

**STANDARD OPERATING PROCEDURE**

**Liquid Nitrogen**

According to the Safety Data Sheet (SDS) for **Liquid Nitrogen** special precautions must be taken when working with this chemical. Below are some of the characteristics of **Liquid Nitrogen** followed by some recommendations in handling the chemical and finally any paperwork needed in order to use the chemical in the laboratory. This Standard Operating Procedure will be followed along with the requirements of the Chemical Hygiene Plan.

GHS Classifications: **Signal Word: Warning**

 **Pictograms: Compressed Gas Hazard**

Additional Classification:

Brief description of proposed chemical work: **Liquid Nitrogen is considered a Cryogenic liquid which is defined as a liquefied gas that is kept in its liquid state at very low temperatures. The term "cryogenic" means "producing, or related to, low temperatures," and have boiling points less than –73°C (–100°F).**

**Section 1: Brief Safety Overview:**

● The Principal Investigator is responsible for training employees using the material on site. The training should include a discussion of the known and potential hazards; an explanation of the relevant policies, techniques and procedures including the proper use of personal protective equipment, emergency/spill procedures and containment equipment (engineering controls).

● Limit access to authorized users.

● Minimize the possibility of inadvertent ingestion, inhalation and direct skin or eye contact with the substance.

● Chemical has been entered in the Chemical Inventory (EHS Assistant)

● Require annual training.

**Section 2: Research Laboratory Procedures**

* **Handling Instructions**

` Example: (Preparation of the stock solutions): **Proper laboratory procedure must be followed and employees must be trained to handle the material.** **Always use the blue gloves located in the red tool cabinet for transport.**

* **Storage:**

**When transferring liquid nitrogen through insulated metal pipes the air surrounding a cryogen containment system can condense. Nitrogen, which has a lower boiling point than oxygen, will evaporate first leaving the oxygen-enriched condensate on the surface increasing the flammability of materials near the system. Equipment containing cryogenic fluid should be kept clear of combustible materials in order to minimize the risk of a fire hazard. Liquid Nitrogen should be stored in specific containers which are not above eye level. Containers should be stored away from corrosives.**

***Location – Engineering controls***

[x]  Ventilation (example: Fume Hood, Canopy Hoods, etc.): **Well ventilated space**

[x]  Designated area (specify): **Laboratory space**

***PPE required:***

[x]  Skin/Body Protection: **Laboratory Coat (jewelry should be removed)**

[x]  Eye protection

[x]  Face shield

[ ]  Respirator (example: N95):

[x]  Hand protection (example: Nitrile gloves): **Loose fitting thermally insulated gloves to withstand extreme cold (jewelry should be removed)**

* **Cleanup/Decontamination procedures for work area after use:**

**The Liquid Nitrogen will evaporate at room temperature.**

* **Disposal Procedures**

**Unwanted Liquid Nitrogen should be removed by the distributor (example: OSU Stores).**

**Section 3: Occupational Exposures**

* **Routes of Exposure**

Skin - **Slightly Hazardous in case of eye and skin contact.**

Inhalation – **Considered an asphyxiate and is very hazardous in case of inhalation.**

Ingestion- **Slightly hazardous in case of ingestion.**

Injection-  **N/A**

* **Toxicological Effects**

Acute Effects/ Precautionary Safety Measures: **Can cause frostbite in the case of ingestion or any skin exposure. Can cause death if there is not enough ventilation.**

Chronic Effects/ Precautionary Safety Measures: **No chronic effects**

* **Occupational Exposure Response and First Aid Measures**

Skin: **Immediately warm frostbite area with warm water not to exceed 105°F (41°C). Seek immediate medical treatment.**

Eyes: **Flush eyes for at least 15 minutes while holding eyelids open. Remove contacts if they do not flush out. Seek immediate medical treatment.**

Inhalation: **Remove victim from the exposure area and take to fresh air immediately. Seek immediate medical treatment. Do not perform mouth-to-mouth resuscitation.**

Ingestion: **Do not induce vomiting. Seek immediate medical treatment.**

* **Emergency Procedure for Chemical Spills and Accidental Releases**

**Small and Large Spills:**

**Evacuate all personnel from the space, shut the door and if possible turn off the power to the room. Liquid will evaporate at room temperature.**

This Standard Operating Procedure must be placed in the Chemical Hygiene Plan and the SDS must be accessible. Also, all laboratory personnel must be familiar with safe handling practices (i.e., training with documentation of training) when working with these chemicals. This must be incorporated into the comprehensive chemical hygiene plan of the laboratory. If you have any questions regarding a comprehensive mandatory laboratory chemical hygiene plan please contact your Representative at Environmental Health and Safety (292-1284).

For any other questions or concerns, please contact:

PI contact information

Name:

Primary Contact Number:

Emergency Contact Number:

P.I. Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_