

THE LINDE GROUP

Linde

Manufacturing

Introduction.

The Engineering Division, with its technological focus on promising market segments such as processing plants for hydrogen, oxygen, olefin and natural gas, is successful throughout the world.

We have extensive process engineering know-how combined with broad experience in the planning, project development and construction of turnkey industrial plants. The wide spectrum of Linde's technologies is characterized by the scope of the temperatures applied, ranging from -271°C in a refrigeration plant for superfluid helium to $1,200^{\circ}\text{C}$ in the process for olefin production.

Production facilities.

The production facilities in Pullach near Munich have an overall area of 52,000 m² of which 11,000 m² are shop floor space.

The main fabrication for plant components in Schalchen, located approx. 100 km east of Munich, Germany, comprises an overall area of 200,000 m². There are 22 production shops with 63,000 m² covered shop floor space for the fabrication of cryogenic equipment.

For very large units satellite workshops are available at the North Sea coast (e.g. Bremen/Germany and Antwerp/Belgium).



Schalchen plant, approx. 100 km east of Munich, Germany

Cold box assembly for the Snøhvit LNG plant in Norway ↑
at the satellite workshop port of Antwerp, Belgium





Aluminium plate-fin heat exchangers

These units are key components in many process plants. Each aluminium plate-fin heat exchanger is specially designed for the required thermal and hydraulic performance thus providing a tailor made and very economic process equipment.

← Plate-fin heat exchanger in the production hall



Cold boxes

An economic alternative to separate installation on site is the assembly of various cryogenic plant components into a steel containment (cold box). Interconnecting piping, vessels, valves and instrumentation are included in this packaged unit to form, after filling with insulation material (perlite), a ready-to-operate unit.

← Cold box assembly



Coil-wound heat exchangers

Coil-wound heat exchangers are compact and reliable with a broad temperature and pressure range and suitable for single phase as well as two phase streams. Multiple streams can be accommodated in one exchanger. They are known for their robustness particularly during start-up and shut-down or plant trip conditions.

← Tube bundle fabrication

Storage tanks for cryogenic gases

Industrial gases such as oxygen, nitrogen and argon are delivered to customers in liquid form at cryogenic temperatures and are then stored by the customers in tanks before future use. The vacuum-insulated double wall tanks consist of two concentric vessels, an austenitic steel inner tank and an outer jacket in carbon steel with an anti-corrosion primer and a special environmentally friendly top coat.

[Various sizes of storage tanks →](#)



Air-heated vaporizers

Linde air-heated vaporizers are heat exchangers for evaporating and superheating of cryogenic fluids, such as oxygen, nitrogen, argon, hydrogen and carbon dioxide. A new generation of all aluminium vaporizers ensures maximum air circulation due to optimized fin and vaporizer geometrics.

[Air-heated vaporizers →](#)



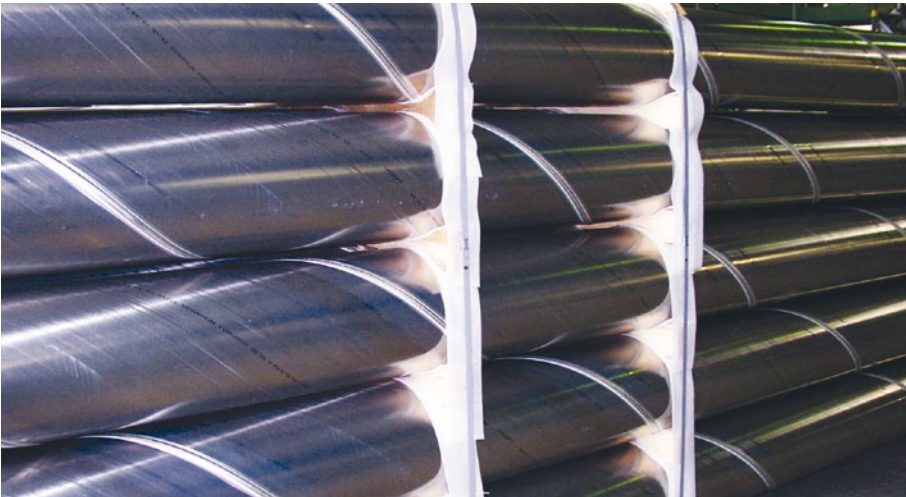
Water-bath vaporizers

Water bath vaporizers are used for the vaporization of all liquefied air gases, carbon dioxides and hydrocarbons in single or multistream operation, including on request the pressure build-up vaporizer.

The Linde water bath vaporizer consists of a water vessel in which a coil-wound tube bundle is submerged, optimized to withstand quick start-ups and temperature changes. The water bath is heated by direct steam injection or hot water circulation. Compared to the Linde air-heated vaporizer, this heat exchanger type is the efficient alternative for larger vaporization demands.

[Fabrication of water-bath vaporizer →](#)





Spiral-welded aluminium pipes

This special type of aluminium pipe is mainly used for the following applications:

- Gas-insulated high voltage switch gears and power transmission lines (GIS/GIL)
- Cryogenic process plants (for example gas treatment plants and air separation units)

The spiral-welding of aluminium pipes is a special continuous fabrication process to obtain leakage free pipes in a wide range of diameters (\varnothing 280 - 1200 mm) and wall thickness (4 - 10 mm) which are in accordance with pressure vessel requirements.

← [Spiral-welded aluminium pipes](#)



Gas-insulated high voltage power transmission line

Designing processes – constructing plants.

Linde's Engineering Division continuously develops extensive process engineering know-how in the planning, project management and construction of turnkey industrial plants.

The range of products comprises:

- Petrochemical plants
- LNG and natural gas processing plants
- Synthesis gas plants
- Hydrogen plants
- Gas processing plants
- Adsorption plants
- Air separation plants
- Cryogenic plants
- Biotechnological plants
- Furnaces for petrochemical plants and refineries

More than 3,800 plants worldwide document the leading position of the Engineering Division in international plant construction.

Production facilities.

We at the Linde Schalchen Plant are located 100 km east of Munich, Germany and cover a total site area of approx. 200,000 m². Our 700 engineers and skilled workers design and manufacture components and complete modules for the application in process plants.

Backed up by more than 100 years of production know-how, highly developed plant modules are manufactured. Our innovative technologies and our competitiveness open the door to participation in prestigious plant projects world-wide.

We provide complete services on field installation and operation. A specialized service crew is available for immediate and professional repair services.

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Product range.

- Aluminium plate-fin heat exchangers as single units or as manifolded assemblies
- Cold boxes with aluminium plate-fin heat exchangers, columns and vessels
- Coil-wound heat exchangers and isothermal reactors for chemical and petrochemical plants
- Columns and pressure vessels in aluminium for cryogenic plants
- Spiral-welded pipes in aluminium
- Storage tanks for liquefied gases
- Steam-heated waterbath vaporizers
- Air-heated vaporizers for liquefied gases