

Fractional Distillation of Liquid Air

- Air is first filtered to remove particulate matter.
- The particle free air is then freed from carbon dioxide and water vapour by cooling, and thereafter compressed.
- The compressed air is further liquefied by additional cooling and expansion through a valve.
- The liquid air obtained is finally separated into its major and minor components by fractional distillation, where nitrogen gas distils off as a vapour at a temperature of -196°C .
- The major components of liquid air are nitrogen gas (boiling point of -195.79°C) and oxygen gas (boiling point of -183°C). Argon, whose boiling point is of -186°C , is one of the minor constituents of liquid air.

Uses of Nitrogen Gas

- Manufacture of ammonia and ammonium compounds.
- As an inert atmosphere especially in the manufacture of substances that are readily oxidized in air.
- As a refrigerant since liquid nitrogen has a low boiling point.
- Manufacture of nitric acid.
- Manufacture of nitrides.
- Nitrogen gas is used to provide an inert atmosphere in electric light bulbs.
- Nitrogen gas is used in mercury thermometers that register high temperatures.
- Nitrogen gas is used as a modified atmosphere (either when pure or when mixed with carbon dioxide) in order to preserve the freshness of packed food by delaying rancidity and oxidative damage.