NITROGEN REJECTION UNITS
NATURAL GAS TREATMENT TECHNOLOGIES
Air Liquide Group

The world leader in gases, technologies and services for Industry and Health

Air Liquide is present in 80 countries with approximately 65,000 employees and serves more than 3 million customers and patients. Oxygen, nitrogen and hydrogen are essential small molecules for life, matter and energy. They embody Air Liquide’s scientific territory and have been at the core of the company’s activities since its creation in 1902.

Air Liquide’s ambition is to lead its industry, deliver long term performance and contribute to sustainability.

Air Liquide Engineering & Construction

A technology partner of choice

Air Liquide Engineering & Construction builds the Group’s production units (mainly air gas separation and hydrogen production units) and provides external customers with efficient, sustainable, customized technology and process solutions.

Our core expertise in industrial gas, energy conversion and gas purification, enables customers to optimize natural resources.

We cover the entire project life-cycle: license engineering services / proprietary equipment, high-end engineering & design capabilities, project management & execution services.

In addition we also offer efficient customer services through our worldwide set-up.

As a technology partner, customers benefit from our research and development to achieve energy transition goals.

Our full suite of technologies

- Liquefied Natural Gas
- Cryogenics
- Hydrogen
- Syngas
- Petrochemicals
- Natural Gas Treatment
- Sulfur
- Standard Plants
- Oleochemicals

- 15 Engineering centers
- 3 Manufacturing centers
- 60 Proprietary technologies
- 1,600 Patents

Air Liquide Engineering & Construction Nitrogen Rejection Units
Air Liquide Engineering & Construction offers a complete portfolio of natural gas treatment technologies, based on Lurgi’s renowned expertise in gas treatment and Air Liquide’s vast know-how in cryogenic processes and a broad range of membranes for gas separation.

Key proprietary equipment designed and manufactured in-house makes our cryogenic Nitrogen Rejection Units (NRUs) extremely efficient, and enables customers to reduce the costs.

VALUE WE BRING:

**Distillation**
Distillation column height reduced by half over the past 20 years.

**Heat Exchangers**
In-house thermal design of brazed aluminum heat exchangers (BAHX).

**Membranes**
Our Air Liquide Advanced Separation division offers a full range of membrane units for the treatment of natural gas and associated petroleum gases.

**Cryogenic Rotating Equipment**
Air Liquide Engineering & Construction has designed over 1,000 plants equipped with cryogenic pumps and turbo expanders.

**Operational Excellence**
Designs are validated and improved via feedback from our own operations.

**Cold Box Manufacturing**
Expertise in cold box design plus competitive cryogenic equipment manufacturing in the United Arab Emirates and China.
Nitrogen Rejection Technologies

Whether naturally occurring in gas reservoirs or resulting from injection into the gas cap for pressure maintenance, nitrogen is frequently present in natural gas at levels that decrease its quality and restrict its marketability. Air Liquide Engineering & Construction offers a comprehensive suite of processes to remove this nitrogen that includes cryogenic and permeation technologies for all feed gas conditions and removal requirements.

Cryogenic Nitrogen Rejection

Cryogenic distillation is an highly efficient and cost-effective solution to remove nitrogen. Air Liquide Engineering & Construction optimizes NRU design to address specific feed conditions and product specifications.

We offer the optimum configuration and the most efficient process considering tolerance of feed gas impurities, such as CO$_2$, H2S, mercaptans or heavy hydrocarbons.

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Nitrogen Rejection Offer

Cryogenic nitrogen rejection units

- **Conceptual studies** stand-alone or combined with Natural Gas Liquids recovery, Enhanced Oil Recovery applications or LNG.
- **Basic engineering** and **FEED** packages.
- **Proprietary cryogenic equipment** (columns, heat exchangers and cold boxes).
- **Modularized** engineering and procurement solutions.
- **Site services** including commissioning and start-up, training for NRU operators and retrofit of existing units.

Combined and integrated cryogenic solutions

- **NRU & NGL recovery**: Various levels of integration between NRU and NGL recovery sections can be achieved. Air Liquide has developed proprietary designs that are well suited to multi-train NGL / NRU / He. Having a single technology provider maximizes the benefit of the integration and streamlines project execution.
- **NRU & Helium**: With its extensive expertise in both nitrogen and helium cryogenic processes, Air Liquide offers integrated solutions of helium recovery with nitrogen rejection. Even small amounts of helium can add significant value to a project.
- **NRU & the full portfolio of LNG products (Turbofin™, Smartfin™ and Liquefin™)**.
- **Syngas purification**: When high-purity CO is required, syngas purification units designed and operated by Air Liquide often include nitrogen removal using cryogenic distillation.

Membrane solutions

**PoroGen™ PEEK-SEP**: a cost-effective technology for fuel gas conditioning and biogas applications

- Best-in-class thermo-mechanical properties and chemical resistance.
- Cost-effective solution for fuel gas conditioning and biogas applications of limited capacity.