UNIVERSITY OF TORONTO MISSISSAUGA	Chemical and Physical Sciences Department	SOP #	005
		Revision #	02
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SOP Owner	Grace Flock	Approval	Grace Flock

Standard Operating Procedure: Liquid Nitrogen (N_2) Handling

WARNING: LN_2 expands 700 times its volume displacing O_2 and creating and may cause asphyxiation. IT DOES NOT SUPPORT LIFE

1. *Purpose: Safe handling of Liquid Nitrogen*

2. *Scope:* Applies to all users

3. *Prerequisites: IRM training and RMF-SST*

4. ***Responsibilities:*** it is everybody responsibility to follow SOP and to report any equipment misuse and or deficiency to the research facility manager.

5. *Personal Protection Equipment (PPE): Closed toe shoes, Long Pants, Goggles, Faceshield*




6. *Procedure:*

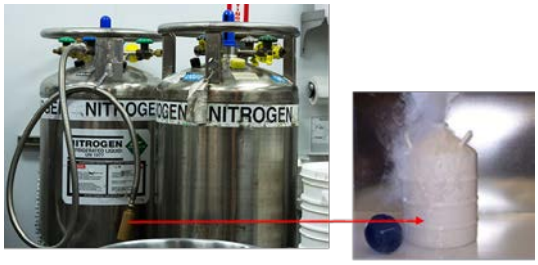
6.1 Liq N2 Storage:

Large amounts (more than 2 L) of LN_2 should always be stored in a well-ventilated area equipped with an O_2 sensor.

6.2 Handling/Dispensing LN2:

Transferring from primary container (Dewar) to large secondary containers (ex. 30L)
These containers should be stored in the cryogenic room

- Put on PPE (as above pictograms)
- Always use the specially designed containers when transporting and handling LN_2 (see below for examples)



- Open valves of primary Dewar slowly to minimize thermal effects and control gas escape
- Do not fill secondary containers to more than 80% of capacity; expansion of gases may cause pressure buildup
- If the container tips over, let it go and evacuate (yourself and all people nearby).
- Following, contact your PI.

Bench top containers: utilized for small scale use in the labs/pods

- Never dispense liquid into an unapproved container, such as a Thermos® bottle. It will shatter.
- Transfer of LN_2 can cause splashing, wear long pants, face shield and appropriated gloves (provided on location, cryogenic storage room)
- Utilize specialized withdrawal devices instead of pouring (LN_2 Pump)
- Transfer liquid slowly to prevent thermal shock, pressure buildup, and splashing.
- Always were appropriate PPE

6.3 Handling/Transporting/Thawing Cryotubes

Cryotubes used to contain samples stored under liquid nitrogen may explode without warning when handling and thawing.

When thawing cryotubes, take the following protective steps:

- Wear a face shield and safety goggles whenever handling cryogenic liquid.
- Wear appropriate insulated gloves
- Wear a buttoned lab coat and pants and closed toes shoes
- Place the cryotube in a secondary tube (example, falcon tube), as a shield, while transporting and or thawing

7.1 Emergency Response Procedure:

1) If there is a large spill or rupture of a Liq N_2 container, Evacuate. Spill may induce oxygen deficiency
2) Call 911 and Campus Police 905-569-4333.

Personal injuries:

Minor injuries:

1) Cold burns should be immediately flushed with tepid water or placed in a warm water bath.
2) Notify your PI.
3) DO NOT RUB SKIN – may damage tissue
4) Seek medical attention immediately for assessment and follow-up:
   ex: emergency department at Credit Valley Hospital or HCC at UTM DV 1123A (depending on severity)

Major injuries: call 911

8. References:

Prepared by Grace Flock (RMF manager)

Revised for University of Toronto Mississauga by Rocsana Pancescu (Chemistry Laboratory Coordinator, Davis Building, UTM Campus)