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**McMaster University**  
**Department of Biology**  
**Standard Operating Procedure for Dry Ice (CO<sub>2</sub>)**

**Revised: February 5, 2008**  
**Reviewed by EOHSS May 2008**  
**Effective: Immediately**

**Applicable Legislation:**

Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 27 (2) (a), 27 (2) (c) & 28 (1) (a), 28 (1) (b), 28(1) (c).

**Intent:** To outline safe handling procedures of Dry Ice, including any equipment that is used in conjunction with Dry Ice, and to outline potential hazards and first aid measures should an incident occur.

**Definitions:**

**Dry Ice:** Carbon Dioxide in a solid state. Exposure to room temperature dry ice will evaporate and release Carbon dioxide gas. Caution should be taken when handling. Although this chemical is not considered to be a product presenting a risk of explosion, do not expose dry ice to liquids as the liquid could explode upon instant thawing of the dry ice. Do not store under pressure.

**Qualified person:** A person who, in respect of a specific duty, is qualified by knowledge, training and experienced to perform the duty safely and properly.

**Requirements of OHSA, Section 27 (2) a, c and Section 28(1) a, b, c**

- 27. (2) (a) A supervisor shall advise a worker of the existence of any potential or actual danger to the health or safety of the worker of which the supervisor is aware.
- 27. (2) (c) Take every precaution reasonable in the circumstances for the protection of a worker.

**Duties of workers**

- 28. (1) A worker shall,
  - (a) work in compliance with the provisions of this Act and the regulations;
  - (b) use or wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn
  - (c) report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker

**Potential Hazards**

**Inhalation:** Inhalation of this product may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.

**Ingestion:** Ingestion of solid can cause burns similar to frostbite.

**Skin Contact:** Dermal contact with the solid could result in freezing of the tissues or frostbite.

**Eye Contact:** Solid can cause burns similar to frostbite. **DO NOT WEAR CONTACT LENSES.**

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**Description of Procedures**

1. All persons shall read the Material Safety Data Sheet and SOP on Dry Ice (CO<sub>2</sub>) and cryogenic materials before using. (review WHMIS materials on Cryogenics).
2. All users will have WHMIS, Fire Safety, Gas Cylinder & Chemical handling and Spills training.
3. All persons shall wear personal protective equipment when handling Dry Ice. This includes wearing a lab coat, appropriate safety glasses or goggles, thermal gloves and closed toe shoes when working with Dry Ice. Leave lab coats, thermal gloves, and other personal protective equipment in the lab once your work is complete to prevent the spread of this or other chemicals outside of the lab.
4. All persons shall know Life Sciences Building Emergency Procedures including the location of Fire pull stations, eye wash stations and safety showers.
5. Obtain Dry Ice from HSC Stores or ABB stores using the appropriate personal protective equipment and tools provided.
6. Wearing thermal gloves and/or using tongs place amount of Dry Ice into a thermal container (cooler) and use a cart for transport.
7. Record the amount of Dry Ice taken with the Stores staff. ¼ block = 1
8. Return to lab and store in -80°C freezer until needed. Dry Ice should remain for approximately 3 days.
9. See appropriate protocol for use. E.g. extraction of RNA by grinding frozen plant leaves; extraction of DNA etc.

**Waste Management and Environmental Responsibility**

Avoid dispersal of spilled material

**Waste disposal procedures**

Follow McMaster University Hazardous Waste disposal procedures

**Decontamination of Equipment**

Using appropriate PPE and handling equipment, remove solid material and place in an appropriate container for storage/disposal.

Ensure area is well ventilated

**Handling and Storage Requirements (refer to MSDS)**

Avoid contact with eyes, skin and clothing. Carbon dioxide is generally delivered as blocks or pellets and should be placed in isolated containers with an upward opening so that sublimation vapours of CO<sub>2</sub> may be released. Dry ice should always be manipulated with pliers (blocks) or with appropriate tools.

**Contingency Plan and Reporting**

All accidents and spills will require persons involved to fill out an "incident report" after the situation has been contained. **In case of a critical injury or major spill Dial 88 for security services & EOHSS ext. 24352**

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**Accident response**

Follow all recommendations in the MSDS

**Inhalation:** In case of inhalation, conscious persons should be assisted to an uncontaminated area and inhale fresh air. The person should be kept warmed and calm. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, give assisted resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

**Skin contact:** Remove contaminated clothing and rinse affected skin with LUKEWARM water. Do not rinse with hot water. Provide medical prompt attention, frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed.

**Eye contact:** Individual in contact with this product should not wear contact lenses. Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 20 minutes. Seek medical attention.

**Ingestion:** If potentially dangerous quantities of this material have been swallowed, call physician immediately. Do not induce vomiting unless directed to do so by medical personnel.

**Notes for physician:** Notify medical personnel that the person may suffer from anoxia.

**Spill clean up (refer to MSDS)**

Use the appropriate personal protective equipment and tools to pick up spilled material and place in an appropriate container for disposal.

DO NOT SEAL to prevent gas build-up

**References:**

Material Safety Data Sheets: Sigma Aldrich  
Risk Management Manual (RMM) McMaster University  
Occupational Health and Safety Act (OHSA)  
Cameron Lab Protocols (2008)