Laboratory Standard Operating Procedure for:

Bleach

Description

This standard operating procedure outlines the handling and use of bleach. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when handling bleach.

Bleach is a general term that typically refers to an aqueous mixture that has a primary active ingredient of either **Sodium Hypochlorite** or **Calcium Hypochlorite** and *usually at concentrations of **3 - 10%.*** Bleach is used primarily as an oxidizing, cleaning, or a bleaching agent, as a disinfectant or within drinking water and waste water purification systems.

Synonyms of bleach include sodium hypochlorite, Clorox, liquid bleach, antiformin, chlorox, Carrel-dakin solution, Chloros, Dakin's solution, hychlorite, Javelle water.

Useful Bleach Links:

- www.atsdr.cdc.gov/toxfaqs/tfacts184.pdf
- http://www.atsdr.cdc.gov/Mhmi/mmg184.pdf
- http://www.asc.co.id/uplimg/File/03%20zMSDS_NaClO_ASC%20R3.pdf
- http://www.cl2.com/documents/Incompatibility%20Chart.pdf

Potential Hazards

- Corrosive. May cause severe irritation or damage to eyes or skin. Vapor may irritate eyes and respiratory tract.
- Incompatible with many chemicals/agents. Hazardous gases (including chlorine and chloramines) may be released if bleach is mixed with an incompatible material.
  - Exposure to these gases can cause coughing, shortness of breath, irritation to, or burning of the eyes, nose, and throat, chest pain, wheezing, fluid in the lungs, and nausea. Chlorine can also be absorbed through the skin and cause pain, inflammation, swelling, and blistering.
- Strong oxidizer. May initiate or promote combustion in other materials.

Occupational Exposure Limits (OELs):

- MIOSHA: **0.5 ppm Chlorine** (*from sodium hypochlorite*), **8-hour** PEL
- MIOSHA: **1 ppm Chlorine** (*from sodium hypochlorite*), **15-minute** STEL
- AIHA (WEEL): **2 mg/m^3 Sodium Hypochlorite, 15-minute** STEL

Engineering Controls

- An eyewash/drench hose combination unit must be available in the immediate work area for any work with corrosive materials, including bleach.
- If large quantities will be used, a safety shower will also be necessary.
- Depending on the material's pH or based on its ability to cause severe tissue damage, e.g., formaldehyde, methylene chloride, methyl ethyl ketone peroxide (MEKP), phenol, etc., the location of the emergency shower and/or emergency eyewash shall be within **25 to 100 feet from the hazardous operation.**

- A system of local and/or general exhaust is recommended to keep employee exposures below MIOSHA Permissible Exposure Limits (PEL). Local exhaust ventilation (LEV) is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
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Work Practice Controls

- **ALWAYS** review the SDS of both bleach and any chemicals/agents before mixing them with bleach to ensure compatibility. A general list of incompatible materials can be found here.
- **NEVER** mix bleach with an unknown liquid or unknown residue.
- Do not mix bleach with any compound that is incompatible with oxidizers.
- Purchase bleach in the smallest containers that are practical for lab use.
- Work with the smallest practicable amount and lowest practicable concentration.

Personal Protective Equipment (PPE)

In order to select the appropriate PPE for the workplace, a Hazard Assessment is conducted. The hazard assessment determines the hazards and potential hazards associated with a task, machinery, or process. The appropriate PPE for the situation may be subsequently determined. The Hazard Assessment Form may be found in Appendix A of the Personal Protective Equipment (PPE) Guideline. It may be completed either by the workplace supervisor.

- Personal protective equipment is especially important. Wear a buttoned lab coat, safety glasses (that meet the requirements of ANSI/ISEA Z87.1) or goggles if splashing may occur, and gloves for any work with bleach. Depending on the quantities and concentrations used, a face shield, impenetrable, chemical apron and sleeves (or coverall), and special gloves may be recommended.
- Should adequate dilution ventilation or LEV be present, respiratory protection should not be necessary. However, in the absence of these and when MIOSHA PEL, or other published occupational exposures limits (OEL) are anticipated to be exceeded, respiratory protection may be necessary. Contact EHS at (313) 593-0921 for a determination of the need for a respirator.

Transportation and Storage

- Transport concentrated bleach solutions in secondary containment, preferably a polyethylene or other non-reactive acid/solvent bottle carrier.
- Store in well-ventilated areas with secondary containment, such as a non-reactive plastic bin.
- Store below eye level.
- Store away from metal (unless the metal has a corrosion-proof coating), and do not store under the sink.
- Store away from incompatibles and flammable materials. Always review the SDS of other chemicals in the storage area for compatibility with bleach.
- Avoid storing on the floor. If storing on the floor is necessary, use secondary containment.

Waste Disposal

If the bleach solution is at a household concentration or less, i.e., a maximum 10% concentration of sodium hypochlorite, **and** was used for disinfecting, limit discharges down a laboratory sink to less than 1-gallon (approx. 3.8 L). If the concentration was >10% **and** was used for disinfecting, limit the sink disposal to less than 2-cups (approx. 500 mL) of bleach solution. Also flush the drain with adequate volumes of water.

This does **not** apply to "waste" bleach, e.g., ***unused*** or ***expired*** bleach. Any **leftover**, **unused product** or **expired bleach** not used as intended by the manufacturer, or used as a disinfectant, needs be collected by OSEH Hazardous Materials Management (HMM) for proper disposal. Contact EHS at (313) 593-0921 for waste containers, labels, manifests, and waste collection. Also, refer to EHS's Hazardous Waste Webpage for more information.

Exposures/Unintended Contact

 ***If the employee is in need of emergency medical attention, call 911 immediately.*** 

In general, flush affected eyes or skin with water for at least 15 minutes, then seek medical attention (see below).

- **Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. **Get medical aid**.
- **Skin:** In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. **Get medical aid**. Wash clothing before reuse.
- **Ingestion: Get medical aid immediately**. ***Do not induce vomiting unless directed to do so by medical personnel.*** Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward. Wash mouth with water, and then give plenty of milk or water to drink and ***obtain urgent medical attention***.
- **Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. **Get medical aid**.

Report all work related accidents, injuries, illnesses or exposures to WorkConnections within 24 hours by completing and submitting the Illness and Injury Report Form. Follow the directions on the WorkConnections website Forms Instructions to obtain proper medical treatment and follow-up.

Complete the EHS Laboratory Incident and Near-Miss Report form.

TREATMENT FACILITIES:

Midwest Medical Center -- *Campus Employees (including student employees)*
Mon-Fri 7:30 am - 4:30 pm
9301 Middlebelt Road
Romulus, MI 48174
Phone: 734-941-1000

After hours - go to:

Midwest Medical Center
Open 24/7
4700 Schaefer
Dearborn, MI 48126
Phone: 313-581-2600

Henry Ford Medical Center-Fairlane -- *University students (non-life threatening conditions)*
19401 Hubbard Drive
Dearborn, MI 48126
Phone: 313-928-8278

Click here for more information.

Spill Procedures

- When a spill occurs, ***personal safety should always come first***.
- Alert and clear everyone in the immediate area where the spill occurred.

A **minor (small) chemical spill** is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., less than 1 Gallon or 3.5 Liters. A **major/large chemical spill** requires active assistance from emergency personnel.

For minor (small) spills:

- Use proper personal protective equipment as indicated above.
- Absorb the spilled bleach using an absorbent, non-combustible material such as appropriate sorbent pads, sand, or vermiculite. ***Do not use combustible materials such as sawdust.***
- Collect residue, place in container and contact EHS at (313) 593-0921 for proper disposal.

For major (large) spills:

Report large chemical spills greater than 1 gallon or 3.5 liters in corridors or common areas, e.g., hallways, elevators, eating areas, rest rooms, offices, etc., to Public Safety at (313) 593-5333 or 911 from a campus phone.

Additional Spill Response Steps:

MINOR CHEMICAL SPILL

- Alert people in immediate area of spill.
- Open outside windows, if possible.
- Wear protective equipment, including safety goggles, gloves and long-sleeve lab coat.
- Avoid breathing vapors from spill.
- Confine spill to as small an area as possible.
- **Do not wash spill down the drain**.
- Use appropriate spill kits/sorbents to neutralize corrosives and/or absorb spill. Collect contaminated materials and residues and place in container. For powdered chemicals sweep carefully to avoid generation of dust or, if appropriate, use moist sorbent pads or wet the powder with a suitable solvent and then wipe with a dry cloth. Contact EHS at (313) 593-0921 for proper disposal.
- Clean spill area with water.

MAJOR CHEMICAL SPILL

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- Close doors to affected area.
- Post warnings to keep people from entering the area.
- Have person available that has knowledge of incident and laboratory to assist emergency personnel.

Additional Spill Links:

- Chemical Spill Control Information

Report all emergencies, suspicious activity, injuries, spills, and fires to Public Safety by calling at (313) 593-5333 or 911 from a campus phone. Register with the University of Michigan-Dearborn Emergency Alert System.

Training of Personnel

All personnel are required to complete the ***Comprehensive Laboratory Safety*** session (**BLS009** *or equivalent*) via MyLINC. Furthermore, all personnel shall read and fully adhere to this SOP when handling bleach.

Certification

I have read and understand the above SOP. I agree to contact my Supervisor or Lab manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator? ☐ **YES** ☐ **NO**

Principal Investigator _____ **Revision Date** _____