

# Safety Topic – Liquid Nitrogen

- **Cold :77 K (–196 °C; –321 °F)**

First Degree	Superficial thickness	minor pain, lack of blisters
Second degree	Partial thickness – superficial	Blisters, clear fluid, and pain
Third degree	Partial thickness – deep	Whiter appearance
Fourth degree	Full thickness	requires grafts
Fifth degree	Subdermal	Hard, leather-like eschar, purple fluid, no sensation

- **Explosion: gas expansion ratio is 1:694**

- ❖ A tremendous amount of force can be generated if liquid nitrogen is rapidly vaporized

- **Asphyxiant**

- ❖ Dangerous because it is odorless, colorless and tasteless - no abnormal sensation
- ❖ Causes about 8 deaths per year in the US
- ❖ Unconsciousness/death can occur within 1 minute
- ❖ Extremely dangerous when LN<sub>2</sub> spilled in an enclosed environment like a basement or elevator

- **Condense oxygen from the air**

- ❖ The liquid in such a vessel becomes increasingly enriched in oxygen (boiling point = 90 K) as the nitrogen evaporates
- ❖ Can cause violent oxidation of organic material

- **Preventions and treatments**

- ❖ Dry and empty hands or loose-fitting thermal insulated or leather gloves
- ❖ Do not store in a confined space without pressure relief devices
- ❖ Safety glasses or even a full face shield
- ❖ Symptoms: dizziness, nausea, vomiting
- ❖ Don't work alone