



Liquid Nitrogen - Health & Safety Facts

GENERAL PROPERTIES

Gaseous nitrogen is colourless and tasteless and is slightly lighter than air at equal temperatures, cold nitrogen vapour is, however, denser than atmospheric air. Liquid Nitrogen is odourless, colourless and boils at -195.80C. One volume of Liquid Nitrogen gives approximately 700 volumes of gas at ambient conditions. Its volume concentration in the atmosphere is 78%. Gaseous and Liquid Nitrogen are non-corrosive and are not flammable. Nitrogen is not toxic.

GENERAL HAZARDS

The most severe hazard associated with the use of nitrogen is that of asphyxiation caused by displacement of the oxygen in the atmosphere.

MATERIAL HAZARDS

Certain steels, such as carbon steel, and some other materials are unsuitable for service at sub-zero temperatures because they lose impact strength and become extremely brittle. Materials normally suitable for service at low temperatures are stainless steels, aluminium and copper and their alloys.

In an area where Liquid Nitrogen spillage can occur care should be taken to ensure that it does not come into contact with vulnerable steel structures and vehicle tyres.

HEALTH HAZARDS

Cold Burns

Liquid Nitrogen and cold nitrogen vapours can produce effects on the skin similar to a burn. Naked parts of the body coming into contact with uninsulated parts of equipment may also stick fast and the flesh may be torn on separation. Affected parts must be washed immediately with large quantities of tepid water. Summon medical help.

Asphyxia

Nitrogen, although non-toxic, can constitute an asphyxiation hazard through the displacement of the oxygen in the atmosphere. When Liquid Nitrogen evaporates, the gas produced is very cold and heavier than air. Thus it may accumulate in low lying areas such as pits and trenches and cause oxygen deficiency.

Neither nitrogen gas nor oxygen depletion are detectable by the normal human senses.

BREATHING A PURE NITROGEN ATMOSPHERE WILL PRODUCE IMMEDIATE LOSS OF CONSCIOUSNESS AND ALMOST IMMEDIATE DEATH

SAFETY PRECAUTIONS

Areas where equipment containing nitrogen is installed or nitrogen is being used shall be well ventilated.

Personnel should not enter enclosed areas which may be deficient of oxygen. Where doubt exists, the atmosphere should be checked with an oxygen analyser and a "Safety Work Permit System" applied.

When handling Liquid Nitrogen or where exposure to very low temperatures can occur, gloves and where appropriate eye protection, safety shoes and body protection shall be worn.

EMERGENCY ACTION

Asphyxiation

Persons showing symptoms of oxygen deficiency should be moved immediately to a normal atmosphere. Persons who are unconscious or not breathing must receive immediate artificial respiration. Medical assistance should be summoned without delay. The victim should be kept warm and resting. It is important that personnel carrying out rescue operations must minimise the risk to themselves.

A RESCUER SHOULD NOT ATTEMPT TO ENTER AN OXYGEN DEFICIENT ATMOSPHERE WITHOUT USING SUITABLE SELF CONTAINED BREATHING APPARATUS

Fire Fighting

Nitrogen is not flammable and no special fire fighting precautions or equipment is needed.

Liquid Nitrogen Spillage

In case of large spills the vaporization rate can be increased by the use of large quantities of water, and thus the period during which the vapour cloud is present will be reduced. However, this will also increase the volume of the vapour cloud which has to be taken into account, if the place is close to public roads, buildings, etc.