

RIGHT – TO – KNOW HAZARD COMMUNICATION

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VERSION

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SCOPE AND APPLICATION

This document serves as the written guide for MSU compliance to the Federal and State of Michigan's Right to Know Laws. All units which use hazardous chemicals, with the exception of laboratories, are required to comply with this document.

The primary objective of the document is to provide a general guide for handling hazardous chemicals in the workplace. The Hazard Communication Document establishes the basic safety principles, equipment and work practices which are capable of protecting employees from physical and health hazards of hazardous chemicals.

This document is intended only to highlight those safety measures necessary for achieving a safe and healthy work environment. Where the scope of hazards is not adequately addressed by this general document, the Supervisor must develop specific Standard Operating Procedures (SOPs).

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

- 1) Any hazardous waste as defined in the Solid Waste Disposal Act, as amended by the Resource Conservation Recovery Act (RCRA) (See the MSU Hazardous Waste Disposal Guide).
- 2) Any hazardous substance defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA.
- 3) Tobacco or tobacco products.
- 4) Wood or wood products.
- 5) Manufactured items (articles), which
 - a. Are formed to a specific shape of design during manufacture
 - b. Have an end use that is contingent upon its shape or form as manufactured
 - c. Do not release or in any way expose an employee to a hazardous chemical during normal use
- 6) Food or alcoholic beverages in a retail food establishment that are packaged for sale to consumers.
- 7) Food intended for personal consumption by employees at the workplace.
- 8) Any drug defined in the Federal Food, Drug and Cosmetic Act when it is in the solid final form for direct administration to the patient.
- 9) Any drug defined in the Federal Food, Drug and Cosmetic Act intended for personal consumption by employees in the workplace.

- 10) Cosmetics, which are packaged for sale to consumers in a retail establishment, and cosmetics intended for personal consumption while in the workplace.
- 11) Any consumer product or hazardous substance if the product is used in the workplace in the same manner as normal consumer use and if the use results in a duration and frequency of exposure that is not greater than exposures experienced by consumers.
- 12) A hazardous chemical in a sealed and labeled package that is received and subsequently sold or transferred in that package if the seal and label remain intact while in the workplace.
- 13) Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard.
- 14) Ionizing and non-ionizing radiation.
- 15) Biological hazards.

REFERENCE REGULATIONS

MIOSHA Hazard Communication (Part 430)

http://www.michigan.gov/documents/CIS_WSH_part_42_47164_7.pdf

MIOSHA Employee Medical Records and Trade Secrets (Part 470)

http://www.michigan.gov/documents/CIS_WSH_part470_48897_7.pdf

MICHIGAN STATE UNIVERSITY STATEMENT OF RESPONSIBILITY

It is the responsibility of Michigan State University, as an employer, to take every reasonable precaution to provide a work environment that is free from recognizable hazards for its employees in accordance with the “general duty” clause of the Michigan Occupational, Safety and Health Act, Section 11(a).

MSU is required, by the Federal Occupational Safety and Health Administration (OSHA) and the Michigan Occupational Safety and Health Administration (MIOSHA), to ensure that all employees are fully informed as to the identities of the hazardous chemicals in their work area and to provide training to employees to ensure safe handling of these chemicals.

Michigan State University and its employees have the responsibility to be well informed regarding hazardous chemicals and the risks associated with using those hazardous chemicals in the workplace. This document is intended for University-wide compliance with the State of Michigan Right to Know Law (MRTKL) and will serve as the Hazard Communication Document for the University with the exception of employees working in University owned and operated laboratories. Employees working in laboratories will comply with the MSU Chemical Hygiene Plan.

THE RIGHT TO KNOW LAW

The Federal Occupational Safety and Health Administration (OSHA) promulgated the Right to Know Law, also known as the Hazard Communication Standard in 1982 and updated it in 2012. The State of Michigan adopted the Federal Standard in 1986 and added additional requirements in the State of Michigan Right to Know Law (MRTKL)(Act No. 80 Amendments to Act 154 Michigan Occupational Safety and Health Act). The State of Michigan standard was updated in 2012.

The MRTKL requires all employees who work with hazardous chemicals to conform to the law regardless of their employer's status as a manufacturer or nonmanufacturer. The law has three sections:

- 1) Michigan's Right to Know Law – provides access to chemical information to workers whose jobs involve the routine use of hazardous chemicals. Five requirements of the Federal Standard also apply to employers under the Michigan Right to Know law;
 - a. Develop a written plan to meet the requirements of the Right-to-Know law,
 - b. Provide to all employees who work with hazardous chemicals, safety education and training,
 - c. Provide availability and use of Safety Data Sheets (SDSs),
 - d. Label all containers of hazardous chemicals,
 - e. Evaluate chemicals produced in their workplaces to determine if they are hazardous.

- 2) Michigan's Firefighter Right to Know Law – provides the fire chief “of the organized fire department for the jurisdiction in which the person is located” the right to request and receive a list of chemicals and SDSs used at a specified location. Under the law, if the fire chief requests it, the following information must be provided within ten working days of the query:
 - a. A listing of all hazardous chemicals at the location,
 - b. SDSs for all hazardous chemicals at the location, and
 - c. Information pertaining to the quantity and location of the chemicals.
 In addition, an employer must provide the fire chief with a written update “when there is a significant change relating to fire hazards and the quantity, location, or presence of hazardous chemicals in the workplace”.

- 3) Michigan's Community Right to Know (RTK) – made it possible for any resident of an employer's county to request a listing of and Safety Data Sheets for all hazardous chemicals present at that employer's workplace. The 1986 Superfund Amendment and Reauthorization Act (SARA) replaced the Community Right to Know Law. Under Title III of SARA, an employer is required to provide an even more comprehensive statement regarding hazardous chemicals in the workplace. Title III of SARA significantly enhances a resident's as well as a worker's access to relevant chemical safety information. Any queries for information regarding the RTK from community residents should be referred to EHS.

RESPONSIBILITIES

Environmental Health and Safety

Environmental Health and Safety (EHS) is responsible for the development and administration of the Michigan State University Hazard Communication Program. EHS shall:

- 1) Serve as the on campus authority and source of information for the MSU Right to Know Program.
- 2) Develop a written Hazard Communication document, and revise it as necessary.
- 3) Provide information and direction for the training of contractors who perform work for MSU and might be exposed to hazardous chemicals while working on campus, or who might bring chemicals into campus workplaces.
- 4) Provide a comprehensive orientation about the RTK law to supervisors, including training materials on chemical safety and chemical handling.
- 5) Establish procedures to evaluate the effectiveness of the program such as training program evaluations, training exams, and self-evaluation checklists.

Unit (departments, institutes, schools, outlying field stations, service groups, facilities, etc.)

The Unit shall:

- 1) Implement the Right to Know program at the departmental level.
- 2) Provide specific training to employees who work with, or may work with hazardous chemicals, or could reasonably be exposed in an emergency.
- 3) Maintain a unit list of Hazardous chemicals.
- 4) Inform employees on the methods that are used to detect the unwarranted presence and/or release of a hazardous chemical in the work area.
- 5) Inform employees on the location of MSU's Hazard Communication Document.
- 6) Train employees on how to obtain an SDS.
- 7) Post a notice of a new or revised SDS not later than 5 working days after receipt for a period of 10 working days and directions for locating the new or revised sheet. A copy of a notice is located in Appendix A.
- 8) Post notices to keep employees informed of their protections and obligations under the Right to Know Law which shall include:
 - a. The location of the SDSs for the hazardous chemicals produced or used in the workplace and the name of the person from whom to obtain the sheets.
 - b. That the employer is prohibited from discharging or discriminating against an employee who exercises the rights regarding information about hazardous chemicals in the workplace.
 - c. That, as an alternative to requesting the employer for an SDS for a hazardous chemical in the workplace, the employee may obtain a copy of the SDS from the department of public health. The sign shall include the address and telephone number of the division of the department of public health that has the responsibility of responding to such requests.

A copy of a notice meeting these requirements is located in Appendix B.
- 9) Inform employees of the standard operating procedures for safe handling and disposal of any hazardous chemical that an employee may come in contact with.
- 10) Maintain documentation of employee training.
- 11) Ensure that employees generating hazardous waste are properly trained.
- 12) Ensure that all hazardous chemicals are labeled according to MSU's labeling policy (Section 3.0).
- 13) Inform employees of the hazards of non-routine tasks.
- 14) Inform employees of the hazards of chemicals contained in unlabeled pipes in their work area.
- 15) Ensure that the Personal Protective Equipment Guideline is implemented and maintained within the department.
- 16) Ensure that the Respiratory Protection Program is implemented and maintained within the department, if required.
- 17) Inform employees in the event that a contractor will be performing work involving hazardous chemicals.

Employee

Individual employees are responsible for their own safety. All individuals performing work with hazardous substances must accept a shared responsibility for operating in a safe manner once they have been informed about the extent of risk and safe procedures for their activities. They also have the responsibility to inform their supervisors of accidents and work practices or working conditions they believe hazardous to their health or to the health of others.

The Employee shall:

- 1) Attend departmental training sessions.
- 2) Label containers according to departmental and MSU policy.
- 3) Know how and where to obtain an SDS.
- 4) Report accidents and unsafe conditions.

EMPLOYEE INFORMATION AND TRAINING

Employees must have access to information and training to ensure that they are apprised of the hazards of chemicals present in the work area. Such information must be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignment involving new exposure situations. Employees should receive periodic refresher information and training to ensure that they are aware of the risks of exposure to hazardous chemicals.

Information

Information provided to employees must include:

- 1) The contents of the MIOSHA MRTKL and how it pertains to an individual's job.
- 2) Any operations in the work area where hazardous chemicals are present.
- 3) The location and availability of the MSU Hazard Communication Document.
- 4) A unit list of hazardous chemicals.

Training

Method of Training

General training will be provided by EHS and may take the form of individual instruction, group seminars, audiovisual presentations, handout material, or any combination of the above. Supervisors or an appropriate designee will provide site-specific training. Please call EHS at 355-0153 for information about the general chemical safety course or sign up for a safety course on our website: <http://www.ehs.msu.edu>.

General awareness training

General awareness training will include:

- 1) Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
- 2) General physical and health hazards of chemicals in the work area.
- 3) The measures employees can take to protect themselves from these hazards, including specific procedures the University or department has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- 4) The applicable details of the MSU Hazard Communication Document, including an explanation of the labeling system and the SDS, and how employees can obtain and use the appropriate hazard information.

Site-specific training

Site-specific training provided by Units/Supervisors to employees will include:

- 1) Site-specific standard operating procedures.
- 2) Specific physical and health hazards of chemicals in the work area (available on SDS).

Documentation

General awareness training required by the Hazard Communication Plan will be documented by EHS. Site-specific training must be documented and maintained by the unit/supervisor and be available to representatives of EHS or regulatory officials upon request.

Record Keeping

EHS will retain records of all employees who take the Hazard Communication course given by EHS.

It is required that records of specific training for individual departments be retained by the supervisor in the department.

Accident records for employees should be written and retained within the unit.

MICHIGAN STATE UNIVERSITY LABELING POLICY

Scope and Application

The Right to Know Law requires any container that contains hazardous materials to be labeled. Labels are to provide immediate information on the identity of chemical constituents of a container, and the inherent danger. Assure that incoming bottles are properly labeled; in general, bottles from the manufacturer are properly labeled. However, if the manufacturer's container is not properly labeled, or if chemicals are transferred to a secondary container, the container must be labeled with the constituents, and hazards, including acute or chronic, and/or well-known hazards.

In order to facilitate and maintain the proper labeling procedure, EHS has established a labeling policy.

The labeling policy does not apply to chemicals in the following categories:

- 1) Any pesticide as defined in the Federal Insecticide, Fungicide, and Rodenticide Act when subject to the labeling requirements of that Act.
- 2) Any chemical substance or mixture as defined in the Toxic Substances Control Act when subject to the labeling requirements of that Act.
- 3) Any food, food additive, color additive, drug, cosmetic or medical or veterinary device or product, including materials intended for use as ingredients in such products (e.g. flavors and fragrances) as defined in the Federal Food, Drug and Cosmetic Act or the Virus-Serum-Toxin Act when they are subject to the labeling requirements under those Acts.
- 4) Any alcohol beverage intended for nonindustrial use when subject to the labeling requirements of the Federal Alcohol Administration Act.
- 5) Any consumer product or hazardous substance as those terms are defined in the Consumer Products Safety Act and Federal Hazardous Substances Act when subject to standards, labeling requirements or regulations issued under those acts.
- 6) Agricultural or vegetable seed treated with pesticides and labeled in accordance with the Federal Seed Act.

Labeling Requirements

- 1) No hazardous chemicals and/or substances will be accepted for use at Michigan State University, or shipped to any other location unless they are clearly labeled with the following information:
 - a. The identity of the hazardous material and proper safety precautions, and
 - b. The appropriate hazard warnings as outlined in the Federal Right to Know Standard.
- 2) All hazardous chemical labels must be clearly legible, in English, and prominently displayed on the container.
- 3) If a chemical being labeled is subject to any special regulatory provisions – such as Michigan class “A” carcinogen, then the chemical must be labeled in accordance with the provision.
- 4) For any process that might create a health hazard during the normal completion of a given task (welding, for instance) the label can be replaced by a sign, placard or batch ticket indicating the identity and nature of the hazard. These warnings must be readily visible to employees during the work shift.
- 5) Stationary process containers, such as tanks, may be identified with signs, placards, process sheets, batch tickets or other written materials instead of actually affixing labels to process containers. The sign or placard must convey the same information that a label would and be visible to employees throughout the work shift.
- 6) Any portable vessel containing hazardous chemicals that will not be used on the work shift during which the container was filled, must be labeled with the appropriate hazard information.
- 7) All prepared solutions must be labeled.
- 8) All labels are subject to review by EHS to update information and to determine whether the label conveys the appropriate amount of information to meet RTK law requirements.
- 9) No label may be removed or defaced unless a substitute is immediately provided. Employees must not remove or deface any label without express consent from a supervisor or EHS. The OSHA Compliance Directive states that, before any product can be used, the proper label must be present. Any container without a label must be reported by the employee to his/her supervisor (supervisors with procedural questions should direct inquiries to EHS at 355-0153).
- 10) The identity on the container label must read exactly as it does on the SDS. If a trade name is used on the SDS, then a trade name should be on the label. If the chemical name is used on the SDS, then the container should be labeled accordingly.
- 11) Pipes must be labeled, by either label or placard, of the hazards of any chemicals in pipes or pipe systems.

Unlabeled containers

If unlabeled containers are found, determine the contents and place a proper label on the container. If the cannot be done, refer to the MSU Hazardous Waste Disposal Guide for proper disposal procedures of unlabeled containers. Supervisors should notify EHS immediately if attempts at labeling and unknown container fail. **A container of an unknown and unlabeled chemical should be labeled or properly disposed of immediately.**

Waste Containers

All hazardous chemical waste should be segregated and labeled according to the MSU Waste Disposal Guide. Special attention should be given to the following areas:

- 1) Waste containers for non-contaminated glass must be labeled (label as "Broken Glass" and kept separate from other non-contaminated waste.
- 2) Upon initial waste collection attach a dated MSU Materials Pick Up tag and label containers with the words "Hazardous Waste".
- 3) Once a chemical has been dated and labeled as a hazardous waste, it may not be accumulated for more than 90 days. Please request a hazardous waste pick-up from EHS once the 90 day storage limit is approached.

For more specific information regarding hazardous wastes, reference the MSU Waste Disposal Guide,

SAFETY DATA SHEETS

A Safety Data Sheet (SDS) is written information about a specific hazardous chemical. SDSs are legally required to be issued for every hazardous chemical that is manufactured or distributed. All SDSs will contain known safety information on the chemical, or the hazards of the commercial product that may contain more than one hazardous chemical.

For some newer chemicals not all of the long-term toxicity information may have been assessed. On these SDSs the phrase, "To the best of our knowledge, this information has not been assessed" will be used. These chemicals should be assumed to be hazardous, unless information elsewhere on the SDS indicates otherwise.

Obtaining an SDS

Employees have the right to obtain copies of any SDS for hazardous chemicals used in their workplace. There are two ways to obtain an SDS:

- 1) Supervisors/Departments have copies of SDSs in a central location from which employees can access a copy.
- 2) An SDS should accompany a shipment of a new chemical. If an SDS is not received the manufacturer must be contacted and an SDS obtained before the chemical can be used in the workplace. SDSs should be placed in the department central location.

Updating an SDS

If an SDS is missing information or does not seem to be acceptable, notify EHS of the chemical and manufacturer. The manufacturer will be contacted and an appropriate SDS will be obtained. The following is a list of some examples where a new SDS would be required:

- 1) An SDS written before 2012. The Federal Hazard Communication Standard required all manufacturers to create new SDSs by June 1, 2012. An SDS written before this may not contain all of the required information.
- 2) The product name has been changed. The SDS must match the product name.
- 3) A product is labeled "new" and/or "improved". The composition of the product may have changed requiring new safety procedures.
- 4) The chemical composition on the SDS does not match the product.

Employee or Contractor Owned Chemicals

Employee owned chemicals

Employees may not bring hazardous chemicals to work. Adequate steps should be taken to assure that employees do not bring hazardous chemicals to work.


Contractor owned chemicals

In the event that a contractor will be performing work involving hazardous chemicals, the IPF Contractor Coordinator will ensure that the chemicals to be used are specified and that a building contact is informed. That building contact will be responsible for communication of this information to affected employees. The location of the SDS for the project must be posted in a central location and the contractor must have copies of these SDSs on-site and available for review for the duration of the project.

APPENDIX A

SDS Posting

***This Workplace
Covered
by the
Michigan
Right To Know Law***




Employers must make available for employees in a readily accessible manner, Safety Data Sheets (SDS) for those hazardous chemicals in their workplace.

Employees cannot be discharged or discriminated against for exercising their rights including the request for information on hazardous chemicals.

Employees must be notified and given direction (by employer posting) for locating Safety Data Sheets and the receipt of new or revised SDS(s).

When the employer has not provided a SDS, employees may request assistance in obtaining SDS from the:

Michigan Department of Licensing and Regulatory Affairs
Michigan Occupational Safety and Health Administration
General Industry Safety and Health Division
(517) 284-7750
Construction Safety and Health Division and Asbestos Licensing
(517) 284-7680
www.michigan.gov/miosha
MIOSHA/CET #2105 (Rev. 05/18)



LARA
LICENSING AND REGULATORY AFFAIRS
CUSTOMER DRIVEN. BUSINESS MINDED.

**SDS(s) For This
Workplace Are
Located At**

Location(s)

Location(s)

Person(s) responsible for SDS(s)

Phone

LARA is an equal opportunity employer/program.

APPENDIX B

Safety and Health on the Job Posting

MICHIGAN SAFETY AND HEALTH PROTECTION ON THE JOB

THE MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ACT, 1974 P.A. 154, AS AMENDED, REQUIRES POSTING OF THIS DOCUMENT IN A CENTRAL AND CONSPICUOUS LOCATION. FAILURE TO DO SO MAY RESULT IN A PENALTY.

The Michigan Occupational Safety and Health Act (MIOGHA) Act No. 154 of the Public Acts of 1974, as amended, provides job safety and health protection for Michigan employees through the maintenance of safe and healthful working conditions. Under the MIOGHA Act and a state plan approved in September 1973 by the U.S. Department of Labor, the Michigan Department of Licensing and Regulatory Affairs is responsible for administering the Act. Department representatives conduct job site inspections and investigations to ensure compliance with the Act and with safety and health standards.

The contents of this poster describe many important provisions of the Act. These provisions apply equally to employers and employees in either private industry or the public sector.

EMPLOYER REQUIREMENTS: MIOGHA requires that each employer:

1. Furnish to each employee employment and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to the employee.
2. Comply with promulgated rules and standards and with orders issued pursuant to the Act.
3. Post this and other notices and use other appropriate measures to keep his or her employees informed of their protection and obligations under the Act, including the provisions of applicable rules and standards.
4. Notify the Michigan Department of Licensing and Regulatory Affairs within 8 hours of any work-related fatality. Notification may be accomplished by calling 1-800-652-0367.
5. Notify the Michigan Department of Licensing and Regulatory Affairs within 24 hours of all work-related inpatient hospitalizations, amputations and losses of an eye. Notification may be accomplished by calling 1-644-664-0742 (4MIOGHA).
6. Make available to employees, for inspection and copying, all medical records and health data in the employer's possession pertaining to that employee.
7. Afford an employee an opportunity with or without compensation to attend all meetings between the Department of Licensing and Regulatory Affairs and the employer relative to any appeal of a citation by the employer.
8. Give the representative of employees the opportunity to accompany the department during the inspection or investigation of a place of employment and to prohibit the suffering of any loss of wages or fringe benefits or discriminate against the representative of employees for time spent participating in the inspection, investigation, or opening and closing conferences.
9. Provide personal protective equipment, at the employer's expense, when it is specifically required by a MIOGHA standard.
10. Not permit an employee, other than an employee whose presence is necessary to avoid, correct or remove an imminent danger, to operate equipment or engage in a process which has been tagged by the Department and which is the subject of an order issued by the Department identifying that an imminent danger exists.
11. To promptly notify an employee who sees or is being exposed to toxic materials or harmful physical agents in concentrations or at levels which exceed those prescribed by a MIOGHA standard.

EMPLOYEE REQUIREMENTS: MIOGHA requires that each employee:

1. Comply with promulgated rules and standards and with orders issued pursuant to the Act.
2. Not remove, displace, destroy, or carry off a safeguard furnished or provided for use in a place of employment, or interfere in any way with the use thereof by any other person.

INSPECTIONS/INVESTIGATIONS: Inspections and investigations are conducted by trained personnel. The Act requires that an employer representative and a representative of employees be given an opportunity to accompany the department representative for the purpose of aiding in the inspection or investigation.

If a representative of employees does not participate, the department representative will consult with a number of employees concerning matters of safety or health in the place of employment.

COMPLAINTS: Employees and employee representative who believe that an unsafe or unhealthy condition exists in their workplace have the right to request an inspection by giving written notice to the Department of Licensing and Regulatory Affairs. If a condition exists which may present an immediate danger, the Department should be notified in the most expedient manner without regard to a written notice. The names of complainants will be kept confidential and not revealed upon the request of the employee. Employees also have the right to bring unsafe or unhealthy conditions to the attention of the department representative during the conduct of an inspection or investigation.

The Act provides that employees may not be discharged or in any manner discriminated against for filing a complaint or exercising any of their rights under the Act. An employee who believes he or she has been discriminated against may file a complaint with the Michigan Department of Licensing and Regulatory Affairs within 30 days of the alleged discrimination.

The U.S. Department of Labor is monitoring the operation of the Michigan Occupational Safety and Health Administration (MIOGHA) to assure the effective administration of the state act. Any person may make a written complaint regarding the state administration of the state act directly to the Regional Office of OSHA, 200 South Dearborn, Chicago, Illinois 60604.

CITATIONS: If upon inspection or investigation the Department of Licensing and Regulatory Affairs believes that a requirement of the Act has been violated, a citation alleging such violation and setting a time period for correction will be issued to the employer. The citation must be prominently posted at or near the place of the alleged violation for three days or until the violation is corrected, whichever is later.

The Act provides for first instance penalties of up to \$7,000 for a violation. Penalties of up to \$7,000 per day may be assessed for failure to correct a violation within a proposed abatement period. Any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$70,000 for each such violation. Employers may appeal the alleged citation, the proposed penalties or the abatement periods to the Department and to the Board of Health and Safety Compliance and Appeals. Employees may appeal the abatement period in a similar manner. Employees also may appeal to the Board of Health and Safety Compliance and Appeals any decision issued by the Department in response to an employer appeal.

Criminal penalties also are provided for in the Act. A person who knowingly makes a false statement or report pursuant to the Act upon conviction is punishable by a fine of up to \$10,000 or may be imprisoned for not more than 6 months or both. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to \$10,000 or by imprisonment for not more than one year or both. A second conviction doubles the maximum monetary penalty and is punishable by imprisonment for up to three years.

VOLUNTARY ACTIVITY & COMPLIANCE ASSISTANCE: The act encourages employers and employees to reduce workplace hazards voluntarily.

The Michigan Department of Licensing and Regulatory Affairs offers limited on-site consultation assistance to employers to assist them in achieving compliance with occupational safety and health standards. Training specialists are available and can give advice on the correction of hazardous conditions and on the development of safety and health systems. Department staff are available to conduct seminars and training relative to occupational safety and health for both employer and employee groups. Requests for service should be addressed to the department at the address shown below.

The U.S. Department of Labor will continue to enforce federal standards governing maritime operations of long shoring, shipbuilding, ship breaking and ship repairing. These issues are not covered by the Michigan Plan for Occupational Safety and Health.

MORE INFORMATION:

Department of Licensing and Regulatory Affairs
Michigan Occupational Safety & Health Administration
530 W. Allegan Street, Box 30640
Lansing, Michigan 48909-0140
www.michigan.gov/dlra

THIS IS AN IMPORTANT DOCUMENT - DO NOT COVER!



- MIOGHA Complaint Hotline 1-800-686-4674
- Fatality Hotline 1-800-652-0367
- MIOGHA Injuries/Illnesses Reporting 1-644-664-0742
- Consultation and Training Assistance 1-517-264-7720



The Department of Licensing and Regulatory Affairs will not discriminate against any individual in any program, activity, or service on the basis of race, color, sex, religion, age, national origin, or disability. Any person who believes they have been discriminated against in any program, activity, or service should contact the Michigan Department of Licensing and Regulatory Affairs at 1-800-686-4674.

MIOGHA 03/07 (064) (012)

APPENDIX C

Understanding the SDS

The format for the Material Safety Data Sheet (MSDS) was originally established in OSHA's Hazard Communication Standard. This format ended up with eight sections to convey hazard information. While this format provided the necessary information, it was thought that the appearance and readability of the MSDS could be improved. The American National Standards Institute (ANSI) wrote a voluntary standard increasing the sections to 16 and standardizing the hazard descriptions using non-technical language. With increasing international trade and varying standards between countries on how an MSDS should be arranged, definitions of hazards, what information should be included, and how that information should be expressed, a Global Harmonization System (GHS) was developed. In 2012, OSHA adopted the GHS standard for the Safety Data Sheet (SDS). As of June 1, 2015, no MSDS may be referenced – everyone must be converted to SDS. As of December 1, 2015, no shipments of materials may occur without the GHS labels.

OSHA GHS SDS

Section	Heading	Contents
1	Identification of the substance or mixture and of the supplier	<ul style="list-style-type: none"> ▪ GHS product identifier. ▪ Other means of identification. ▪ Recommended use of the chemical and restrictions on use. ▪ Supplier's details (including name, address, phone number, etc.). ▪ Emergency phone number.
2	Hazards identification	<ul style="list-style-type: none"> ▪ GHS classification of the substance/mixture and any national or regional information. ▪ GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.) ▪ Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.
3	Composition/information on ingredients	<p>Substance</p> <ul style="list-style-type: none"> ▪ Chemical identity. ▪ Common name, synonyms, etc. ▪ CAS number, EC number, etc. ▪ Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance. <p>Mixture</p> <ul style="list-style-type: none"> ▪ The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cutoff levels.

		NOTE: For information on ingredients, the competent authority rules for CBI take priority over the rules for product identification.
4	First aid measures	<ul style="list-style-type: none"> ▪ Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion. ▪ Most important symptoms/effects, acute and delayed. ▪ Indication of immediate medical attention and special treatment needed, if necessary.
5	Firefighting measures	<ul style="list-style-type: none"> ▪ Suitable (and unsuitable) extinguishing media. ▪ Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products). ▪ Special protective equipment and precautions for firefighters.
6	Accidental release measures	<ul style="list-style-type: none"> ▪ Personal precautions, protective equipment and emergency procedures. ▪ Environmental precautions. ▪ Methods and materials for containment and cleaning up.
7	Handling and storage	<ul style="list-style-type: none"> ▪ Precautions for safe handling. ▪ Conditions for safe storage, including any incompatibilities.
8	Exposure controls/personal protection	<ul style="list-style-type: none"> ▪ Control parameters, e.g., occupational exposure limit values or biological limit values. ▪ Appropriate engineering controls. ▪ Individual protection measures, such as personal protective equipment.
9	Physical and chemical properties	<ul style="list-style-type: none"> ▪ Appearance (physical state, color, etc.). ▪ Odor. ▪ Odor threshold. ▪ pH. ▪ Melting point/freezing point. ▪ Initial boiling point and boiling range. ▪ Flash point. ▪ Evaporation rate. ▪ Flammability (solid, gas). ▪ Upper/lower flammability or explosive limits. ▪ Vapor pressure. ▪ Vapor density. ▪ Relative density. ▪ Solubility(ies). ▪ Partition coefficient: n-octanol/water. ▪ Autoignition temperature. ▪ Decomposition temperature.
10	Stability and reactivity	<ul style="list-style-type: none"> ▪ Chemical stability. ▪ Possibility of hazardous reactions. ▪ Conditions to avoid (e.g., static discharge, shock or vibration). ▪ Incompatible materials.

		<ul style="list-style-type: none"> ▪ Hazardous decomposition products.
11	Toxicological information	<ul style="list-style-type: none"> ▪ Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including: <ul style="list-style-type: none"> ▪ Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact); ▪ Symptoms related to the physical, chemical and toxicological characteristics; ▪ Delayed and immediate effects and also chronic effects from short- and long-term exposure; ▪ Numerical measures of toxicity (such as acute toxicity estimates).
12	Ecological information	<ul style="list-style-type: none"> ▪ Ecotoxicity (aquatic and terrestrial, where available). ▪ Persistence and degradability. ▪ Bioaccumulative potential. ▪ Mobility in soil. ▪ Other adverse effects.
13	Disposal considerations	<ul style="list-style-type: none"> ▪ Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.
14	Transport information	<ul style="list-style-type: none"> ▪ UN Number. ▪ UN Proper shipping name. ▪ Transport hazard class(es). ▪ Marine pollutant (Yes/No). ▪ Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises.
15	Regulatory information	<ul style="list-style-type: none"> ▪ Safety, health and environmental regulations specific for the product in question.
16	Other information including information on preparation and revision of the SDS	

REACH: "A4.3.8.3.3 Special requirements may exist for gloves or other protective clothing to prevent skin, eye, or lung exposure. Where relevant, this type of PPE should be clearly stated. For example, "PVC gloves" or "nitrile rubber gloves", and thickness and breakthrough time of the glove material. Special requirements may exist for respirators." UNECE GHS Annex 4, 2007.

APPENDIX D

Glossary of Terms Used on an SDS

Acid – An acidic solution has a pH of less than 7. The lower the pH, the greater the acidity. Acids can react with metals such as (but not limited to) zinc, iron or magnesium. This reaction can produce hydrogen gas. Solutions of acids can also conduct electricity.

Acidosis – A condition where the body has a lower pH than normal. This may cause headache, nausea and vomiting and may be life threatening if not treated.

ACGIH – The American Conference of Governmental Industrial Hygienists is a voluntary membership organization of professional industrial hygiene personnel in governmental or educational institutions. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLV's) for hundreds of chemical substances, physical agents and Biological Exposure Indices (BEI).

Action Level – A concentration designated in 29 CFR part 1910 for a specific substance or physical agent, calculated as an eight hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Activated Charcoal – Charcoal that has been specially treated to remove organic residues and to increase porosity and surface area. Charcoal briquettes cannot be substituted for activated charcoal.

Acute – Condition has rapid onset or is of short duration (as opposed to long duration, or chronic).

Acute Exposure – An exposure occurring over a relatively short period of time.

Acute Toxicity – Health effect resulting from a single exposure to a substance.

Aerosol - Any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state. Aerosol includes aerosol dispensers.

AIHA – The American Industrial Hygiene Association is a global organization of industrial hygienists and other occupational health, safety and environmental professionals.

Alcohol – A chemical which may be easily absorbed through the skin and may react with acids and oxidizing agents. Many alcohols are flammable and may burn with an invisible flame. Simple alcohols (methanol, ethanol, propanol) are water soluble. All alcohols are toxic to humans if taken internally.

Alkaline – A basic solution which has a pH greater than 7.0. Sometimes referred to as caustic. Acids and bases should not be stored together. If they are allowed to mix they may react violently.

Alloy - A metallic material, homogeneous to the naked eye, consisting of two or more elements so combined that they cannot be readily separated by mechanical means. Alloys are considered to be mixtures for the purpose of classification under the GHS.

Alopecia – Loss of hair.

Ames Test – A test used to determine whether a chemical causes genetic changes.

Analgesia – The loss of sensitivity to pain.

Anesthesia – The loss of sensation or feeling.

Anorexia – The loss of appetite.

Anosmia – The loss of the sense of smell.

Anoxia – The absence of oxygen in blood and tissues.

ANSI – The American National Standards Institute is a voluntary membership organization (run with private funding) that develops national consensus standards for a wide variety of devices and procedures.

Anuria – The absence of urine production.

Aqueous – A water solution.

Asphyxiant – A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants such as nitrogen either use or displace oxygen in the air. They become especially

dangerous in confined or enclosed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with the body's ability to absorb or transport oxygen to the tissues.

Asthma – A lung disease caused by a reaction to fumes, dusts and gases. Symptoms include wheezing, a tight feeling in the chest, coughing and shortness of breath.

Asymptomatic – Does not cause or exhibit symptoms of disease.

Atrophy – Decrease in size of an organ or tissue from disease, injury, or lack of use.

Autoclave – A device to expose items to steam at a high pressure in order to decontaminate the materials or render them sterile.

Autoignition – The autoignition temperature of a substance is the temperature at or above which a material will spontaneously ignite (catch fire) without a spark or flame.

Biohazard – Infectious agents that present a risk or potential risk to the health of humans or other animals, either directly through infection or indirectly through damage to the environment.

Benign – A cell or tumor that will not grow uncontrollably and is not threatening to life.

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.

Bradycardia – A slow heart rate that may cause dizziness, fatigue, shortness of breath or fainting spells.

Bronchitis – Inflammation of the air passages of the lungs.

“C” or Ceiling – A description usually seen in connection with a published exposure limit. It refers to the concentration that should not be exceeded, even for an instant. It may be written as TLV-C or Threshold Limit Value-Ceiling (See also THRESHOLD LIMIT VALUE).

Carcinogen – A substance that may cause cancer in animals or humans.

Carcinoma – A cancerous growth that tends to spread through the body to other organs.

CAS 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".

Cataract - A partial or complete cloudiness of one or both eyes.

Chemical – Any substance or mixture of substances.

Chemical Hygiene Officer – An employee who is designated by the employer and who is qualified by training and experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan – A written program developed and implemented by the department which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting students, instructors, and other personnel from the health hazards presented by the hazardous chemicals used in that particular workplace.

Chronic Exposure – A prolonged exposure occurring over a period of days, weeks, or years.

Classification – To identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this section. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

Coma – A deep and prolonged state of unconsciousness.

Combustible – According to the DOT and NFPA, COMBUSTIBLE liquids are those having a flash point at or above 100 deg. F (37.8 deg. C), 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".

Common Name – Any designation or identification such as code name, code number, trade name, brand name, or generic name used to identify a chemical other than by its chemical name.

Compressed Gas – A gas or mixture of gases that, in a container, will have an absolute pressure exceeding 40 psi at 70°F or 21.1°C. A gas or mixture of gases having, in a container, an absolute

pressure exceeding 104 psi at 130oF or 54.4oC, regardless of the pressure at 70oF. A liquid having a vapor pressure exceeding 40 psi at 100oF or 37.8oC.

Concentration - The relative amount of a material in combination with another material. For example, 5 parts (of acetone) per million (parts of air).

Conjunctivitis – Inflammation of the mucous membrane of the eye which can result in itching, watery eyes and blurred vision, eye pain, and sensitivity to light.

Corrosive – A substance that, according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel. A Skin corrosive produces irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours.

Cutaneous/Dermal – Pertaining to or affecting the skin.

Cyanosis – Bluish color of the skin resulting from a lack of oxygen in the blood.

Cytotoxin – A substance toxic to cells in culture, or to cells in an organism.

Decomposition - The breakdown of a chemical or substance into different parts or simpler compounds. Decomposition can occur due to heat, chemical reaction, decay, etc.

Designated Area – An area which may be used for work with “select carcinogens”, reproductive toxins, or substances which have a high degree of acute toxicity. This area may be the entire laboratory or an area under a device such as a laboratory hood.

Dermatitis – An inflammation of the skin.

Dilution Ventilation – See GENERAL VENTILATION.

DOT – The United States Department of Transportation is the Federal agency that regulates the labeling and transportation of hazardous materials.

Dyspnea – Shortness of breath, difficult, or labored breathing.

Edema – Accumulation of body fluids in tissues.

Embolism – A partial or total blockage of a blood vessel.

Emesis – Vomiting

Emphysema – A disease in which the lung becomes damaged. This results in a decrease in respiratory function.

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.

EPA Number – The number assigned to chemicals regulated by the Environmental Protection Agency (EPA).

Epidemiology – The study of disease in human populations.

Epistaxis – Nosebleed.

Erythema – A reddening of the skin.

Evaporation Rate – The rate at which a material is converted to vapor (evaporates) at a given temperature and pressure when compared to the evaporation rate of a given substance. Health and fire hazard evaluations of materials involve consideration of evaporation rates as one aspect of the evaluation.

Explosive – A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure or high temperature.

Fetotoxin – A chemical that can cause health effects in a developing fetus or embryo.

Fibrosis – Formation of connective fibrous (fiber-like) tissue, a scar.

Flammable Aerosol = Aerosols shall be considered for classification as flammable if they contain any component which is classified as flammable.

Flammable Gas – Category 1: A gas that, at an ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or, a gas that, at an ambient temperature and pressure forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit. **Category 2:** Gases, other than those of Category 1, which, at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi), have a flammable range while mixed in air.

Flammable Liquid – According to the DOT and NFPA a flammable liquid is one that has a flash point below 100 deg.F. (see FLASH POINT). According to OSHA a Flammable liquid means a liquid having a flash point of not more than 93°C (199.4°F).

Flammable Solid – A solid, other than a blasting agent or explosive, that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently it creates a serious hazard. Powders of metals or metal alloys shall be classified as flammable solids when they can be ignited and the reaction spreads over the whole length of the sample in 10 min or less.

Flash Point – The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture and burn when a source of ignition (sparks, open flames, etc.) is present. The test method is indicated on the SDS after the flash point.

Fume – A solid particle that has condensed from the vapor state.

Gangrene – The decay of body tissue caused by insufficient blood supply.

Gas – Chemical substances that exist in the gaseous state at room temperature and pressure.

Gastric – Pertaining to the stomach.

General Ventilation – Also known as general exhaust ventilation, this is a system of ventilation consisting of either natural or mechanically induced fresh air movement to mix with and dilute contaminants in the workroom air. This is not the recommended type of ventilation to control contaminants that are highly toxic, when there may be corrosion problems from the contaminant, when the worker is close to where the contaminant is being generated, and where fire or explosion hazards are generated close to sources of ignition (See LOCAL EXHAUST VENTILATION).

Gingivitis – A reversible inflammation of the gum tissue.

Grams per Kilogram (g/Kg) – This indicates the dose of a substance given to test animals in toxicity studies. For example, a dose may be 2 grams (of substance) per kilogram of body weight (of the experimental animal).

Hazard Category – The division of criteria within each hazard class, e.g. oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard Class – The nature of the physical or health hazards, e.g. flammable solid, carcinogen, oral acute toxicity.

Hazard not otherwise classified (HNOC) – An adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this section. This does not extend coverage to adverse physical and health effects for which there is a hazard class addressed in this section, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by MIOSHA (e.g. acute toxicity Category 5)

Hazard Statement – A statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

Hazardous Chemicals – Any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Health Hazard – A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard.

Hematuria – Blood in the urine.

Hepatic – Pertaining to the liver.

Hives – A temporary skin condition due to an allergic reaction producing an elevated patch of skin and/or pimples and wheals accompanied by burning, stinging, or severe itching.

Hypotonic – A condition where the electrolyte concentration of the blood is lower than the inside of the cells. This will cause water to enter the cells which may cause them to burst.

Hypoxia – A deficiency of oxygen in arterial blood and/or in the tissues.

Ignitable – A solid, liquid or compressed gas waste that has a flash point of less than 140deg.F. Ignitable material may be regulated by the EPA as a hazardous waste as well.

Immiscible – Liquids that are not soluble in each other. An example is oil and water.

Incompatible – The term applied to two substances to indicate that one material cannot be mixed with the other without the possibility of a dangerous reaction.

Inert – A chemical which is not reactive.

Ingestion – Taking a substance into the body through the mouth as food, drink, medicine, or unknowingly as on contaminated hands or cigarettes, etc.

Inhalation – The breathing in of an airborne substance that may be in the form of gas, fumes, mists, vapors, dusts, or aerosols.

Inhibitor – A substance that is added to another to prevent or slow down an unwanted reaction or change.

Intraperitoneal – Within or administered through the peritoneum. The peritoneum is a membrane that lines the walls of the abdominal cavity. It is often abbreviated I.P.

Intravenous – Within or administered through a vein (a blood vessel). It is often abbreviated I.V.

Iridocyclitis – An inflammation of the colored part of the eye (iris) and of the muscles and tissue involved in focusing the eye.

Irritant – A substance which produces an irritation effect when it contacts skin, eyes, nose, or respiratory system.

Jaundice – A condition marked by a yellowish color to the skin and the whites of the eyes caused by excessive breakdown of red blood cells or liver dysfunction.

Ketosis – The presence of excess ketones in the body. Ketones are a byproduct of fat metabolism. When certain enzymes are absent or damaged, the amount of ketones in the body can build up to dangerous levels. Ketosis can lead to coma and death if untreated.

Laboratory – A facility where relatively small quantities of hazardous materials are used on a non-production basis.

Laboratory Scale – Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.

Laboratory-type Hood – A device constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory.

Laboratory Use of Hazardous Materials – The handling or use of chemicals in which the following conditions are met: (1) chemical manipulations are carried out on a laboratory scale; (2) multiple chemical procedures or chemicals are used; (3) the procedures involved are not part of a production process; and (4) protective laboratory practices and equipment are available and in common use to minimize the potential for personnel exposure to hazardous chemicals.

Lachrymator – An irritant which causes tearing of the eyes.

Laminar Air Flow – Air flow in which the entire mass of air within a designated space moves with uniform velocity in a single direction along parallel flow lines with a minimum of mixing.

Lesion – A cut or wound.

Lethal Concentration 50 – The concentration of an air contaminant (LC50) which will kill 50 percent of the test animals in a group during a single exposure.

Lethal Dose 50 – The dose of a substance or chemical (LD50) which will kill 50 percent of the test animals in a group within the first 30 days following exposure.

Lethargy – A physical state of sluggishness, apathy (indifference), inattention and/or reduced physical activity, usually from illness, overwork or chemical exposure.

Leukemia – An abnormal increase in the number of white blood cells in the tissues of the body.

Local Exhaust Ventilation (Also known as exhaust ventilation) – A ventilation system which captures and removes air contaminants at the point they are being produced before they escape into the workroom air. The system consists of hoods, ductwork, a fan, and possibly an air cleaning device. Advantages of local exhaust ventilation over general ventilation include: removing the contaminant rather than diluting it; less airflow making it a more economical system over the long run; and conservation or reclamation of

valuable material. The system, however, must be properly designed with the correctly shaped and placed hoods, correctly sized fans, and correctly connected ductwork.

Lower Explosive Limit (LEL) (Also known as Lower Flammable Limit-LFL) – The lowest concentration of a substance which will produce a fire or flash when an ignition source (flame, spark, etc.) is present. It is expressed in percent of vapor or gas in the air by volume. Below the LEL or LFL, the air/contaminant mixture is theoretically too “lean” to burn (See also UEL).

Malaise – A non-specific feeling of unease, discomfort, or fatigue.

Malignant – A cell or tumor which is growing in an uncontrolled fashion and is threatening to life. Cancer.

Melting Point – The temperature at which a solid changes to a liquid. A melting range may be given for mixtures.

Metastasis – The spread of a disease (usually cancer) from an original site of infection to other parts of the body.

Miscible – Liquids which are soluble in each other.

Mixture – A combination or a solution composed of two or more substances in which they do not react.

MSHA – The Mine Safety and Health Administration; a federal agency which regulates the mining industry in the safety and health area.

Mutagen – Anything which can cause a change (or mutation) in the genetic material of a living cell.

Narcosis – Stupor or unconsciousness caused by exposure to a chemical.

Necrosis – The death of cells or tissue.

Neoplasm – An abnormal growth of tissue.

Nephrotoxin – A toxic agent or substance which inhibits, damages, or destroys the cells and/or tissues of the kidneys.

Neurotoxin – A toxic agent or substance which inhibits, damages, or destroys the tissues of the nervous system, especially neurons, the conducting cells of the body's central nervous system.

NFPA – The National Fire Protection Association is a voluntary membership organization whose aims are to promote and improve fire protection and prevention. NFPA has published 17 volumes of codes known as the National Fire Codes. Within these codes is Standard No. 704, "Identification of the Fire Hazards of Materials". This is a system which rates the hazard of a material during a fire. These hazards are divided into health, flammability, and reactivity hazards and appear in a well-known diamond system using from zero through four to indicate severity of the hazard. Zero indicates no special hazard and four indicates severe hazard.

NIOSH – The National Institute for Occupational Safety and Health is a federal agency which, among its various responsibilities, trains occupational health and safety professionals, conducts research on health and safety concerns, and tests and certifies respirators for workplace use.

Nystagmus – A rapid, involuntary motion of the eyeball.

Occupational Safety and Health Administration (OSHA) – A federal agency under the Department of Labor which publishes and enforces safety and health regulations for most businesses and industries in the United States.

Odor Threshold – The minimum concentration of a substance at which a majority of test subjects can detect and identify the substance's characteristic odor.

Oliguria – A lower than normal volume of urine.

Oxidation – The process of combining oxygen with some other substance or a chemical change in which an atom loses electrons.

Oxidizer – A substance which gives up oxygen easily to stimulate combustion of organic material.

Oxygen Deficient – An atmosphere having less than the normal percentage of oxygen found in normal air. Normal air contains 20.8% oxygen at sea level.

Palpitation – A sudden awareness of one's own heartbeat, usually occurs as a sensation in the chest of a rapid, irregular, or unusually strong heartbeat.

Percutaneous – Passing through exposed skin.

Permissible Exposure Limit (PEL) – An exposure limit which is published and enforced by OSHA as a legal standard. PEL may be either a time-weighted-average (TWA) exposure limit (8 hour), a 15-minute short term exposure limit (STEL), or a ceiling (C). The PELs are found in Tables Z-1, Z-2, or Z-3 of OSHA regulation 1910.1000. (See also TLV)

Personal Protective Equipment – Any devices or clothing worn by the worker to protect against hazards in the environment. Examples are respirators, gloves, and chemical splash goggles.

Phlegm – An abnormally large amount of thick, viscous, or stringy mucus.

Physical Hazard – A chemical which is classified as posing one of the following hazardous effects: compressed gas, explosive, flammable (gases, aerosols, liquids, or solids), organic peroxide, oxidizer (liquid, solid, or gas), pyrophoric (liquid or solid), self-reactive, self-heating, corrosive to metal, or water reactive.

Pictogram – A composition which may include a symbol plus other graphic elements, such as a border, background pattern, or color, which is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

Pneumoconiosis – A scarring of the lungs due to long-term occupational inhalation of dusts.

Polymerization – A chemical reaction in which two or more small molecules combine to form larger molecules which contain repeating structural units of the original molecules. A hazardous polymerization is the above reaction with an uncontrolled release of energy.

Precautionary Statement – A phrase which describes recommended measures which should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Product Identifier – The name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

Prostration – A state of extreme physical exhaustion, weakness, or collapse.

Pulmonary Edema – A build-up of fluid in the lungs. It is particularly dangerous if not treated.

Pyrophoric Material – A chemical substance or mixture which will ignite spontaneously in dry or moist air at below 130oF (54.4 C).

RAD – The unit of absorbed dose equal to 100 ergs per gram or 0.01 joules per kilogram of absorbing material.

Reactive Material – A chemical substance or mixture which may vigorously polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure, or temperature. Includes chemical substances which can be classified as explosive, an organic peroxide, a pressure generating material, or a water reactive material.

Reactivity – A substance’s susceptibility to undergoing a chemical reaction or change which may result in dangerous side effects, such as explosion, burning, and corrosive or toxic emissions. The conditions which cause the reaction, such as heat, other chemicals, and dropping will usually be specified as “Conditions to Avoid” when a chemical’s reactivity is discussed on an SDS.

Reproductive Toxins – Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effect on fetuses.

Respirator – A device which is designed to protect the wearer from inhaling harmful contaminants.

Respiratory Hazard – A particular concentration of an airborne contaminant which, when it enters the body by way of the respiratory system or by being breathed into the lungs, results in some bodily function impairment.

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

Safety Data Sheet (SDS) – An information document which contains relevant information about a specific chemical or mixture. Also lists the hazards of the chemical, appropriate emergency response procedures, protective equipment which should be worn, etc.

Sclera – The white of the eyes.

Select Carcinogens – Chemicals listed by MIOSHA as carcinogens, by the National Toxicology Program (NTP) as “known to be carcinogens” and by the International Agency for Research on Cancer (IARC) as Group I carcinogens. Also included are chemicals or processes listed in either Group 2A or 2B by IARC or under the category “reasonably anticipated to be carcinogens” by NTP and that cause statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:

1. After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/ml³,
2. After repeated skin application of less than 300 mg/kg of body weight per week, or
3. After oral dosages of less than 50 mg/kg of body weight per day.

Sensitizer – A substance which may cause no reaction in a person during initial exposures, but afterwards, further exposures will cause an allergic response to the substance.

Short Term Exposure Limit – Represented as STEL or TLV-STEL, this is the maximum concentration to which workers may 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 TLV-TWA must not be exceeded.

Signal Word – A word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are “danger” and “warning”. “Danger” is used for the more severe hazards, while “warning” is used for the less severe.

“Skin” – This designation sometimes appears alongside a TLV or PEL. It refers to the possibility of absorption of the particular chemical through the skin and eyes. Thus, protection of large surface areas of skin should be considered to prevent skin absorption so that the TLV is not invalidated.

Specific Chemical Identity – the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or any other information which reveals the precise chemical designation of the substance.

Spontaneous Combustion – Self-heating materials, those which exhibit spontaneous ignition or heat themselves to a temperature of 200 deg C (392 deg F) during a 24-hour test period. Linseed oil on rags can spontaneously combust.

Stupor – A state where one has a markedly reduced response to stimuli. People in a stupor lack coordination and may injure themselves.

Subcutaneous – Below or underneath the skin.

Substance – Chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Syncope – A temporary or brief suspension of consciousness due to deficiency of oxygen in the brain, fainting.

Symptomatic – A physical indication of disease or disorder.

Systemic – Spread throughout the body; affecting many or all body systems or organs; not localized in one spot or area.

Tachycardia – A fast heart rate.

Target Organ Effects – The organs which are most likely to be effected by exposure to a chemical.

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

Threshold Limit Value (TLV – Airborne concentrations of substances devised by the ACGIH which represent conditions under which it is believed that nearly all workers may be exposed day after day with no adverse effect. TLVs are advisory exposure guidelines, not legal standards, which are based on evidence from industrial experience, animal studies, or human studies when they exist. There are three different types of TLVs: Time Weighted Average (TLV-TWA); Short Term Exposure Limit (TLV-STEL); and Ceiling (TLV-C). (See also PEL)

Thrombosis – A blood clot inside a blood vessel.

Time Weighted Average – The average concentration over a given work period (e.g. 8-hour workday) 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.

Tinnitus – The sensation of a ringing, roaring, clicking, or buzzing sound in the ears even though no such external noise is present. It is usually intermittent.

Toxic – Refers to any chemical or substance which can damage a cell, organ, or organism.

Toxicity – The potential of a substance to exert a harmful effect on humans or animals and a description of the effect and the conditions or concentration under which the effect takes place.

Trade Name – The commercial name or trademark by which a chemical is known. One chemical may have a variety of trade names depending on the manufacturers or distributors involved.

Trade Secret – Any confidential formula, pattern, process, device, information or compilation of information which is used in an employer’s business, and which gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Unstable (Reactive) – A chemical which, in its pure state or as commercially produced, will react vigorously in some hazardous way under shock conditions (i.e. dropping), certain temperatures, or pressure.

Upper Explosive Limit (UEL) – Also known as Upper Flammable Limit (UFL), is the highest concentration (expressed in percent of vapor or gas in the air by volume) of a substance which will burn or explode when an ignition source is present. Theoretically, above this limit the mixture is said to be too “rich” to support combustion. The difference between the LEL and the UEL constitutes the flammable range or explosive range of a substance. That is, if the LEL is 1 ppm and the UEL is 5 ppm, then the explosive range of the chemical is 1 ppm to 5 ppm. (See also LEL)

Urticaria – Hives.

Vapor – The gaseous state of substances which are normally in the liquid or solid state at normal room temperature and pressure. Vapors evaporate into the air from liquids such as solvents, which often have low boiling points.

Vapor Pressure – The pressure that a solid or liquid exerts when it is in equilibrium with its vapor at a given temperature.

Vertigo – A sensation or illusion of movement in which a person senses himself to be revolving in space (subjective vertigo) or having his surrounding environment rotating or spinning (objective vertigo) when he is actually stationary.

Water-reactive – A chemical which reacts with water to release a gas which is either flammable or presents a health hazard.