EHS
ENVIRONMENTAL
HEALTH AND SAFETY

# Benzene – Lab-Specific Standard Operating Procedure

| | |
|---|---|
| Principal Investigator (PI): | |
| Room: | Building: |
| Extension: | Department: |

| Chemical | WHMIS 2015 Pictograms | Classification |
|---|---|---|
| Benzene |  | Flammable liquids - Category 2<br>Skin corrosion/irritation - Category 2<br>Serious eye damage/eye irritation - Category 2<br>Germ cell mutagenicity - Category 1B<br>Carcinogenicity - Category 1A<br>Specific target organ toxicity - single exposure (narcotic effects) - Category 3 - Narcotic effect3 6<br>Specific target organ toxicity - repeated exposure - Category 1<br>Aspiration hazard - Category 1 |

## Hazard Awareness

Benzene is a clear colourless organic solvent with an aromatic odour. The liquid and vapour are highly flammable. TOXIC: Prolonged or repeated exposures can cause a decrease in white blood cells and platelets, and harm the immune system. May harm the nervous system. MUTAGENICITY: May cause genetic damage. CARCINOGENICITY: Known to cause cancer of the blood and has been associated with other types of cancer.

- International Agency for Research on Cancer (IARC): Carcinogenic to humans
- American Conference for Governmental Industrial Hygienists (ACGIH): Confirmed human carcinogen

Regulation 833, *Control of Exposure to Biological or Chemical* Agents, and the ACGIH exposure limits for benzene are; TWA 0.5ppm, STEL 2.5ppm

Benzene is a chemical listed in the Designated Substances Regulation (Reg. 490) under the Ontario Occupational Health and Safety Act. The exposure of a worker to these substances is prohibited, regulated, restricted, limited or controlled. For additional information on designated substances at Carleton, visit https://carleton.ca/ehs/programs/working-lab/designated-substance-compliance-program/

## Engineering Controls

All handling of benzene must be conducted in a fume hood, with the sash at the lowest working height.

Chemical fume hoods must be running between 80-150 linear feet/minute and tested by EHS within the last year. If the hood is not working properly, contact FMP Service Centre.

| |
|---|
| Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. |
| *Add additional engineering controls specific to the laboratory.* |
| **Administrative Controls** |
| Procedure-specific safety training must be provided by the principal investigator (PI) or other qualified personnel to all researchers working with benzene. Documentation of training is required. |
| Read the safety data sheet (SDS) and lab-specific Standard Operating Procedure for benzene prior to use. |
| Review procedures for any potential for exposure. |
| Contact Environmental Health and Safety office for assistance with assessment and determining appropriate control methods. |
| An eyewash and safety shower must be in the immediate work area where benzene is used. |
| *Add additional administrative controls specific to the laboratory.* |
| **Work Practices** |
| Employers, supervisors and workers must comply with Ontario Regulation 490 *Designated Substances* when there is potential for exposure to benzene in the workplace. |
| All bottles must be clearly labeled with the chemical name and hazard classes and kept tightly-sealed. |
| Empty containers of benzene must be handled carefully since product residues (vapors, liquid) are still harmful. |
| Affix “Hazardous Waste” labels to all benzene waste. Use full chemical names to describe the waste (i.e., no chemical abbreviations or symbols), be stored in bottles with tightfitting caps or lids, and be stored with compatible chemicals. |
| *Add additional work practices specific to the laboratory.* |
| **Personal Protective Equipment** |
| At a minimum, chemical splash goggles that meet American National Standards Institute (ANSI) standard Z-87.1 or CSA Z94.3 must be worn when handling benzene. |
| Chemical resistant gloves must be worn while handling benzene. PIs must determine if additional protection for the hands (e.g., heavy-duty gloves, wearing two pairs of gloves, using longer gloves that cover the hands, wrists, and forearms, etc.) is required. |
| A lab coat and closed-toe footwear must be worn. |
| *Add additional personal protective equipment requirements specific to the laboratory.* |

| |
|---|
| **Storage** |
| Store benzene as indicated in safety data sheets (SDSs). |
| Store benzene in a flammables cabinet. |
| Ensure labels on original bottles remain legible and prominently displayed to identify contents. |

| |
|---|
| Keep containers tightly closed. |
| Benzene must be stored in a cool, dry, well-ventilated area out of direct sunlight and away from heat and ignition. |
| Store benzene away from oxidizers, corrosives and peroxides. Check safety data sheet for further incompatibilities. |
| *Add additional storage requirements specific to the laboratory.* |

| **Spill and Incident Procedures** *(<25 mL in the fume hood/any amount outside the fume hood)* | |
|---|---|
| Evacuate the laboratory. | |
| Close door(s) to lab and pull the fire alarm to evacuate the building. | |
| Call Campus Safety Services Emergency Number - **4444** | |
| Do not re-enter area until instructed to do so by emergency personnel. | |
| Report accident to PI/Supervisor and EHS. | |
| **First Aid Procedures** *(Always have the SDS on hand in an emergency)* | |
| First Aid – Eyes | 1. Immediately move to the eyewash station, hold eyelids open and flush with water. Remove contact lenses while flushing (if applicable).<br>2. Call Campus Safety Services Emergency Number – **4444**<br>3. Continue flushing the eyes for 15 minutes.<br>4. Seek medical attention.<br>5. Report incident to PI/Supervisor and EHS. |
| First Aid – Skin | 1. Immediately move to safety shower or other water source and begin rinsing affected area(s). Remove contaminated clothing (if applicable) while flushing.<br>2. Call Campus Safety Services Emergency Number – **4444**<br>3. Continue rinsing for 15 minutes.<br>4. Seek medical attention.<br>5. Report incident to PI/Supervisor and EHS. |
| First Aid – Ingestion | 1. Immediately rinse the mouth with cold water. Do NOT induce vomiting.<br>2. If the victim is conscious, have them drink water.<br>3. Call Campus Safety Services Emergency Number – **4444**<br>4. Seek medical attention<br>5. Report incident to PI/Supervisor and EHS. |
| First Aid – Inhalation | 1. Move to fresh air.<br>2. Report incident to PI/Supervisor and EHS. |

| **Additional Information** |
|---|
| *Add any additional information specific to the laboratory.* |