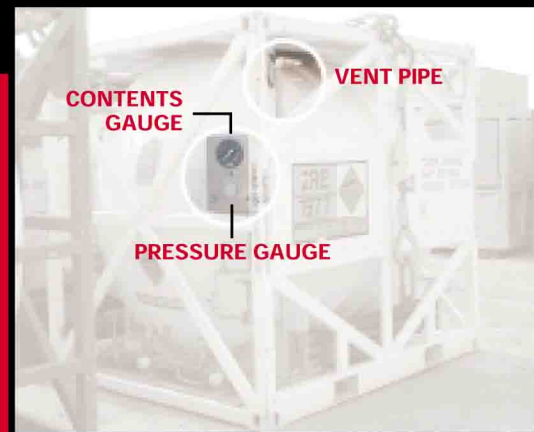
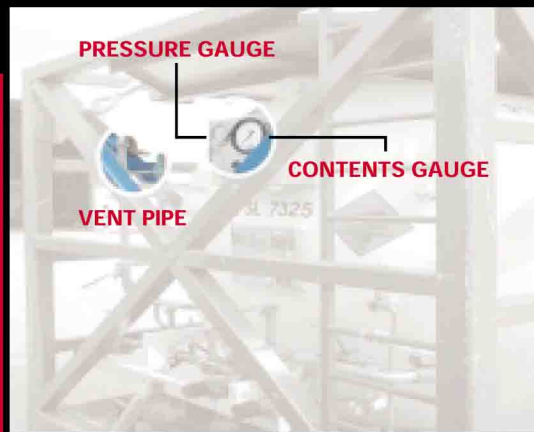


Hazards associated with Carriage and Transportation of bulk Nitrogen (N₂)

In 2002 there was a serious accident offshore in which employees were overcome by inerting gases while working in open air. The escape of nitrogen can pose a serious risk to personnel, even in open air, due to the asphyxiant nature of this gas. We are all aware of the dangers of entering enclosed spaces but this gas can also pose serious risks to partially enclosed spaces (safe havens, buildings and offices) where there is the possibility of minimal air movement. Concentrations of asphyxiants can lead to rapid unconsciousness which in addition can result in physical injury from falling.



CONTENTS GAUGE

A check of this gauge should confirm the volume of product the tank contains.

PRESSURE GAUGE

This indicates what pressure is contained within the tank - the pressure relief valves are set to open at 1.9 bar - if the gauge is indicating close to this pressure the tank is about to vent.

VENT PIPE

Contact and close proximity to this are to be avoided.

TRANSPORTATION

During cargo inspection process and at quayside during cargo handling operation, hazards personnel can be exposed to:

- Gas/pressure release at pipe
- Cold burns from physical contact with vent pipe

SPILLS

Spillages of liquified gases will rapidly vaporise and emergency procedures must be planned to prevent additional risks occurring

- water sprays aimed directly at liquified gas may deflect it to other areas
- contact between liquified gas and water may result in a rapid phase transfer which can be violent
- water spray may increase the rate of evaporation thereby increasing the size of the gas cloud
- water may freeze producing a slippery surface
- gas cloud entering buildings causing oxygen deficient atmosphere within
- approaching a spill/leak may mean you are approaching an oxygen deficient atmosphere

MARINE

Hazards personnel may be exposed to:

- N₂ concentrations may be found in cargo area, safe havens and walkways especially in still air conditions leading to asphyxiation.
- N₂ concentrations being sucked in by intake fans leading to asphyxiation.
- Pressure release and cold burns at vent pipe during cargo handling operations.
- Pressure release as personnel pass tank especially on welldeck vessels.