INDIANA UNIVERSITY

Laboratory Safety Guideline

# Labeling of Laboratory Chemicals and Waste

## Introduction

Proper chemical labeling is essential for a safe laboratory work environment. The absence of labels or use of abbreviations, formulas, or chemical structures on labels can lead to accidental exposure to chemicals whose labels have been misinterpreted and to the production of unknown chemical wastes.

These "unlabeled chemicals" not only present potential hazards but are expensive to dispose. The following are classified as “unlabeled chemicals”: bottles without a label, containers labeled with only codes, generic process labels that do not specifically list chemicals contained, and obviously mislabeled chemicals such as waste bottles that still have the original product label.

Of particular importance is the distinction between the labeling of laboratory chemical products and the labeling of laboratory chemical waste.

## Regulatory Basis

Labeling of chemical products used in the laboratory is regulated by the Occupational Safety and Health Administration (OSHA) whereas the labeling of chemical waste generated in the laboratory is regulated by the Environmental Protection Agency (EPA). Both of these agencies define the minimum standards by which an employer or generator of hazardous waste must comply. State and local regulations or university policies may exceed these minimum requirements.

### Labeling of Laboratory Waste

The EPA requires that containers of hazardous chemical waste be labeled according to 40 CFR 262.34(c)(1)(ii). This standard requires the containers to be labeled with the words “Hazardous Waste” or “with other words that identify the contents of the containers.” Identifying the contents means listing the constituents of the waste including the percent water and other chemicals or components present in the waste.

In accordance with the regulations and to avoid “unknowns” in the laboratory IU requires that all hazardous waste containers in satellite accumulation areas must be labeled “hazardous waste” and with “other words that identify the contents of the containers.” This is accomplished by affixing a “hazardous Chemical Waste” tag to the bottle and identifying the contents. Non-hazardous waste and sharps must also be labeled accordingly with a marker or label for EH&S or the custodial staff to identify.

The university has been citied for not labeling aqueous non-hazardous waste despite the fact that there was a log of the contents because the bottle was not labeled with a number or ID that corresponded to the log of the contents. Therefore the university requires that bottle numbers or ID’s be written on the bottle that correspond to the log or that the contents of the waste be written directly onto the bottle so that 1) we are in compliance with the regulation and 2) so that a determination of the nature of the waste (hazardous vs. non-hazardous) can be made.

By: Christopher E. Kohler, Certified Chemical Hygiene Officer

Office of Environmental, Health, and Safety Management 1514 E. Third Street Bloomington, IN 47405 (812) 855-6311 www.ehs.indiana.edu

INDIANA UNIVERSITY

Laboratory Safety Guideline

# Labeling of Laboratory Chemicals and Waste

The determination of a hazardous waste under this regulation can be based on numerous characteristics of the waste or if it is listed as a hazardous waste in the regulation. The "characteristic hazardous wastes" are based on the ignitability, corrosivity, reactivity, or the toxicity of the chemical constituents, whereas, the "listed hazardous wastes" are based upon the source of the waste both from specific sources (such as dry cleaners) and non-specific sources (such as "spent halogenated solvents").

## Labeling of Laboratory Chemicals

The definition of a hazardous substance under the Laboratory Safety Standard (29 CFR 1910.1450) as referenced in the Hazard Communication Standard (29 CFR 1910.1200) includes substances that pose either a physical or health hazard defined as "carcinogens, toxic and highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes."

In general, with the inclusion of physical hazards (such as flammability) and heath hazards (such as irritants, sensitizers, and chemicals that effect specific target organs), this results in a much more extensive and broader range of chemicals that are defined as "hazardous chemicals" than those defined as "hazardous wastes" by the EPA. The OSHA Hazard Communication Standard states that because of this "most chemicals in the workplace have some hazard potential, and thus will be covered by the rule."

As a result, many laboratory chemicals that meet the definition of "hazardous" products may not meet the definition of "hazardous" waste and may be disposed through the sanitary waste disposal system. **Conversely, just because a chemical may be disposed of as a non-hazardous waste does not necessarily define it as a non-hazardous product.**

Under the Laboratory Safety Standard labels on incoming containers of hazardous chemical must not be removed or defaced. Under the hazard communication standard all containers of hazardous materials must be labeled, tagged, or marked with the "identity" of the chemical and the appropriate hazard warning.

The "identity" is defined in OSHAs Hazard Communication Standard as the chemical or common name that can be found on the MSDS sheet. Also in this standard, labels are not required for chemicals that are transferred to containers intended for "immediate use" and are "under the control of and used only by the person who transferred it and only within the work shift in which it was transferred." These containers may include experimental apparatus such as beakers, flasks, and syringes; however, they must be labeled if they contain chemicals beyond the end of the shift.

The regulatory standards and recommendations are based on the laboratory safety guidelines found in *Prudent Practices in the Laboratory* which states that all containers in the laboratory should be labeled including those intended for immediate use. *The CRC Handbook of Laboratory Safety* also explains that the requirements of the hazard communication standard must be followed in order to provide equivalent protection. It is with this regard that the Chemical Hygiene Plan, IUs *Laboratory Chemical Safety Plan*, which is mandated by the Laboratory Safety Standard is written to contain the suggested requirement from Appendix A that all containers be labeled with the identity and appropriate hazard warning information.

By: Christopher E. Kohler, Certified Chemical Hygiene Officer

Office of Environmental, Health, and Safety Management 1514 E. Third Street Bloomington, IN 47405 (812) 855-6311 www.ehs.indiana.edu

INDIANA UNIVERSITY

Laboratory Safety Guideline

# Labeling of Laboratory Chemicals and Waste

## Procedures for Labeling of Chemical Containers

Chemical labeling requirements apply to all chemical containers, hazardous and non-hazardous, (including waste containers, product containers, and secondary containers) and must be labeled with the identity (chemical name, trade name, or abbreviation found on the MSDS) and the hazardous property (corrosive, flammable, etc.). This can be accomplished by writing on the bottle with a permanent marker, affixing a hand written or typed adhesive label, string tag, or other type label to the container.

- Inspect incoming containers to ensure that they have legible labels.
- Manufacturer chemical labels should never be removed or defaced until the chemical is completely used. Empty containers that are saved for re-use must have the original label removed or marked out and obliterated. Empty containers that are used for waste or chemical products must have a new label affixed or have the information written directly on the bottle.
- Label all containers in English to identify the contents with the full chemical name(s) and appropriate hazard warning information. The identity on the label should correspond to a chemical name, trade name, or abbreviation found on the MSDS. No abbreviations, formulas, or chemical structures may be used unless it is otherwise labeled appropriately.
- Small containers that are difficult to label such as 1-10 ml vials and test tubes can be labeled as a group and stored together. A log or laboratory notebook with corresponding sample numbers on the bottles or group may be used to identify the contents.
- Unattended beakers, flasks, and other laboratory equipment containing chemicals used during an experiment should be labeled as described above. Beakers, flasks, syringes prepared and used immediately or by the end of the shift may be unlabeled.
- Secondary containers must be labeled with the chemical name and hazard when the substance is transferred from the labeled primary container to a secondary container.
- If a chemical or mixture is produced or synthesized in the laboratory and is intended for outside use the provisions of 1910.1200 apply which requires the preparation of a Material Safety Data Sheet. (Call EH&S for assistance 855-6311).
- Synthesized chemicals must be labeled as accurately as possible until the chemical name is known, either with the chemical group or hazard class.
- If a chemical or mixture in the lab is unknown then it is assumed to be hazardous.
- In the case of buffer and protein solutions it is appropriate to label the container “Buffer Solution” with the type of buffer in solution (i.e. “Buffer Solution – Tris”). Abbreviations are acceptable if also listed on the MSDS as a common name or synonym. For abbreviations not found on the MSDS, post a log that identifies the chemical name(s) and hazard warning.
- All chemicals (especially time sensitive chemicals, Laboratory Chemical Safety Plan SOP 3.17) must be labeled with the “date received” and “date opened.”

By: Christopher E. Kohler, Certified Chemical Hygiene Officer

Office of Environmental, Health, and Safety Management 1514 E. Third Street Bloomington, IN 47405 (812) 855-6311 www.ehs.indiana.edu

INDIANA UNIVERSITY

Laboratory Safety Guideline

# Labeling of Laboratory Chemicals and Waste

- All chemical storage areas such as cabinets, shelves and refrigerators should be labeled to identify the hazardous nature of the chemicals stored within the area (e.g., flammables, corrosives, oxidizers, water reactives, toxics, carcinogens, reproductive toxins, and general storage (non-reactive, non-hazardous). All signs should be legible and conspicuously placed.
- Food items used in the lab for demonstration or experimental purposes should be labeled "For Lab Use Only."

## Procedures for Labeling of Chemical Waste Containers

Waste collected in containers in laboratories are subject to the EPA definition of a "hazardous waste" (see definition above). These areas are known as "satellite" accumulation areas.

- All hazardous waste containers in satellite accumulation areas must be labeled with the words "hazardous waste" and with "other words that identify the contents of the containers."
- All waste containers (hazardous and non-hazardous) should be clearly labeled in English with the full chemical name(s) (no abbreviations or formulas) and appropriate hazard warning information. Small containers that are difficult to label such as 1-10 ml vials and test tubes can be labeled as a group. This can be accomplished by using the EH&S "Hazardous Chemical Waste Tags" and listing the components in the waste (including the percent water).
- If a chemical waste or mixed chemical waste in the lab is unknown then it is assumed to be hazardous. All unknowns are required to be characterized prior to disposal. Procedures are available at EH&S.
- All hazardous waste containers must be marked with an accumulation date which is the date that the container becomes full **or** the date that it is turned in for disposal. Waste containers should NOT be filled to more than 90% of their capacity. All full hazardous waste containers should be disposed of promptly by calling EH&S (855-6311) or requesting a pickup on-line at www.ehs.indiana.edu/hazard.html.
- Non-hazardous waste and non-hazardous sharps containers must also be identified appropriate label with the chemicals or contaminants for EH&S or the custodial staff.

## References


1. Furr, A. Keith, *The CRC Handbook of Laboratory Safety*, 5th Edition, 2000.
2. National Research Council, *Prudent Practices in the Laboratory*, Handling and Disposal of Chemicals, 1995.
3. Title 29, Code of Federal Regulations, Part 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories.
4. Title 29, Code of Federal Regulations, Part 1910.1200, Hazard Communication.
5. Title 40, Code of Federal Regulation, Part 262.34, Standards Applicable to Generators of Hazardous Waste.



By: Christopher E. Kohler, Certified Chemical Hygiene Officer

Office of Environmental, Health, and Safety Management 1514 E. Third Street Bloomington, IN 47405 (812) 855-6311 www.ehs.indiana.edu