

## Handling Cryogenic Liquids

Cryogenic liquid is defined as a liquid with a normal boiling point below  $-130^{\circ}\text{F}$  ( $-90^{\circ}\text{C}$ ). The most commonly used one in ACE is liquid nitrogen.

### ***Precautions when handling Cryogenic Liquid:***

1. Avoid direct contact with cryogenic liquids as they are extremely cold, and they can cause cryogenic burn.

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2. Cryogenic Liquid should only be carried in cryogenic dewar, cryogenic liquid cylinder or cryogenic storage tank.



Figure 1: cryogenic dewar

3. Wear loose-fitting cryogenic gloves, goggles and/or face shield, long-sleeved shirt and closed shoes when handling cryogenic liquid.



Figure 2: cryogenic gloves

4. Use trolleys when transporting cryogenic liquid. Secure the dewar on trolleys with proper secondary container.

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5. Work in a well-ventilated area. Cryogenic liquids produce large volumes of gas when vaporize. For example, one volume of liquid nitrogen vaporizes to 694 volumes of nitrogen gas at  $20^{\circ}\text{C}$  at 1 atm.

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6. Never attempt to prevent vapours from escaping from cryogenic liquid dewar. A cryogenic liquid cannot be indefinitely maintained as a liquid, if the liquid is vaporized in a sealed container, it can produce enormous pressures that could rupture the container.

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7. Oxygen gas sensors are recommended when cryogenic liquids are handled in enclosed areas. People should not be permitted in atmospheres containing less than 19.5%

oxygen without supplied air.

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8. If skin contacts liquefied cryogenic gases, place the affected area in water bath (< 40°C). Do not rub.
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9. If eyes are exposed to the extreme cold of the liquid or vapour, immediately warm the frostbite area with water (<40°C) and seek medical attention.
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