

TOSHA HAZARD ALERT



DRY ICE

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What is Dry Ice

Dry ice is the solid form of carbon dioxide (CO₂) which converts directly to carbon dioxide gas at -78°C (-109°F). Carbon dioxide gas is a colorless, odorless gas. Typically found in flakes, pellets, or block form, dry ice is commonly used by pharma distributors, hospitals, and other healthcare facilities to ship and maintain pharmaceuticals at their appropriate temperature.

What are the Hazards

- Dry ice is an extremely cold solid which may cause burns to the skin or frostbite.
- Dry ice will sublime (change from solid to gas) at any temperature above -109 °F. This releases potentially substantial volumes of CO₂ (1 pound solid is approximately 250 liters gas), which can displace oxygen quickly in the air around the dry ice. This can create an asphyxiation hazard; causing dizziness, headaches, difficulty breathing, loss of consciousness and death.
- When dry ice sublimates, the outgassing may also cause hypercapnia, elevated carbon dioxide levels present in blood.
- Due to the rapid emission of large volumes of CO₂ gas, dry ice stored in a sealed container can pressurize the container. Given enough time at normal room temperature, such a container may rupture if the gas is not able to escape.
- TOSHA's permissible exposure limit (PEL) is 10,000 ppm (18,000 mg/m³) and the short term exposure limit (STEL) is 30,000 ppm (54,000 mg/m³).

Proper Storage

- Dry ice should always be stored in well-ventilated locations.
- Dry ice should be stored in insulated, ventilated storage areas, chests, insulated coolers, or specially designed coolers for dry ice.
- Never store dry ice in tightly sealed containers that would prevent CO₂ from venting.
- Do not store in a confined space, walk-in cooler, refrigerator, environmental chambers, or rooms without ventilation.

Personal Protective Equipment (PPE)

- Wear appropriate eye protection, including goggles and/or a face shield.
- Wear loose-fitting thermally insulated gloves (e.g., leather or cloth) to manually handle dry ice.
- Never handle dry ice with bare hands.
- Inspect gloves thoroughly prior to each use.
- Protective clothing such as long-sleeved shirts, lab coats, or aprons may be necessary to prevent skin exposure.

Training

- Employers must train employees to use the appropriate personal protective equipment (PPE) according to 29 CFR 1910.132.
- Training for PPE shall be repeated when the workplace changes, the type of PPE changes, or when inadequacies in employees' knowledge or use occur.
- Employers must train employees on the hazards associated with dry ice in accordance with the Hazard Communication Standard, 29 CFR 1910.1200 and the TN Right-To-Know law, TDLWD Rule 0800-01-09. Training must include an explanation of labels received on shipped containers, the workplace labeling system, and the safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information.
- Training for hazard communication shall be repeated annually, per the TN Right-To-Know Law.

Fatal Facts: Asphyxiation Fatality



A 47-year-old co-owner of a restaurant business died when he became locked in a walk-in cooler containing a large amount of dry ice. Electrical power on a Friday evening was lost to the building complex where the business was located. Between 400 and 500 pounds of dry ice was purchased to prevent the loss of food in the cooler. The dry ice was placed in the cooler around midnight. On Sunday afternoon, the electrical power was restored to the building and the victim entered the business Sunday night to determine if the food had been saved. When he entered the walk-in cooler, the door closed behind him and locked. The inside lock-release mechanism was broken and had been missing for an extended period of time. The hole in which the release shaft should have been located was filled with putty to prevent loss of cold air; the release mechanism was on a shelf outside the cooler. The victim was unable to exit the cooler and was discovered on Monday morning. He had succumbed to the high levels of carbon dioxide in the cooler from sublimation of the dry ice.

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