

HELIAL liquefiers

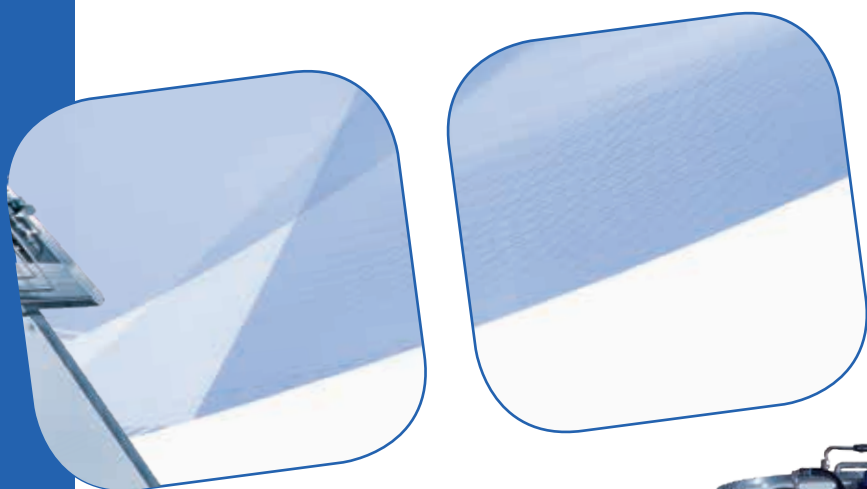
Range of automatic helium liquefiers



HELIAL liquefiers is a complete range of 15 to 300 L/hr helium liquefiers.

To simplify matters, all your operations are controlled automatically: compressor management, system cooling, nominal operating conditions and liquefier shutdown. Pre-cooling with nitrogen may enable you to double your production of liquid helium.

Our experts can tailor-made the system to meet your specific needs, through a wide range of solutions.



Guarantee from a world leader in cryogenics

Air Liquide is the world leader in gases, technologies and services for Industry and Health with more than fifty years of technical, industrial and commercial experience in mechanical cold production, liquefaction, storage and distribution of cryogenic fluids at very low temperatures: a benchmark in expertise.

Air Liquide's teams addresses the specific needs of each customer using a global approach that combines consulting, design, commissioning, testing and maintenance.



The turnkey liquefaction system

Air Liquide offers a comprehensive liquefaction system, covering every aspect from gaseous helium recovery to your application.

Legend:

Basic offer

Optional offer

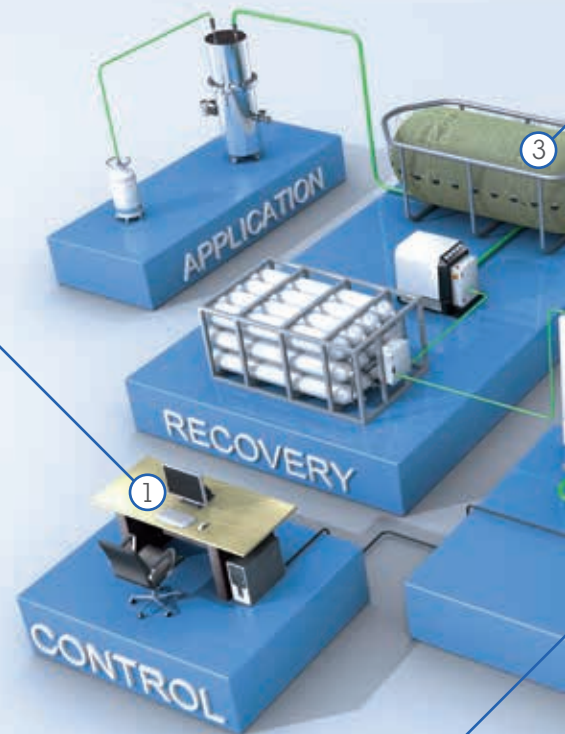
1. CONTROL

Monitoring station

You can monitor your liquefaction system remotely and continuously through a network connection. Your system can also be placed under the control of Air Liquide technical team via a remote access, offering monitoring, notification and diagnosis.

Gas analysis system

The gas can be analyzed continuously at different points in the facility so that any anomaly can be detected.



2. LIQUEFACTION

In-line dryer

The in-line dryer eliminates the moisture from the helium produced in the recovery system.

Purifier internal or external to the cold box

Using the cooling capacity of the liquefier, the internal purifier can purify helium containing up to 20% air by volume. The external purifier is required for larger throughputs or so that the whole capacity of the cold box can be dedicated to liquefaction.

Cold box

The heart of the liquefaction system, it includes the heat exchangers, the turbines and the cryogenic valves. The control panel is included with this module.

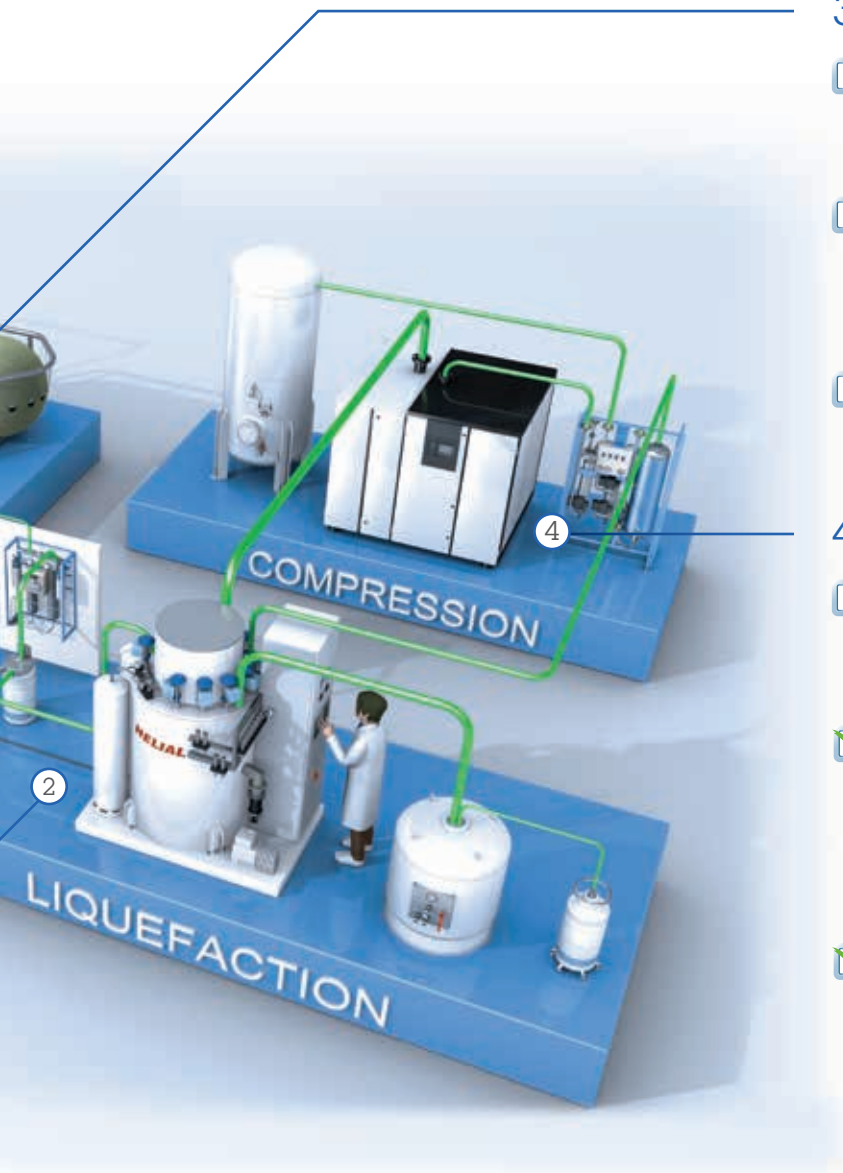
Liquid helium storage tank

It ensures that the liquid helium produced can be stored, with a static evaporation rate of less than 0.5% per day.

Cryogenic transfer line

It ensures the transfer of the fluid between the cold box and the storage unit. The length can be adapted upon request.





3. RECOVERY

Gas bag

It recovers the impure gaseous helium produced by your applications.

High pressure recovery compressor

It compresses the impure helium so it can be stored at 200 bar, and is equipped with purification and drying systems.

High pressure impure helium storage unit

4. COMPRESSION

Medium pressure pure helium storage unit

It maintains a constant cycle pressure in the liquefaction-compression loop.

Compression station with oil lubricated screws

Air- or water-cooled, it compresses helium gas at the start of the cycle and includes a primary de-oiling.

Oil removal unit

Once compressed, the gas must then be purified. The oil is removed using coalescent cartridges and then by adsorbing the oil vapors on activated charcoal. It is connected with the storage unit and also includes the cycle pressure management system (*high pressure and low pressure regulation*). At output, the helium has no trace of oil and can be used in the cold box.

Air Liquide supports you throughout the different phases of design, commissioning and operation of your liquefaction system.

Design

- Support you with designing specifications
- Advice on the choice of components

Commissioning

- From monitoring on site equipment installation and connections to complete on site facility implementation
- Start-up supervision and support
- Acceptance tests on-site
- Provision of appropriate fluids for start-up

Operation

- Training of operation teams
- Maintenance contract
- Extension of warranty

After-sales service

- Technical support
- Spare parts
- Advice and optimization
- Customer network

Key benefits of **HELIAL** liquefiers

✓ High reliability

- **Manufacturing quality complies with prevailing international standards and codes**
- Systems in operation **for more than 30 years**
- **Quality assurance system** of production processes

✓ Easy to use

- **Automatic and programmable operations**
- **Communication interfaces are user-friendly**
- **Remote monitoring**

✓ Low maintenance

- **No wearing parts** for the liquefier
- **Low maintenance** on the compressor
- **Reliability of turbines** based on static gas-bearing technology
- **Reliability and robustness** of integrated components
- **Continuous self-diagnosis** of system so that any breakdowns can be anticipated

✓ Controlled operating costs

- **Minimum consumption of utilities** (nitrogen, water, electricity and compressed air)
- The production of liquid helium can be **adjusted to meet your needs**
- **Team training** for optimum use of liquefiers
- **Customized support and advice**



Turbines with the highest MTBF* value on the market

HELIAL liquefier is equipped with turbo expanders which constitute the core system of the liquefaction process.

Specifically developed by Air Liquide to operate in harsh industrial environments, our turbines are tested in real conditions on dedicated test benches.

Our turbines use extremely reliable static gas-bearing technology, reaching rotation speeds of up to 300,000 revs per minute with the highest measured on-site MTBF value on the market, namely 150,000 hours.

** Mean Time Between Failures*

Main technical features



Liquefaction capacities and consumption	HELIAL SL	HELIAL ML	HELIAL LL
Capacity with nitrogen pre-cooling	From 35 to 85 L/h	From 110 to 170 L/h	From 200 to 330 L/h
Capacity without nitrogen pre-cooling	From 15 to 40 L/h	From 45 to 80 L/h	From 100 to 150 L/h
Compressor power	From 55 to 90 kW	From 110 to 160 kW	From 200 to 315 kW

Max Dimensions L x W x h (mm)	HELIAL SL	HELIAL ML	HELIAL LL
Compressor	2,110 x 1,290 x 1,950	2,750 x 1,910 x 2,140	3,695 x 2,145 x 2,560
Oil removal unit	1,850 x 975 x 2,275	2,100 x 1,275 x 2,560	2,100 x 1,275 x 2,560
Cold box	2,450 x 1,466 x 2,547	2,450 x 1,615 x 2,626	2,900 x 1,900 x 3,700

Contacts

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A world leader in gases, technologies and services for Industry and Health, Air Liquide is present in 73 countries with approximately 67,100 employees and serves more than 3.9 million customers and patients.