**Cryogens and Dry Ice**

Cryogenic fluids, such as liquid air, liquid nitrogen, or liquid oxygen, are used to obtain extremely cold temperatures. Most cryogenic liquids are odorless, colorless, and tasteless when vaporized. When cryogenic liquids are exposed to the atmosphere, however, they create a highly visible and dense fog. All cryogens other than oxygen can displace breathable air and can cause asphyxiation. Cryogens can also cause frostbite on exposed skin and eye tissue. Cryogenic vapors from liquid oxygen or liquid hydrogen may cause a fire or explosion if ignited.

Cryogens, as well as dry ice, can be hazardous to workers if not handled properly.Follow these guidelines when working with cryogenic liquids:

* Avoid eye or skin contact with these substances.
* Never handle dry ice or liquid nitrogen with bare hands.
* Use cryogenic gloves, which are designed specifically for working in freezers below -80°C and for handling containers or vials stored in these freezers.
* Cryogenic gloves need to be loose-fitting so that they can be readily removed if liquid nitrogen splashes into them or a piece of dry ice falls into them.
* Always use appropriate eye protection.
* Do not use or store dry ice or LN2 in confined areas, walk-in refrigerators, environmental chambers or rooms without ventilation. A leak in such an area could cause an oxygen-deficient atmosphere.
* Never place a cryogen on tile or laminated counters because the adhesive will be destroyed.
* Never store a cryogen in a sealed, airtight container at a temperature above the boiling point of the cryogen; the pressure resulting from the production of gaseous carbon dioxide or nitrogen may lead to an explosion.
* For more information about specific cryogens, read the Material Safety Data Sheet for the substance in question.
* Before working with cryogenic liquids, acquire a thorough knowledge of cryogenic procedures, equipment operation, safety devices, material properties, protective equipment usage.
* Keep equipment and systems extremely clean.
* Pre-cool receiving vessels to avoid thermal shock and splashing.
* When discharging cryogenic liquids, purge the line slowly. Only use transfer lines specifically designed for cryogenic liquids.
* Rubber and plastic may become very brittle in extreme cold. Handle these items carefully when removing them from cryogenic liquid.
* Store cryogenic liquids in double-walled, insulated containers (e.g., Dewar flasks).
* To protect yourself from broken glass if the container breaks or implodes, tape the exposed glass on cryogenic containers.
* Do not store cylinders of cryogenic liquids in hallways or other public areas.

IMPORTANT: Be aware of the tremendous expansion and threat of asphyxiation when a cryogenic liquid vaporizes at room temperature.

**First Aid**

* In case of exposure to cryogens or dry ice, remove any clothing that is not frozen to the skin. Do NOT rub frozen body parts because tissue damage may result. Obtain medical assistance as soon as possible.
* Place the affected part of the body in a warm water bath (not above 40°C). Never use dry heat.