

GENERAL INFORMATION

Dry Ice is frozen carbon dioxide, a normal part of our earth's atmosphere. It is the gas that we exhale during breathing and the gas that plants use in photosynthesis. It is also the same gas commonly added to water to make soda water. Dry Ice is particularly useful for freezing, and keeping things frozen because of its very cold temperature: -109.3°F or -78.5°C . Dry Ice is widely used because it is simple to freeze and easy to handle using insulated gloves. Dry Ice changes directly from a solid to a gas -sublimation- in normal atmospheric conditions without going through a wet liquid stage. Therefore it gets the name "dry ice."

As a general rule, Dry Ice will sublimate at a rate of five to ten pounds every 24 hours in a typical ice chest. This sublimation continues from the time of purchase, therefore, pick up Dry Ice as close to the time needed as possible. Bring an ice chest or some other insulated container to hold the Dry Ice and slow the sublimation rate. Dry Ice sublimates faster than regular ice melts but will extend the life of regular ice.

It is best not to store Dry Ice in your freezer because your freezer's thermostat will shut off the freezer due to the extreme cold of the Dry Ice! Of course if the freezer is broken, Dry Ice will save all your frozen goods. Commercial shippers of perishables often use dry ice even for non frozen goods. Dry ice gives more than twice the cooling energy per pound of weight and three times the cooling energy per volume than regular water ice (H_2O). It is often mixed with regular ice to save shipping weight and extend the cooling energy of water ice. Sometimes dry ice is made on the spot from liquid CO_2 . The resulting dry ice snow is packed in the top of a shipping container offering extended cooling without electrical refrigeration equipment and connections. Caution: Keep Dry Ice away from children if they cannot be closely supervised at all times.

HANDLING

Dry Ice temperature is extremely cold at -109.3°F or -78.5°C . Always handle Dry Ice with care and wear protective cloth or leather gloves whenever touching it. An oven mitt or towel will work. If touched briefly it is harmless, but prolonged contact with the skin will freeze cells and cause injury similar to a burn.

STORAGE

Store Dry Ice in an insulated container. The thicker the insulation, the slower it will sublimate. Do not store Dry Ice in a completely airtight container. The sublimation of Dry Ice to Carbon Dioxide gas will cause any airtight container to expand or possibly explode. Keep proper air ventilation wherever Dry Ice is stored. Do not store Dry Ice in unventilated rooms, cellars, autos or boat holds. The sublimated Carbon Dioxide gas will sink to low areas and replace oxygenated air. This could cause suffocation if breathed exclusively. Do not store Dry Ice in a refrigerator freezer. The extremely cold temperature will cause your thermostat to turn off the freezer. It will keep everything frozen in the freezer but it will be used up at a faster rate. It is the perfect thing if your refrigerator breaks down in an emergency. There are also Commercial Storage Containers available.

VENTILATION

Normal air is 78% Nitrogen, 21% Oxygen and only 0.035% Carbon Dioxide. If the concentration of carbon dioxide in the air rises above 0.5%, carbon dioxide can become dangerous. Smaller concentrations can cause quicker breathing but is otherwise not harmful. If Dry Ice has been in a closed auto, van, room, or walk-in, for more than 10 minutes, open doors and allow adequate ventilation before entering. Leave area containing Dry Ice if you start to pant and breath quickly or your fingernails or lips start to turn blue. This is the sign that you have breathed in too much CO₂ and not enough oxygen. Dry Ice CO₂ is heavier than air and will accumulate in low spaces. Do not enter closed storage areas that have or have had Dry Ice before airing out completely.

PICK-UP TIME AND TRANSPORTING

Plan to pick up the Dry Ice as close to the time it is needed as possible. It sublimates at 10%, or 5 to 10 pounds every 24 hours, whichever is greater. Carry it in a well-insulated container such as an ice chest. If it is transported inside a car or van for more than 15 minutes make sure there is fresh air. After 15 minutes with Dry Ice only in its paper bag in the passenger seat next to me, I started to breathe faster and faster as though I were running a race. I couldn't figure out why I was so out of breath until I saw the car air system was set in the re-circulated position, not fresh outside air.

BURN TREATMENT

Treat Dry Ice burns the same as a regular heat burns. See a doctor if the skin blisters or comes off. Otherwise if only red it will heal in time as any other burn. Apply antibiotic ointment to prevent infection and bandage only if the burned skin area needs to be protected.

COUNTERTOPS

Do not leave Dry Ice on a tiled or solid surface countertop as the extreme cold could crack it.

DISPOSAL

Unwrap and leave it at room temperature in a well-ventilated area. It will sublimate from a solid to a gas.

DO NOT leave Dry Ice unattended around children.

SHIPPING REFRIGERATED OR FROZEN ITEMS

From frozen lasagna to chocolates. From human tissue to prescription drugs - more and more goods are shipped refrigerated or frozen.

First and most important a good insulated container is needed. An inexpensive styrofoam cooler from the grocery store will rarely work. It breaks easily and usually is not the right shape for shipping. A thick poly styrene box like Omaha Steaks uses or one from ThermoSafe, or the newest box from Control Temp Packaging will reduce the amount of dry ice needed and allow extended shipping times.

Next is the shipping temperature. Use Dry Ice for shipping FROZEN goods as Dry Ice will freeze everything in the shipping box. Use "gel packs" or "blue ice" for goods to be REFRIGERATED. A combination of dry ice and gel packs will extend the shipping time by several days if the shipped items can be frozen for a short time or thawed for a short time.

For Dry Ice plan on using 5 to 10 pounds for each 24-hour period depending upon the quality of the insulated shipping container. This will keep everything frozen in a container up to 15 quarts. For larger containers and greater shipping times multiply dry ice quantities by this rate. The best shipping container is a two-inch thick urethane insulated box tested to lose only 5 pounds for a 10-quart storage volume every 24-hours. Newer materials developed for Control Temp Packaging in Norcross, GA have tested nearly the same as urethane. Less thick or efficient insulation will need more Dry Ice because it will sublime faster.

For gel packs, as a generality use one pound per cubic foot per day. (Most gel packs come in 1/2 pound size but newer ones are up to 2 pounds.) This will be last for up to three days. For a longer time Dry Ice has to be combined to extend the gel packs with the possibility of freezing the goods briefly in the beginning.

When packing items in the container put dry ice any gel packs and the product as close together as possible with the dry ice on top. Fill any empty space with wadded newspaper or Styrofoam peanuts as any "dead-air-space" will cause the Dry Ice to sublimate faster.

Dry Ice sublimation (changing from a solid to a gas) will vary depending on the outside temperature, air pressure (on an airplane with lower air pressure it will sublimate a little faster) and efficiency of the insulation. The more Dry Ice you have stored in the container, the longer it will last. Dry Ice, at -109.3°F or -78.5°C, will freeze and keep frozen everything in the container until it is completely sublimated. These frozen items will still take some extra time to thaw because they will have been so cold.

FOR MORE INFORMATION GO TO WWW.DRYICEINFO.COM