Dry Ice Safety

What is Dry Ice?

Dry ice is the solid form of carbon dioxide. It is non-combustible and is available in flakes, pellets, or block form.

Dry ice is extremely cold, with a temperature of -79˚ C.

Dry ice will sublimate into Carbon Dioxide (CO2) gas at a temperature of -78.5 C (-109.3 F) or higher.

Dry ice is commonly used to cool reactions or to ship biological specimens.



Hazards of Dry Ice

Dry ice is considered hazardous for three reasons:

* Explosion hazard: dry ice releases a large volume of carbon dioxide gas as it sublimates. If packaged in a container that does not allow for release of the gas, it may explode, causing personal injury or property damage.
* Suffocation hazard: a large volume of carbon dioxide gas emitted in a confined space, or other unventilated area (e.g. cold room) may create an oxygen deficient atmosphere.
* Contact hazard: dry ice is a cryogenic material that causes severe frostbite upon contact with skin.

Handling Dry Ice Safely

 Dry ice must be stored in a well-ventilated location. NEVER store dry ice in a cold room, warm room, or storage closet unless adequate supply ventilation is provided.

* Dry ice cannot be stored in any type of tightly sealed device such as an ultra-low freezer, plastic/glass container, or other enclosed space. Store dry ice in a stryofoam chest, insulated cooler or a special cooler designed for the storage of dry ice (i.e. allows for the release of carbon dioxide gas).
* NEVER handle dry ice with your bare hands. Always wear thermal gloves to reduce risk of thermal burns to the skin.
* Dispose of unneeded dry ice by:
  + Letting the unused portion sublimate in a well-ventilated area.
  + NEVER dispose of dry ice in a sink, toilet or other device. Such action can destroy the structure because of the temperature difference.
  + NEVER dispose of dry ice in the trash or garbage.
  + NEVER leave unneeded dry ice in hallways or other public areas.
* Do not place dry ice on a tiled or solid surface countertop as the extreme cold will cause damage.
* Never transport hazardous materials in your personal vehicle. If you transport dry ice in an approved university vehicle, it must be stored in the trunk or location apart from the driver.

*Dry Ice is frozen Carbon Dioxide.  Unlike most solids, it does not melt into a liquid, but instead changes directly into a gas.*

Storage Instructions:

* Store Dry Ice in an insulated container.  The better the insulation, the slower the Dry Ice sublimation.  Do not store Dry Ice in a refrigerator or a freezer (unless the Dry Ice is being used to maintain the proper holding temperature).
* Do not store Dry Ice in an airtight container; never store in a glass container.  The sublimation of Dry Ice into Carbon Dioxide gas will cause an airtight container to expand, rupture, or burst.
* Always store Dry Ice in a well-ventilated area.  Avoid storing Dry Ice in an unventilated room, cellar, or automobile.  The sublimated Carbon Dioxide gas will sink to low areas and replace oxygenated air.  Carbon Dioxide gas at elevated concentrations may be fatal when breathed.
* Some surfaces left in direct contact with Dry Ice may be damaged by the extreme cold.  Adhesives may become brittle and break.

Ventilation Requirements:

* Air is composed of 78% Nitrogen, 21% Oxygen and only 0.035% Carbon Dioxide.  If the concentration of CO2 in the air rises above 0.5%, it becomes dangerous.
* Carbon Dioxide is heavier than air and will accumulate in low spaces.  Do not enter closed Dry Ice storage areas without first ventilating the space.