

# Working Safely with Dry Ice

Dry ice, the solid form of carbon dioxide (CO<sub>2</sub>), is commonly used in UW research. Its properties allow for rapid cooling of materials, but also pose unique worker safety hazards. Below are guidelines for how to work with dry ice safely.

## HAZARDS OF DRY ICE

- **Contact Hazard:** At -109 °F (-79 °C), skin contact with dry ice can lead to severe frostbite; skin cells freeze and become damaged very quickly.
- **Asphyxiation Hazard:** Dry ice will sublime (change from solid to gas) at any temperature above -109 °F. This releases potentially substantial volumes of CO<sub>2</sub> (1 pound solid = 250 liters gas), which can displace oxygen quickly in the air around the dry ice, causing difficulty breathing, loss of consciousness and death. This is especially of concern in non-ventilated or confined spaces.
- **Explosion Hazard:** Due to the rapid emission of large volumes of CO<sub>2</sub> gas, any dry ice that is stored in a closed container can pressurize the container. Given enough time at normal room temperature, such a container may explode if the gas is not able to escape. *Serious physical injury has occurred at UW due to improper packaging of dry ice.*
- **Occupational Exposure Limits:** Eight-hour, time-weighted average is 5,000 parts per million (ppm); 15-minute, short-term exposure limit is 30,000 ppm

## HANDLING DRY ICE

Dry ice can come in flake, pellet or block forms. Use the following precautions when handling dry ice in any form:

- Wear appropriate eye protection, including goggles and/or a face shield, as well as a laboratory coat.
- Use tongs to handle dry ice when possible.
- Use loose-fitting, thermally insulated gloves to manually handle dry ice. Nitrile exam gloves will not provide enough protection. **Never handle dry ice with bare hands.**

## STORAGE AND DISPOSAL

- Always store dry ice in a well-ventilated location.

- Do not store dry ice in confined areas with limited ventilation. This includes cold rooms, walk-in refrigerators and environmental chambers.
- Never store dry ice in a tightly sealed container, such as a plastic or glass bottle, or any container with a screw-top lid that will not vent. Styrofoam is an appropriate storage material since it is both insulated and not airtight.
- To dispose of dry ice, place it in a well-ventilated area at room temperature; the remainder of the ice will sublimate away.
- Never dispose of dry ice in a trash can, chemical waste container or other garbage/waste can.
- Never dispose of dry ice in a sink, toilet or other fixture; the temperature difference can destroy the plumbing.
- Do not leave dry ice unattended in open areas.

## TRANSPORTING DRY ICE

- Only package dry ice in containers that are appropriate (i.e., non-sealable and not damaged by cold temperatures).
- All packaging must allow for release of CO<sub>2</sub> gas. Never seal a container with dry ice in it.
- If you receive or see a container that appears swollen or bulging, or if you suspect dry ice is improperly placed in a sealed container, secure the area and call 911. Do not try to release pressure on your own, which can cause serious injury.
- When shipping commercially (e.g., FedEx, UPS, USPS), reference EH&S's webpage on [Shipping Hazardous Materials](#).
- If applicable, take the online class "[Shipping Dry Ice with Non-Dangerous Goods](#)" every two years.

For questions about working with dry ice, contact EH&S at 206.543.7262.