**STUPOR:**

Partial or nearly complete unconsciousness.

**SUBCUTANEOUS:**

Beneath the skin.

**SUBLIME:**

Change from the solid to the vapor phase without passing through the liquid phase.

**SYNERGY:**

Interaction of materials to give a combined result different from either material alone.

**SYNONYM:**

Another name or names by which a material is known.

**SYSTEMIC EFFECTS:**

Acute or chronic adverse health effects which occur in parts of the body removed from the site of exposure to the material.

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## T

**TACHYCARDIA:**

Excessively rapid heartbeat, with a pulse rate above 100.

**TACHYPNEA:**

Increased rate of respiration.

**TARGET ORGAN TOXIN:**

Toxic substance that attacks a specific organ of the body.

**TERATOGEN:**

Substance or agent to which exposure of a pregnant female can result in malformation in the fetus.

**THRESHOLD LIMIT VALUE (TLV):**

ACGIH's airborne concentration of a material to which nearly all persons can be exposed day after day, without adverse effects. TLV's are expressed in 3 ways:

- **TLV-C:**  
Ceiling limit, concentration that should not be exceeded even instantaneously.
- **TLV-STEL:**  
Short term exposure limit, maximum concentration for a continuous 15-minute exposure period.
- **TLV-TWA:**  
Time-weighted average, concentration for a normal 8-hour work day or 40-hour work week.

**THRESHOLD PLANNING QUANTITY (TPQ):**

Per 40 CFR 302. The amount of material at a facility that requires emergency planning and notification per CERCLA.

**TINNITUS:**

Ringling sound in the ears.

**TOXICITY:**

Sum of adverse effects resulting from exposure to a material, generally by the mouth, skin, or respiratory tract.

**TOXICOLOGY:**

Study of the nature, effects, and detection of poisons in living organisms. Also, substances that are otherwise harmless but prove toxic under particular conditions.

**TOXIC SUBSTANCE:**

Chemical or material that (1) has evidence of an acute or chronic health hazard, and (2) is listed in the RTECS manual, provided that the substance causes harm at any dose level; causes cancer or reproductive effects in animals at any dose level; has a median lethal dose level of less than 500 mg per kg of body weight when administered orally to rats; has a median lethal dose level of less than 1000 mg per kg of body weight when administered by continuous contact to the bare skin of albino rabbits; or has a median lethal concentration in air of less than 2,000 ppm by volume of gas or vapor, or less than 20 mg per liter of mist, fume, or dust when administered to albino rats.

**TOXIC SUBSTANCES CONTROL ACT (TSCA):**

Public Law PL 94-469. Found in 40 CFR 700-799. EPA has jurisdiction. Effective January 1, 1977. Controls the exposure to and use of raw industrial chemicals not subject to other laws. Chemicals are to be evaluated prior to use and can be controlled based on risk. The act provides for a listing of all chemicals that are to be evaluated prior to manufacture or use in the US.

**TRADE NAME:**

Trademark name or commercial trade name for a material given by the manufacturer.

**TRADE SECRET:**

Any confidential formula pattern, process, device, information, or compilation of information used in an employer's business and gives the employer an opportunity to obtain an advantage over competitors.

**TWA:**

Time-weighted average exposure is the airborne concentration of a material to which a person is exposed, averaged over the total exposure time, generally the total workday (8 to 12 hours).

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## U

**UPPER EXPLOSIVE (FLAMMABLE) LIMIT (UEL):**

Highest concentration (highest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, electric arc, or flame) is present.

**UNSTABLE:**

Tending toward decomposition or other unwanted chemical change during normal handling or storage.

**USE:**

To package, handle, react, or transfer.

**UTRICARIA:**

Nettle rash; hives; elevated, itching white patches.

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## V

**VAPOR:**

Gaseous state of a material suspended in air that would be a liquid or solid under ordinary conditions.

**VAPOR DENSITY:**

Weight of vapor or gas compared to an equal volume of air; expression of the density of the vapor or gas.

**VAPOR PRESSURE:**

Pressure exerted by a saturated vapor above its liquid in a closed container. Important facts to remember:

- Vapor pressure of a substance at 100°F will always be higher than the vapor pressure of the substance at 60°F.
- Vapor pressures reported on SDS/s in mmHg are usually very low pressures; 760 mmHg is equivalent to 14.7 psi.
- The lower the boiling point of a substance, the higher its vapor pressure.

**VAPOR:**

Gaseous form of a solid or liquid substance as it evaporates.

**VENTILATION:**

Circulating fresh air to replace contaminated air.

**VERTIGO:**

Feeling of revolving in space; dizziness, giddiness.

**VISCOSITY:**

Tendency of a fluid to resist internal flow without regard to its density.

**VOLATILE ORGANIC COMPOUNDS (VOC):**

Used in coatings and paint because they evaporate very rapidly.

**VOLATILITY:**

Measure of how quickly a substance forms a vapor at ordinary temperatures.

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## W

**WATER REACTIVE:**

Material that reacts with water to release a gas that is either flammable or presents a health hazard.

**WORK AREA:**

A room or defined space in a workplace where hazardous chemicals are produce or used, and where employees are present.

**WORKPLACE:**

An establishment at one geographical location containing one or more work areas.

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## Z

**ZINC FUME FEVER:**

Caused by inhalation of zinc oxide fume characterized by flu-like symptoms, a metallic taste in the mouth, coughing, weakness, fatigue, muscular pain, and nausea, followed by fever and chills.

**Z LIST:**

OSHA's Toxic and Hazardous Substances Tables Z-1, Z-2, and Z-3 of air contaminants, found in 29 CFR 1910.1000. These tables record PEL's, TWA's, and ceiling concentrations for the materials listed. Any material found on these tables is considered to be hazardous.