

**UNIVERSITY OF ROCHESTER
ENVIRONMENTAL HEALTH & SAFETY**

Policy No.: LS001	Approved by: Mike Liberty
Title: Dry Ice Handling Procedures	Date: October 14, 2020
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Prepared by: Carolyn Place	

I. PURPOSE

This policy establishes procedures for the safe storage, usage, and handling of dry ice in laboratories at the University of Rochester.

The main hazards of dry ice include burns and asphyxiation. Insulated cryogenic gloves and eye protection must be worn when handling dry ice. Use of dry ice in poorly ventilated areas can result in depletion of the oxygen level resulting in asphyxiation.

II. PERSONNEL AFFECTED

University laboratory personnel
EH&S personnel

III. DEFINITIONS / USES

Dry ice is the solid form of carbon dioxide, non-combustible, and available in flakes, pellets or block form. Dry ice will sublime (vaporize directly to the gas state) at a temperature of -78.5°C (-109.3°F) or higher.

Dry ice is commonly purchased from a commercial manufacturer. Some labs make limited quantities of dry ice (for immediate use) using a "Dry Ice Machine" (various manufacturers currently available).

Dry ice is commonly used to cool reactions or to ship biological specimens. Shipping using dry ice is covered under the EH&S Shipping Biological Training and Dry Ice located on MyPath.

IV. RESPONSIBILITIES

All University laboratory personnel must follow the safe storage, usage, and handling of dry ice procedures (see below).

EH&S personnel, upon discovery of improper storage or handling of dry ice will notify the PI/Laboratory Supervisor of the problem for immediate corrective action.

V. PROCEDURES

A. Storage:

1. Dry ice must be stored in a Styrofoam chest, insulated cooler, or a special cooler designed for the storage of dry ice. The cooler must then be located in a well ventilated place, such as the open lab. NEVER store coolers in closets, cabinets, refrigerators, or walk in coolers/cold rooms.

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2. Due to the thermal expansion of dry ice (one pound of dry ice produces about 250 liters of gaseous carbon dioxide), sufficient gaseous carbon dioxide can be produced in a sealed container to cause an explosion. Dry ice is NEVER to be stored in any type of tightly sealed devices such as an ultra-low freezer or plastic/glass container.
3. Dry ice will sublimate about five to ten pounds every 24 hours (blocks last longer) in a typical storage cooler. Plan on purchasing dry ice as close as possible to the time needed.
4. Normal air is composed of 78% nitrogen, 21% oxygen, and only 0.04% carbon dioxide. Concentrations greater than 0.5% (5000 ppm) can become dangerous. Therefore, handle dry ice in well-ventilated locations.

B. Hazards/Precautions:

1. Burns/frostbite: Dry ice can cause burns to the skin in short periods of times. Cryogenic gloves must be used when handling dry ice. Eye protection in the form of safety glasses, goggles, or face shield must also be worn when handling dry ice.
2. Suffocation: carbon dioxide is a simple asphyxiant. Always store dry ice in a well-ventilated area to minimize the build-up of carbon dioxide. Personnel must use caution should dry ice be stored in a deep cooler. Never bend over with your head in a cooler while scooping out dry ice, as the vapors are heavy and settle in low lying places or containers.
3. Explosions: Placing dry ice into a tightly sealed container can permit sufficient gas build up to cause an explosion. Never place dry ice inside an ultra-low freezer or other enclosed space!
4. Placement of dry ice in rooms with little or no ventilation can result in a build-up of the carbon dioxide in the area. Do not store dry ice in a confined area such as walk-in coolers, refrigerators, freezers, closets, or cars/vans.
5. The Safety Data Sheet for dry ice is available through the manufacturer or distributor, or through the EH&S MSDSOnline portal (see below).
6. Medical assistance for dry ice injuries is available by contacting University Health Services at x5-2662. Report injuries from dry ice using the Incident Report Forms available at <http://www.safety.rochester.edu/SMH115.html>.
7. When using dry ice to ship materials, the shipper must abide to all applicable shipping regulations.
8. Disposal of unneeded dry ice is accomplished by:
 - a. Letting the unused portion sublimate (recommended for well-ventilated locations because it will occur over a period of several days and the ventilation will take care of the gas liberated);

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- b. NEVER dispose of dry ice in a sink, toilet or other drain (such action can destroy the structure due to the temperature difference);
- c. NEVER dispose of dry ice in the trash or garbage; and
- d. NEVER place unneeded dry ice in corridors (some corridors may not be well ventilated and the oxygen level can be reduced to low levels).

VI. REFERENCES

Safety Data Sheets:

<https://shib2.its.rochester.edu/idp/profile/SAML2/Redirect/SSO?execution=e1s1>

Shipping Biological Specimens using dry ice:

<https://www.safety.rochester.edu/labiosafe/ShippingBiologicalMaterials.html>

VII. APPENDICES/FORMS

None

VIII. REVISION HISTORY

Date	Revision No.	Description
5/1/2009	New	Handling procedures for dry ice
9/18/2017	Reviewed	No Changes
10/14/2020	Revision 1	Minor Updates