

Liquid Nitrogen Safety Information Form

You must read this information carefully and sign the bottom before being able to check out liquid nitrogen (LN₂) and a Dewar from the LSU Department of Chemistry.

Liquid Nitrogen: LN₂ may look like water, but it is extremely cold with a temperature of 77K, -196°C, and -321°F. More than a few seconds of contact can cause severe frostbite burns. Pouring some on unprotected skin is actually less dangerous than on clothing in contact with skin. Your skin is so hot relative to LN₂ that there is an initial shielding effect called **Leidenfrost Barrier** that offers short-term protection against the freezing effects of LN₂. You will notice this if you pour some on a non-carpeted floor. The LN₂ rolls around as if it is a little hover-craft. This is actually the case as the floor temperature is so hot relative to the very cold LN₂ that as the LN₂ comes in contact with the floor, the vaporization of LN₂ to gaseous N₂ gas to form between the LN₂ and the floor. This cushions the LN₂ and allows it to “float” above the floor. The same effect will briefly protect your skin from contact with LN₂. Thus, you can quickly dip your fingers/hand into LN₂ with no ill effect (aside from it feeling a little cold). **Keeping skin in contact with LN₂ for more than a few seconds, however, will cause enough heat to be drained away to minimize the Leidenfrost Barrier effect and allow the LN₂ to come in direct contact causing extremely serious frostbite burns.** Pouring LN₂ onto your skin from a height (over 1 foot) minimizes the Leidenfrost Barrier effect and increases the frostbite burn quickness. **Always wear safety glasses, which we provide, when doing the experiment.**

Liquid Nitrogen Dewar: The container that the LN₂ comes in is called a Dewar. This is an aluminum container with two layers and a vacuum in-between. The vacuum is the best insulator for keeping the LN₂ from evaporating too quickly. **Important note:** the LN₂ in the Dewar is boiling slowly and releasing gaseous N₂ gas continually. The Dewar has a loose “lid” which is a Styrofoam rod shown the photo. This allows the N₂ gas boiling slowly off of the LN₂ to escape the Dewar. It is not meant to be air-tight or prevent the LN₂ from spilling out of the Dewar if you tip the Dewar over. Please do not lose this foam lid or try to seal up the Dewar. The Dewar needs to be kept upright when transporting it.



Transporting a Filled LN₂ Dewar: When transporting a filled LN₂ Dewar in your car, it is very important to secure it properly. If it tips over, the LN₂ will spill out. It is important to seat belt it into a seat in your car (usually the back seat). The photos show a Dewar properly seat belted into a car. Make sure you wrap the seat belt through and around the handle of the Dewar, similar to that shown in the photos. Since the Dewar is evaporating N₂ gas constantly at a low rate, it is also important to have fresh air flowing through your car. If you are not sure of your car's air flow, open a window partially while driving with a filled Dewar of LN₂. If you are transporting a 10-liter Dewar, you may be able to place it on the floor behind the passenger front seat, for example, and push the seat back so it wedges the larger Dewar between the front seat and back seat.



Returning the Dewar: You should dump out any left-over LN₂ outside after the event before putting it back in your car. You can gather attendees at the event to witness this if appropriate. Keep any spectators back away from where you initially pour the LN₂, which can be safely dumped on pavement, sidewalks, or dirt/gravel. If you dump LN₂ on grass or plants, it could kill them, please avoid doing that. The Dewar and Styrofoam containers should be returned as soon as possible to Choppin 133. We have a limited number of Dewars for these events, so it is important to return it as soon as possible. Dewars cost \$300 to \$500 each and students not returning one in a reasonably amount of time will be charged for it.

Your signature below indicates that you have read, understand, and agree to the above instructions.

Name (printed) _____

Signature _____

Date _____