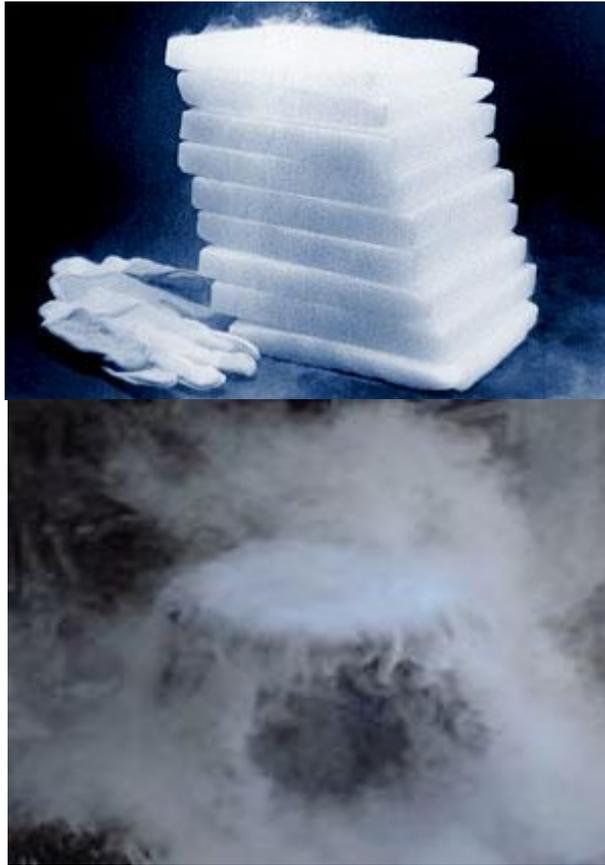


North Hollywood Ice Co.

Dry ice

Uses and Precautions



Contacting

North Hollywood Ice Co.

(818)-762-2237 (310)-860-1030 (323)-465-5538

11317 Chandler blvd. North Hollywood CA, 91601

IMMEDIATE DELIVERY*24 Hour a day*7 Days a week

Handling Dry Ice



- **Do Not Handle With Bare Hands.** Dry ice can cause severe burns if not properly handled. Prevent direct contact with skin with cloth gloves, tongs, cloth, etc...
- **DO NOT PUT IN MOUTH** or attempt to taste dry ice. Small chunks of dry ice can be a choking hazard as well as a burn hazard.
- **DO NOT INHALE.** Dry ice is solid carbon dioxide and will deplete oxygen, which will cause suffocation. Be sure to provide adequate ventilation when utilizing dry ice. If dry ice is being used in walk in freezer use the buddy system to enter the freezer.
- **DO NOT CONFINE IN STOPPERED BOTTLE.** If dry ice is confined in a container the gases will expand to the point of explosion. Shrapnel from the container can be dangerous.



Wound after dry ice was placed in bottle and topped off.

Storing and Shipping Dry Ice

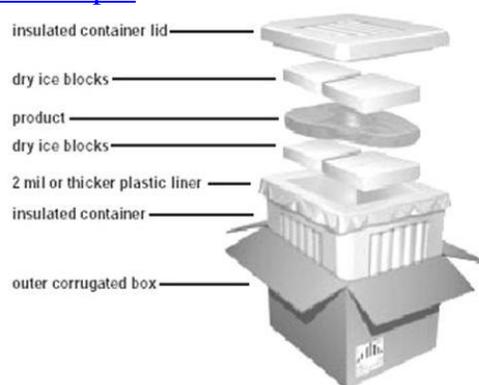


- **DO NOT LEAVE DRY ICE ON A TILED COUNTER TOP.** Dry ice will crack a glass or tiled countertop if applied long enough.
- **DO NOT STORE DRY ICE IN A REFRIGERATOR OR FREEZER.** Unlike regular ice dry ice keeps its self-cold if provided proper insulation. When storing dry ice place it in a Styrofoam or other type of picnic cooler. If a cooler is not available wrap dry ice in a poly bag then in a newspaper or towel. Remember the better insulation that is provided, the longer your dry ice will last.
- **HOW TO TRANSPORT AND STORE DRY ICE UNTIL READY TO USE**
The best container to transport and store Dry Ice is an ice chest. It will still sublimate 5 to 10 pounds each 24 hours, so plan to pick up the Dry Ice as close as possible to the time it will be used. Dry Ice is very cold so use insulated gloves to handle it. Do not store Dry Ice in your refrigerator freezer. The extremely cold temperature will cause your

thermostat to turn off your freezer. (But it will keep things frozen if your refrigerator breaks down in an emergency.) 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 until a hole opens or it explodes.

- **SHIPPING DRY ICE.** **Hazardous Material Declaration Form.** A hazardous material declaration form must be filled out and submitted to Environmental Health and Safety (EHS) for any dry ice shipment whether it contains a hazardous material (dangerous good) or not. This is important to ensure all dry ice shipments are categorized and labeled properly. Samples that contain no hazardous materials can be processed the same day. Those that do contain hazardous material could take up to a week to process. You can determine whether a material is a hazardous material by going to the following table: <http://www.myregs.com/dotrspa/>. Please plan ahead. A hazardous material declaration form can be obtained at: <http://www.ehs.neu.edu/dot/declaration.pdf>.

Training. Only personnel that have received United States Department of Transportation (DOT) Hazardous Material training can ship packages containing dry ice if it is shipped by air or water. Personnel at EHS have received this training and are able review packaging, labeling, shipping papers and will authorize the shipment for you. If the shipment contains a hazardous material, a representative from EHS must sign the "Shippers Declaration of Dangerous Goods" for you (unless you have received DOT training).



Packaging. Packages for dry ice must allow for the release and venting of gaseous carbon dioxide. The material you're shipping and the dry ice must be enclosed in a Styrofoam box with a sturdy cardboard outer cover. Shipping companies are not accepting Styrofoam boxes as outer layers.

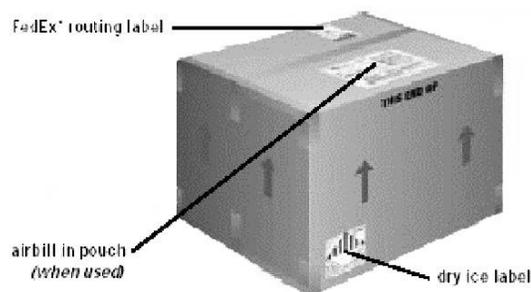
Labeling. The class 9 miscellaneous "dry ice" label is provided free by FedEx; you may order them through their toll free number 1•800•Go•FedEx, or (800-463-3339). This label satisfies the US Department of Transportation (DOT) and International Air Trade Association (IATA) marking and labeling requirements when accurately completed. The dry ice label must be outside the outer container. Please remove or obliterate any existing labels on a box that you may be reusing. Clearly mark outer packaging on the same side with:



1- Sender and Recipient

From: Your Name
Name
Department Name

To: Recipient's
Address



Northeastern University
Boston, MA, 02115

City, State, Zip

2- A DOT shipping class 9, miscellaneous label
3- Marking on the label the following information:

- UN1845
- Dry Ice
- Net weight of dry ice in kilograms.

4- These markings are in addition to markings that may be required by the sample if it is a hazardous material. Please note until January 1, 2005, the "Air Eligible" label is optional.

Air Bill. The air bill (Figure I) must be filled out properly and can be signed by the shipper (you) once all paperwork and packaging has been reviewed by a representative of EHS. If the shipment contains a hazardous material, then the Shipper's Declaration of Dangerous Goods (Figure II) must be signed by a representative of EHS. **Please note:** EHS will require a copy of the air bill and Shipper's declaration of dangerous goods for its files, so the forms can be maintained for the appropriate period of time as required by DOT.

Figure I

FedEx. US Airbill
Express
FedEx Tracking Number 846988274931

1 From Please print and press hard.
Date May 10, 2004 Sender's FedEx Account Number Account Number
Sender's Name J. Price Phone (617) 373 2769
Company Northeastern University
Address Office of Environmental Health and Safety, 229 Forsyth Building
City Boston State MA ZIP 02115-5000

2 Your Internal Billing Reference OPTIONAL
First 24 characters will appear on invoice.

3 To
Recipient's Name Chemical Hygiene Officer Phone (781) 581 7370
Company Marine Science Center
Recipient's Address 430 Nahant Road
City Nahant State MA ZIP 01908

4a Express Package Service
 FedEx Priority Overnight Next business morning*
 FedEx Standard Overnight Next business afternoon*
 FedEx First Overnight Earliest next business morning delivery to select locations*
 FedEx 2Day Second business day*
 FedEx Express Saver Third business day*
FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service Packages over 150 lbs.
 FedEx 1Day Freight*
 FedEx 2Day Freight Second business day*
 FedEx 3Day Freight Third business day*
* Call for confirmation.

5 Packaging * Declared value limit \$500
 FedEx Envelope*
 FedEx Pak* Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
 FedEx Box
 FedEx Tube
 Other

6 Special Handling
 SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes.
 HOLD Weekday at FedEx Location NOT Applicable for FedEx First Overnight.
 HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.
Does this shipment contain dangerous goods?
 No Yes As per attached Shipper's Declaration Yes Shipper's Declaration not required Dry Ice 1 3 kg
Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging. Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.
 Sender Acct. No. in Section 1 will be billed.
 Recipient Third Party Credit Card Cash/Check
FedEx Acct. No. Exp. Date
Credit Card No.

Total Packages Total Weight Total Declared Value*
\$.00
*Our liability is limited to \$100 unless you declare a higher value. See back for details. FedEx Use Only

8 Sign to Authorize Delivery Without a Signature
By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.
467
Rev. Date 11/03-Part #190291-4©1994-2003 FedEx-PRINTED IN U.S.A. MWA 01 **

Figure II

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least three copies to the airline)

Shipper _____ Air Waybill No. _____
 Page 1 of 1 Pages
 Shipper's Reference Number (optional) _____

Consignee _____

FedEx

Two completed and signed copies of this Declaration must be handed to the operator.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: (delete non-applicable)

PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY
------------------------------	---------------------

Airport of Departure _____

Airport of Destination: _____

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder, or an IATA cargo agent.

Shipment type: (delete non-applicable)

NON-RADIOACTIVE	RADIOACTIVE
-----------------	-------------

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification					Quantity and type of packaging	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN or ID No.	Pack-ing Group	Subsi-dary Risk			

Additional Handling Information _____

Emergency Telephone Number _____

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations.

Name/Title of Signatory _____
 Place and Date _____
 Signature _____
 (see warning above)

FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT.

FedEx M-1421 10/02 LOGOS# 2041730848 MWI

Questions. If you have questions or require additional information, please contact Environmental Health and Safety at x2769.

Disposal of unused dry ice

- **DO NOT LEAVE DRY ICE AROUND CHILDREN.** Dry ice being solid carbon dioxide is a normal part of our earth's atmosphere. So when disposing of dry ice it is ok to leave outside. Unwrap dry ice and leave in well-ventilated area to avoid suffocation. Dry ice sublimates (goes from solid to gas) at a higher rate when exposed to moisture, and air or wind.

Calculating Dry Ice

- **Vertical Uprights** – Freezing: 30 lbs. per door or approximately 750 lbs per isle.
Refrigerating: 20 lbs per door or approximately 500 lbs per isle
- **Dairy Cases** – Freezing: 100 lbs per 10 ft
Refrigerating: 60 lbs per 10 ft
- **Coffin Cases** – Freezing: 100 lbs per 10 ft
- **Meat Freezers** – Calculate 3 lbs. per Square ft.
- **DRY ICE FOG**
Dry Ice when combined with hot tap water can produce vigorous bubbling water and voluminous flowing fog. For example, with 5 pounds of Dry Ice in 4 to 5 gallons of hot water, the greatest amount of fog will be produced the first 5 to 10 minutes. There will be far less fog for the next 5 to 10 minutes as the water-cools down and the volume of Dry Ice diminishes. As the water-cools, the fog becomes wispiers. Dry Ice makes fog because of its cold temperature, -109.3°F or -78.5°C, immersed in hot water, creates a cloud of true water vapor fog. When the water gets colder than 50°F, the Dry Ice stops making fog, but continues to sublime and bubble. The fog will last longer on a damp day than on a dry day.

- **HOW TO MAKE FOG**

For each 15-minute period put 5 to 10 pounds of Dry Ice into 4 to 8 gallons of hot water. This will make lots of fog depending upon the temperature of the water and the size of the pieces of Dry Ice. Hotter water will make more fog. Very hot water will add its own rising steam to the vapor cloud. If there is no steam the fog will flow down hill and in the direction of any air movement. A small fan can help control the direction. Smaller pieces of Dry Ice with more surface area produce a greater volume of fog and cool the water down much faster. In both cases the result is more fog for a shorter amount of time. Keep the water hot with a hot plate, electric skillet, or some other heat source to produce fog for a longer time. Otherwise when the water gets too cold it must be replaced to continue the fog effects. If the container is completely filled with water the fog will flow over the sides the best. But the Dry Ice sublimation will vigorously bubble the water and splash it out. Even a $\frac{3}{4}$ filled container will splash some so place the container where spilled water will not ruin anything. The water vapor fog will also dampen the area it flows across. Be careful because after some time floors do get slippery.

Application	Amount	Duration
Witches Punch	3 to 5 lbs	Up to $\frac{1}{2}$ an hour
Pumpkins	3 to 5 lbs	Up to $\frac{1}{2}$ an hour
Witches Pot	5 to 15 lbs	Up to an $\frac{3}{4}$ hour
Small Room (Use 2 Pots)	15 to 30 lbs	Up to an hour

Large Room (Use 3-4 Pots)	50 lb package	Up to an hour
Swimming Pool (unheated)	50 lb package	1 to 2 hours
Patio (No Wind)	50 to 100 lbs	1 to 2 hours

- **POOL & JACUZZI**

50 to 100 pounds of Dry Ice dropped directly into a heated swimming pool will make fog for an hour or longer depending on the water temperature and the size of the Dry Ice pieces. Because of the Jacuzzi's hot water, it makes the most fog the quickest. As long as the water is kept hot, it can take 50 to 100 pounds per hour. The Dry Ice will carbonate the water for several days. If possible drain the Jacuzzi. The swimming pool will read more alkaline during this time so wait to add acid until the carbonation has dissipated. If the temperature of the water in a swimming pool, fountain, waterfall, or birdbath is too cold (less than 60°F) the Dry Ice will bubble but produce much less fog.

- **ADD DRY ICE TO BEVERAGES**

It is OK to put Dry Ice into beverages for drinking as long as the dry ice is food grade. Use 2 to 4 pounds of Dry Ice for each gallon of room temperature punch. Use large pieces of Dry Ice not small pieces. The Dry Ice is heavier than ice and will sink to the bottom. Do not use any regular ice! The Dry Ice will do the cooling and must not be eaten or swallowed. Too much Dry Ice will freeze the beverage so have extra standing by. It will bubble and give off the most fog when the beverage is room temperature. When most of the Dry Ice has sublimated, it will surround itself with ice and float to the top. There is still a small piece of Dry Ice in the center of these ice pieces so do not serve or eat them. Carefully ladle the beverage into drinking

glasses without any Dry Ice. Add regular ice to glasses for cooler drinks.

** (Food grade means the CO₂ used to make the dry ice is the same quality CO₂ as used for soda fountains and also the dry ice can be used to transport food and produce.)

- **WITCHES BREW**

A first grade teacher gave me the best recipe for "witches brew": 1 can Grape Juice. (Dark color) 1 can Pineapple Juice. (Strange pulpy texture) 3-5 pounds of food grade Dry Ice. (Do not use regular ice) Mix room temperature juices together. When ready for special brew add the Dry Ice. Do not touch Dry Ice directly, but use insulated gloves or tongs. Ladle juice into cups without any Dry Ice and it will be perfectly safe. If you want cooler drinks add ice to the cups not the punch bowl.

- **STAGE PRODUCTIONS**

Using a fog machine or buckets of hot water and a fan, many shows are enhanced by adding flowing fog. I have seen it most often in the dance of the snowflake fairies in the Nutcracker Suite, and it is frequently used in Brigadoon and Oklahoma for their dream scenes.

- **FOG MACHINES**

A theater fog machine is generally a 30 to 55-gallon metal or plastic water barrel with a 110-volt or a 220-volt hot water heater to keep the water hot. Dry Ice is placed in a bucket with holes to allow hot water to enter. When the bucket is lowered into the hot water fog is instantly produced. The resulting water vapor fog is gently blown by a fan and directed to the desired area by an air duct tube. Fog stops whenever the bucket of Dry Ice is pulled out of the water. More modern fog machines pump heated water over a tray holding the Dry Ice.

- **GARBAGE DISPOSAL VOLCANO**

A fantastic simulated volcano can be made in a sink with a garbage disposal. Run hot water and put one to two pound pieces Dry Ice into your garbage disposal. When you turn the disposal on it will make a marvelous eruption. Be sure to wear goggles as the hot water and ejected Dry Ice could be dangerous. See also Volcano in our "Science/School Projects" section.

- **DRY ICE "FIRECRACKERS"**

Small pieces of Dry Ice placed in an empty one liter plastic soda bottle and then filled $\frac{1}{4}$ to $\frac{1}{2}$ with hot water may explode 2 to 120 seconds after the top is tightly screwed on. It also may crack anywhere and just fizzle. Wear gloves and eye protection because the resulting explosion may dangerously push out pieces of the plastic bottle or the bottle top. A woman in Houston standing too close lost her eye from the ejected bottle top, so make sure no one is holding the bottle nor anyone is near it when it explodes. Although the explosion sprays mostly carbon dioxide gas and water, many municipalities classify them with more dangerous firecrackers and outlaw them. Southern Utah's "Spectrum", reports: "It's a felony to drop a dry-ice bomb in Utah." Sometimes these dry ice bombs are called "terrorist devices" and people using them are arrested. In our area several teenagers were jailed for three days for setting off these Dry Ice firecrackers. The logical defense explains there is no chemical reaction - only a change in the state of matter - from a solid to a gas. Unfortunately there may be a high cost in lawyers fees to persuade a DA or judge of this fact. Therefore **DO NOT DO THIS IF IT IS ILLEGAL IN YOUR COMMUNITY!** For safety **DO NOT EVER ALLOW CHILDREN TO DO THIS.** Always supervise children around Dry Ice. Of course using anything other than plastic bottles is even more dangerous and by no means should ever be permitted!

Basic How to Use Guide

- **For Freezing** – Dry ice must be placed on top of items. Dry ice smoke will circulate adequately when placed on top of items. Do not allow direct contact with fish or meat. Freezer burn damage may result.
- **For Cooling** – Place dry ice in bottom of cooler, cover with wet ice or insulating material, then place food, cans etc... Do not allow direct contact with dry ice.
- **Approximate Cooling times:**
 - 5-7lbs. – 18 to 24 hours
 - 8-12lbs. – 24 to 40 hours
 - 13 to 20lbs. – 40 to 60 hours

Ordering your dry ice from North Hollywood Ice Co.

In the event of a power failure, refrigeration repair, or a natural disaster, it is always necessary to have a back-up freezing source in order to keep from losing an entire inventory. This is the fundamental purpose of dry ice. At a temperature of - 109 degrees Fahrenheit, its very presence in a restricted area creates chilled to freezing temperatures depending on the quantity used.

Dry ice is made from Carbon Dioxide gas, which is compressed into a solid. Because of its gaseous origin, dry ice sublimates, it does not melt. Once solidified it is a very dense mass. This makes it relatively heavy for its dimensions. A 50lb block for example only measures 11”high x 9” square.

Dry Ice is harmless to foods unless there is direct physical contact where it can cause the food to burn at the spot where contact was made

otherwise there is no danger from its cooling effects.

Upon ordering we deliver dry ice in standard 50 lb. blocks. Each block is cut into 5 slices each weighing 10 lbs. each. These slices are placed from top to middle shelves of target area, as cold air will drop to bottom levels. If power is still available but only refrigeration is down, it is best to leave off any fans running as this will circulate the cold air increasing the dry ice effectiveness.

So for any questions, concerns, or even to place an order, please do not hesitate to call North Hollywood Ice Co. We take calls 24 hours a day and one of our friendly ice consultants would love to assist you with all your ice needs.