



## STANDARD OPERATING PROCEDURE SAFE HANDLING OF DRY ICE

1. PURPOSE & SCOPE
  - 1.1. This procedure describes methods for safely using, storing, and handling dry ice. This procedure applies to all University of Notre Dame personnel whose work involves Dry Ice.
2. HAZARD DESCRIPTION:
  - 2.1. Dry ice is the solid form of carbon dioxide that is available in flakes, pellets or block form and is non-combustible
  - 2.2. Dry Ice will sublime (vaporize directly to the gas state) at a temperature of -78.5C (-109.3F) or higher. Dry ice will sublimate about 5 to 10 pounds every 24 hours (blocks last longer) in a typical storage cooler.
  - 2.3. Handle dry ice with appropriate insulated gloves. Using bare hands can result in burns/frostbite to the skin in a short period of time.
  - 2.4. Use of dry ice in poorly ventilated areas can result in the depletion of the oxygen level resulting in asphyxiation.
  - 2.5. Placing dry ice into a tightly sealed container can produce sufficient gas build up to cause an explosion.
3. RESPONSIBILITIES
  - 3.1. Principal Investigators shall ensure this procedure is implemented in their work areas and labs.
  - 3.2. University personnel responsible for shipping packages containing dry ice must be properly trained in the Department of Transportation (DOT) and/or International Air Transportation Association shipping requirements. Training is available online: [Dry Ice Shipping Training](#)
    - 3.2.1. General shipping requirements:
      - Dry ice must be packaged in containers that allow the release of CO<sub>2</sub> gas.
      - Packages must be labeled with the MISCELLANEOUS LABEL.
      - Packages must be marked next to the miscellaneous label with the UN NUMBER and the PROPER SHIPPING NAME.
      - The NET WEIGHT of dry ice must be marked on the outside of the package.
      - The SHIPPER'S DECLARATION should NOT be COMPLETED UNLESS dry ice is used as a refrigerant for shipment of another dangerous good that requires the completion of the Shipper's Declaration. Do not complete the Shipper's Declaration for shipping diagnostics or biological products on dry ice.

4. CONTROLS:
  - 4.1. Dry ice is to be stored in a well-ventilated location and placed in a Styrofoam, chest, insulated cooler, or a special cooler designed for the storage of dry ice.
  - 4.2. Because of the thermal expansion of dry ice (one pound of dry ice produces about 250 liters of gaseous carbon dioxide), do not store in a tightly sealed container.
  - 4.3. Do not use or store dry ice in confined areas, walk-in refrigerators, environmental chambers or rooms without ventilation.
  - 4.4. Dry ice baths should be open to the atmosphere to avoid pressure build up.
  - 4.5. Storage containers require hazard communication labeling. See Appendix A for an example label.
  - 4.6. Personnel handling dry ice shall be trained on the hazards (Section 2 of this procedure).
5. PERSONAL PROTECTIVE EQUIPMENT (PPE):
  - 5.1. Safety goggles, cryogenic gloves, lab coat or lab apron must be worn when handling dry ice.
6. DISPOSAL OF UNNEEDED DRY ICE:
  - 6.1. Let the unused portion sublimate (recommended for well-ventilated areas because it will happen over several days and ventilation will take care of the gas liberation).
  - 6.2. Never dispose of dry ice in a sink, toilet or other drain.
  - 6.3. Never dispose of dry ice in the trash or garbage
  - 6.4. Never leave surplus dry ice in the corridors.
7. FREQUENCY OF REVIEW:
  - 7.1. RMS will review SOP on an annual basis.
  - 7.2. Review date will be added to SOP upon review.
8. REFERENCES:
  - 8.1. [OSHA Quick Fact on Dry Ice](#)
  - 8.2. [Dry Ice MSDS \(Air Gas\)](#)
  - 8.3. University of Rochester "[Dry Ice Handling Procedures](#)"
  - 8.4. Stanford University "[General Use SOP for Cryogenic Liquids](#)"

Appendix A

Example Hazard Communication Label

