



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, Chlorox, 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/upling/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/m³ 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. *Contact EHS at (810) 766-6763 for a determination of the need for a safety shower if there is not one available.*
- 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. *Contact EHS at (810) 766-6763 for a determination of the need for an LEV system, if there is not one available.*

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. Contact EHS at (810) 766-6763 to obtain a copy of the Hazard Assessment Form. The form may be completed by Environment, Health and Safety, workplace supervisor, laboratory supervisor or principal investigator.

- 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 overall), 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 (810) 766-6763 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 EHS for proper disposal through the Hazardous Waste Management Program. Contact EHS at (810) 766-6763 for waste containers, labels, manifests, and waste collection. Also refer to UM-Flint Hazardous Waste Management Program and EHS webpage <http://www.umflint.edu/ehs/environment-health-and-safety> 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.**

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the [Illness and Injury Report Form](#) to WorkConnections within 24 hours. Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the [EHS Laboratory Incident and Near-Miss Report Form](#). This will be valuable in improving laboratory safety on UM-Flint campus.

TREATMENT FACILITIES:

MAJOR INJURIES	MINOR INJURIES –During Business Hours	MINOR INJURIES –After Business Hours
Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710 Hurley Medical Center One Hurley Plaza Flint, MI 48503 (810) 262-9000 McLaren Hospital Flint 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000	Genesys Occupational Health Network 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. & Sun. Noon to 8 pm McLaren Flint-Burton OCC Center 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat & Sun 10 am to 2 pm	Downtown Flint 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550 Genesys East 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351 Genesys North 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397 Genesys South 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

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 of a known chemical 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 (810) 766-6763 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 UM-Flint Department of Public Safety (DPS) at (810) 762-3333 (or 911).

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 (810) 766-6763 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:

- www.oseh.umich.edu/pdf/chemspil.pdf
- <http://www.oseh.umich.edu/emer-chemical.shtml>

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan-Flint Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

Training of Personnel

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the **Comprehensive Laboratory Safety** session (**BLS009** or equivalent) via [MyLINC](#), or UM-Flint EHS on-line training or other equivalent approved by EHS. 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 _____