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Laboratory Hazard Communication

Document Type: Guideline

I. PURPOSE AND OBJECTIVE:

This guideline outlines the methods and sources of hazard communication in the Laboratory.

II. GENERAL INFORMATION:

The Occupational Health and Safety Administration (OSHA) revised its Hazard Communication Standard (HCS) to align with the United Nations' Global Harmonized System of Classification and Labeling of Chemicals (GHS). Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDS), formally known as Material Safety Data Sheets (MSDSs). It is anticipated that the new label elements and SDS requirements will improve worker understanding of the hazards associated with the chemicals in their workplace.

III. PROCEDURE:

The first compliance date of the revised HCS was December 1, 2013. OSHA required as of that date employers train those workers who work with Hazardous Chemicals to understand the new chemical label and SDS formats. The Laboratory strives to accomplish this goal by devising and utilizing a learning module with documentation through testing on Medical Training (MTS) and/or Workday, at the end of the student's learning experience. Following is a summary of the elements required on a chemical label according to the OSHA Standard:

A. Container labeling

1. Section managers are responsible to verify that containers of hazardous chemicals,

which are received in their department, are properly labeled. Appropriate labeling is presented legibly and in English, and consists of:

a. Product Identifier: how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same identifier must be both on the label and in section 1 of the SDS (identification).

b. Signal word: used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. There are only two signal words “Danger” and “Warning.” Within a specific hazard class, “Danger” is used for the more severe hazards and “Warning” for the less severe hazards. There will be only one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a “Danger” signal word and another warrants the signal word “Warning” then only “Danger” should appear on the label.

c. Pictogram: OSHA’s required pictograms must be in the shape of a square set at a point and include a black hazard symbol on a white background with a red frame sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. OSHA has designated eight pictograms under this standard for application to a hazard category.

d. Hazard Statement: describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: “Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin.” The applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see this same statement for the same hazards, no matter what the chemical is or who produces it.

e. Precautionary statement(s): Means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.

f. Name, address, and phone number of the chemical manufacturer, distributor, or importer.

2. Laboratory managers/ supervisors/specialists should require that each chemical containers in their department retain the appropriate labeling, and that this labeling is not damaged or defaced. If a label is damaged or missing, the department should label the container according to contents and hazards.

a. Accumulation containers should be labeled with the chemical name(s), waste codes and accumulation start date.

B. Safety Data Sheets : The (HCS) (29 CFR 1910.1200(g), requires that the chemical

manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formally Material Safety Data Sheet (MSDS) for each hazardous chemical to each customer to communicate information on these hazards. The information contained in the SDSs is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent user-friendly, 16-section format. One of this policy's functions is to provide guidance to help workers who handle hazardous chemicals become more familiar with the format and understand the contents of the SDSs.

It is the employers responsibility to make the SDSs readily accessible to employees for hazardous chemicals in their workplace. The Laboratory accomplishes this by keeping inventories of printable SDSs of chemicals used in the laboratory on computers; where employees have immediate access to the information without leaving the work area. The SDS includes information such as the properties of each chemical; the physical, health, and environmental hazards; protective measures; safety precautions for handling storing, and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well).

Sections 1 through 8 contain general information about the chemical, identification, hazard, composition, safe handling practices, and emergency control measures (E.g., fire fighting). This information should be helpful to those that need to get the information quickly. Section 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information and other information including the date of preparation or last revision of the SDS. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS), but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

1. Identification - identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:
    a. Product Identifier used on the label and any other common names or synonyms by which the substance is known.
    b. Name address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.
    c. Recommended use ot the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).
2. Hazard(s) Identification - identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:
    a. The hazard classification of the chemical (e.g., flammable liquid category).
    b. Signal word

c. Hazard statements(s).

d. Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (e.g., skull and crossbones, flame).

e. Precautionary statements(s).

f. Description of any hazards not otherwise classified.

g. For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Please note that this is a total percentage of the mixture and not tied to the individual ingredients(s).

3. Composition/Information on Ingredients - identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and chemicals where a trade secret is claimed. The required information consists of:

    a. Substances

        i. Chemical name.

        ii. Common name and synonyms.

        iii. Chemical Abstracts Service (CAS) number and other identifiers. Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.

    b. Mixtures

        i. Same information required for substances.

        ii. The chemical name and concentration (i.e., exact percentage) of ingredients which are classified as health hazards and are:

            a. Present above their cut-off concentration limitsor

            b. Present a health risk below the cut off/concentration limits

        iii. The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:

            a. A trade secret claim is made.

            b. There is batch to batch variation, or

            c. The SDS is used for a group of substantially similar mixtures.

    c. Chemicals where a trade secret is claimed

        i. A statement that the specific chemical identity and/or exact percentages (concentration of composition has been withheld as a trade secret is required).

4. First-Aid Measures - describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:
    a. Necessary first-aid instructions by relevant routes of exposure, (inhalation, skin and eye contact, and ingestion).
    b. Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
    c. Recommendations for immediate medical care and special treatment when necessary.
5. Fire – Fighting Measures - this section provides recommendations for fighting a fire caused by the chemical. The required information consists of:
    a. Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
    b. Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
    c. Recommendations on special protective equipment or precautions for firefighters
6. Accidental Release Measures - provides recommendations on the appropriate response to spills leaks or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:
    a. Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent contamination of skin, eyes, and clothing.
    b. Emergency procedures, including instructions for evacuations, consulting experts when needed and appropriate protective clothing.
    c. Methods and materials used for containment (e.g., covering of drains and capping procedure(s)).
    d. Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning or vacuuming; adsorbent materials; and/ir equipment required for containment/clean up).
7. Handling and Storage - provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:
    a. Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices (e.g., eating drinking and smoking areas is prohibited).

b. Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

8. Exposure Controls/Personal Protection - indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. The required information consists of:
    a. OSHA permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold limit values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet where available.
    b. Appropriate engineering controls (e.g., local exhaust ventilation, or use only in an enclosed system).
    c. Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure).
    d. Any special requirements for PPE, protective clothing or respirators (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of glove material).
9. Physical and Chemical Properties - identifies physical and chemical properties associated with the substance or mixture. The SDS may not contain every item on the below list as information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential.The minimum required information consists of:
    a. Appearance (physical state, color, etc.)
    b. Odor
    c. Odor threshold
    d. pH
    e. Melting point/freezing point
    f. Initial boiling point and boiling range
    g. Flash point
    h. Evaporation rate
    i. Flammability (solid, gas)
    j. Upper/lower flammability or explosive limits
    k. Vapor pressure
    l. Vapor density
    m. Relative density

n. Solubility(ies)

o. Partition coefficient: n-octanol/water

p. Auto-ignition temperature

q. Decomposition temperature

r. Viscosity.

10. Stability and Reactivity - describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other. The required information consists of:

    a. Reactivity

        i. Description of the specific test data for the chemical(s). This data can be for a class or family of chemical if such data adequately represent the anticipated hazard of the chemical(s), where available.

    b. Chemical stability

        i. Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.

        ii. Description of any stabilizers that may be needed to maintain chemical stability.

        iii. Indication of any safety issues that may arise should the product change in physical appearance.

    c. Other

        i. Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions. Also, a description of the conditions under which hazardous reactions may occur.

        ii. List of conditions that should be avoided (e.g., static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions).

        iii. List classes of incompatible materials (e.g., classes of chemicals or specific substance(s) with which the chemical could react to produce a hazardous situation.

        iv. List of any known or anticipated hazardous decomposition products that could be produced because of use, storage, or heating.

11. Toxicological Information - identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

    a. Information on the likely routes of exposure (inhalation, ingestion skin and eye contact).

b. Description of the delayed, immediate, or chronic effects from short-and long term exposure.

c. The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (median lethal dose))-the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.

d. Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure.

e. Indication of whether the chemical is listed in the National Toxicology Program (NTP). Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.

12. Ecological Information (non-mandatory) - provides information to evaluate the environmental impact of the chemical(s) if it were released into the environment. This information must include:

    a. Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (e.g. acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants; toxicity data on birds, bees, plants).

    b. Whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis.

    c. Results of tests of bioaccumulation potential making reference to the octanol-water partition coefficient (Kow) and the bio-concentration factor (BCF), where available.

    d. The potential for a substance to move from the soil to the groundwater (indicate results from adsorption studies or leaching studies).

    e. Other adverse effects (e.g., environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential and/or global warming potential).

13. Disposal considerations (non-mandatory) - provides guidance on proper disposal practices, recycling or reclamation of chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Exposure Controls/Personal Protection of the SDS. This information may include:

    a. Description of appropriate disposal containers to use.

    b. Recommendations of appropriate disposal methods to employ.

    c. Description of the physical and chemical properties that may affect disposal activities.

    d. Language discouraging sewage disposal.

    e. Any special precautions for landfills or incineration activities.

14. Transport information (non–mandatory) - provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea. This information may include:
    a. United nations number (UN) - four-figure identification number of the substance.
    b. UN proper shipping name
    c. Transport hazard class(es)
    d. Packing group number, if applicable, based on the degree of hazard.
    e. Environmental hazards (e.g., identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code (IMDG Code).
    f. Guidance on transport in bulk (according to Annex II of MARPOL 73/78 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code (IBC Code).
    g. Any special precautions which an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises (indicate when information is not available).
15. Regulatory Information (non-mandatory) - identifies the safety health and environmental regulations specific for the product that is not indicated anywhere else on the SDS. This information may include:
    a. Any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency, or Consumer Product Safety Commission regulations).
16. Other Information - indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version.

IV. GHS vs. Hazardous Materials Identification System/ National Fire Protection Association (NFPA)

OSHA Hazard Communication Standards were made to assure the labeling of hazardous chemicals, classification of such chemicals, and the format of SDSs within the international community be consistent utilizing the Global Harmonizing System as standard. The previous statements defining what is expected to be found on hazardous chemical labels and/or SDSs addresses these issues individually. Employees working with hazardous materials need to understand the difference between the GHS and the HMIS/NFPA grading system. The differences are listed below:

A. 2012 Haz Com and GHS Differences
    1. Classifications in GHS not in 2012 Haz Com

2. Acute Toxicity Category 5
3. Skin Corrosion/Irritation Category 3
4. Aspiration Category 2

B. Consumer products may include these categories in their classification requirements for labeling. May appear in SDS.
    1. Unclassified Hazards (not in GHS, in 2012 Haz Com)
    2. Simple Asphyxiant (health hazard category)
    3. Pyrophoric Gases (physical hazard category)
    4. Combustible Dust (physical health category)
    5. Hazard Not Otherwise Classified (HNOC)

C. Classifying Carcinogenicity - Approximate Equivalences among IARC, NTP RoC, And GHS Carcinogenicity Classifications

Approximate Equivalences Among Carcinogen Classification Schemes

IARC	GHS	NTP RoC
Group 1	Category 1A	Known
Group 2A	Category 1B	Reasonably Anticipated
Group 2B	Category 2	Reasonably Anticipated

V. EMPLOYEE INFORMATION AND TRAINING

Employees receive training about hazardous chemicals before being placed in a work situation, which exposes them to these chemicals.

A. Training is conducted at initial orientation and on MTS and/or Workday as part of the initial orientation process. Safety training will then be conducted on an annual basis thereafter.

B. It is the responsibility of each department head to maintain documentation of training.

C. Hazard communication training consists of:
    1. Explanation of the requirements of the OSHA Hazard Communication Standard and the details of the Hospital Plan.
    2. Operations in the work area where hazardous chemicals are present, including routine and emergency situations, and the physical and health hazards associated with these operations.
    3. Location of the written hazard communication plan, list of chemicals in the department, and location of SDS sheets.
    4. Methods for detection of the presence or release of a hazardous chemical, (monitoring devices, visual appearance or odor, etc.).
    5. Measures employees can use to protect themselves from chemical hazards, including personal protective equipment, work practices, engineering controls, and

emergency procedures.

6. How to read and interpret labels and SDS sheets.

D. Upon receipt of a new hazardous chemical, section managers should evaluate the chemical to determine the hazard(s) associated with the product. If the product contains a new hazard, (one to which staff members have not received training), the section manager should provide hazard communication training to those staff members who are required to work with the hazardous chemical.

Approval Signatures

Step Description	Approver	Date
Medical Directors	Jeremy Powers: Chief, Pathology	8/16/2023
Medical Directors	Muhammad Arshad: Chief, Pathology	8/14/2023
Policy and Forms Steering Committee Approval (if needed)	Deborah Poloch: Medical Technologist Lead	8/9/2023
Site Laboratory Leaders	Kimberly Geck: Dir, Lab Operations B	8/9/2023
	Deborah Poloch: Medical Technologist Lead	8/9/2023

Older Version Approval Signatures

Medical Directors	Jeremy Powers: Chief, Pathology	10/25/2021
Medical Directors	Muhammad Arshad: Chief, Pathology	10/19/2021
Policy and Forms Steering Committee Approval (if needed)	Deborah Poloch: Lab Quality Coord	10/8/2021
Policy and Forms Steering Committee Approval (if needed)	Gail Juleff: Project Mgr Policy	10/8/2021
Site Laboratory Leaders	Joan Wehby: Dir, Lab Operations C	10/8/2021
Site Laboratory Leaders	Kimberly Geck: Dir, Lab Operations B	9/30/2021
	Deborah Poloch: Lab Quality Coord	9/30/2021
	Jeremy Powers: Physician	12/20/2019
	Muhammad Arshad: Staff Physician	12/11/2019
Policy and Forms Steering Committee Approval (if needed)	Deborah Poloch: Lab Quality Coord	12/11/2019
Site Laboratory Leaders	Kimberly Geck: Dir, Lab Operations A	11/22/2019
Site Laboratory Leaders	Amber Macumber: Mgr Laboratory	10/30/2019
Site Laboratory Leaders	Kimberly Geck: Dir, Lab Operations A	9/29/2019
Site Laboratory Leaders	Joel Wisniewski: Mgr Laboratory	9/24/2019
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Applicability

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