

Chemical gases for a wide
range of applications.

As boundless
as the sea.



Essential elements for success. Optimise your processes with chemical gases from Linde.

A large number of industrial processes depend on chemical gases. They can be basic chemicals for synthesis, they optimise the production efficiency of plants, they improve the product quality and they are vital in terms of environmental protection.

That's why chemical gases play an important role in many industries – from starch modification in organic chemistry to stabilising wines in the beverage industry. As a globally active gases and services supplier and a highly reliable engineering partner, Linde helps its customers optimise a huge number of industrial processes and applications by making them more efficient and eco-friendly.

The technical expertise of our employees and our well-proven supply security are targeted at providing you with the optimal chemical gases as key elements for our joint success.

Furthermore, while focusing on satisfying your needs and requirements with our high-quality products and services, we are also highly committed to environmental protection, safety and health in the workplace, and the development of sustainable production methods.

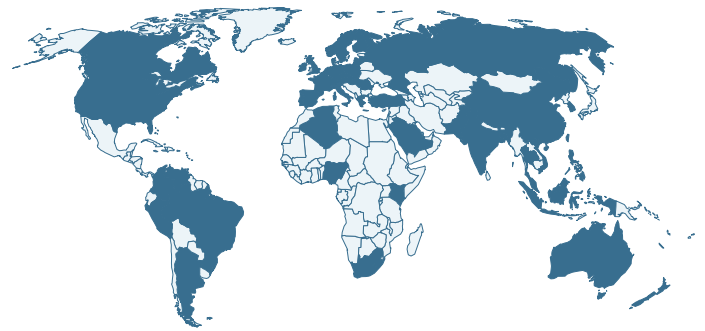


A global network for local needs. Meeting any demand with the highest level of supply reliability.

Linde operates chemical gases production and packaging facilities throughout the world. This provides us with substantial bulk storage, bulk breaking and blending capabilities. Our established network of raw material manufacturers allows us to supply gases for the chemical industry whenever and wherever needed.

The Linde Gases Division offers products in a wide range of package sizes, including road/rail tankers, ISO containers, tube/cylinder trailers, drum tanks and cylinders, thus covering a broad spectrum of gas delivery alternatives and ensuring that your consumption profile is met. So no matter which supply mode you choose, Linde always guarantees optimal product quality and maximum security of supply.

Furthermore, our sourcing, trans-filling, quality assurance and logistics are always handled following best operational practices. That way, you can always be sure that the optimal product quality, safety and environmental requirements are met when doing business with Linde.



■ Chemical gases capabilities





Any industry, any application. We find the right solutions.

Any industry has its unique challenges that can only be met with the help of the right tools and products combined with the necessary experience and know-how.

Linde offers you all these elements and supports you in many aspects of research, development and production. Moreover, our deep understanding of market needs and our state-of-the-art technical know-how enable us to develop efficient solutions for virtually any application that requires chemical gases.

Our chemical gases are used by a large number of different industries, for example:

- Chemical and petrochemical industry
- Construction
- Electronics
- Energy (power generation)
- Environmental protection (e.g. water treatment)
- Food and beverage industry
- Glass production
- Healthcare
- Metallurgy
- Mining and metallurgy
- Pharmaceutical
- Pulp and paper
- Refrigeration
- Rubber and plastics



As numerous as the tasks, as versatile as the products. Chemical gases at a glance.

In terms of supply, Linde offers to-the-door delivery of a wide range of packaged chemical gases. Their specifications and volumes are always defined by the scale and type of your specific application.

Major chemical gases and their applications

Ammonia (NH₃)

For heat treatment, furnace atmospheres, chemical manufacture, refrigeration, rubber production, wood pulping

Carbon monoxide (CO)

For chemical synthesis, food preservation, ore extraction

Ethylene (C₂H₄)

For cutting and thermal spraying, fruit ripening, crop growth, LNG refrigeration

Ethylene oxide (C₂H₄O)

For sterilisation, pharmaceutical synthesis

Hydrogen chloride (HCl)

For cotton de-linting, chemical manufacture, pharmaceutical synthesis, metal surface treatment

Sulphur dioxide (SO₂)

For food preservation in the packaging industry, winemaking, float glass process and water treatment

Sulphur hexafluoride (SF₆)

For electrical insulation of transmission and distribution equipment, medical imaging and surgery, magnesium processing and particle accelerators

Chlorine (Cl₂)

For bleaching of paper and textile, water treatment, production of basic chemicals and pharmaceuticals, etching in electronics

Foam blowing agents

For the foam blowing industry, including products with zero GWP (global warming potential) and ODP (ozone depletion potential)

Propellants

For the full range of aerosol applications

Fire suppression agents

For fast, safe and clean extinguishing systems

Other chemicals, e. g.

Boron trichloride, hydrogen bromide, hydrogen sulphide, ethane, tungsten hexafluoride, iso-butane, pentanes etc.

Precisely measured. Tailor-made supply systems for chemical gases.

A reliable supply with high-quality gases guarantees efficient production. Throughout the entire production chain, accurate dosage and perfect timing are key elements in all industries. This is why Linde designs your gas supply system according to your actual demand and service needs concerning gas types, gas qualities and required volumes.

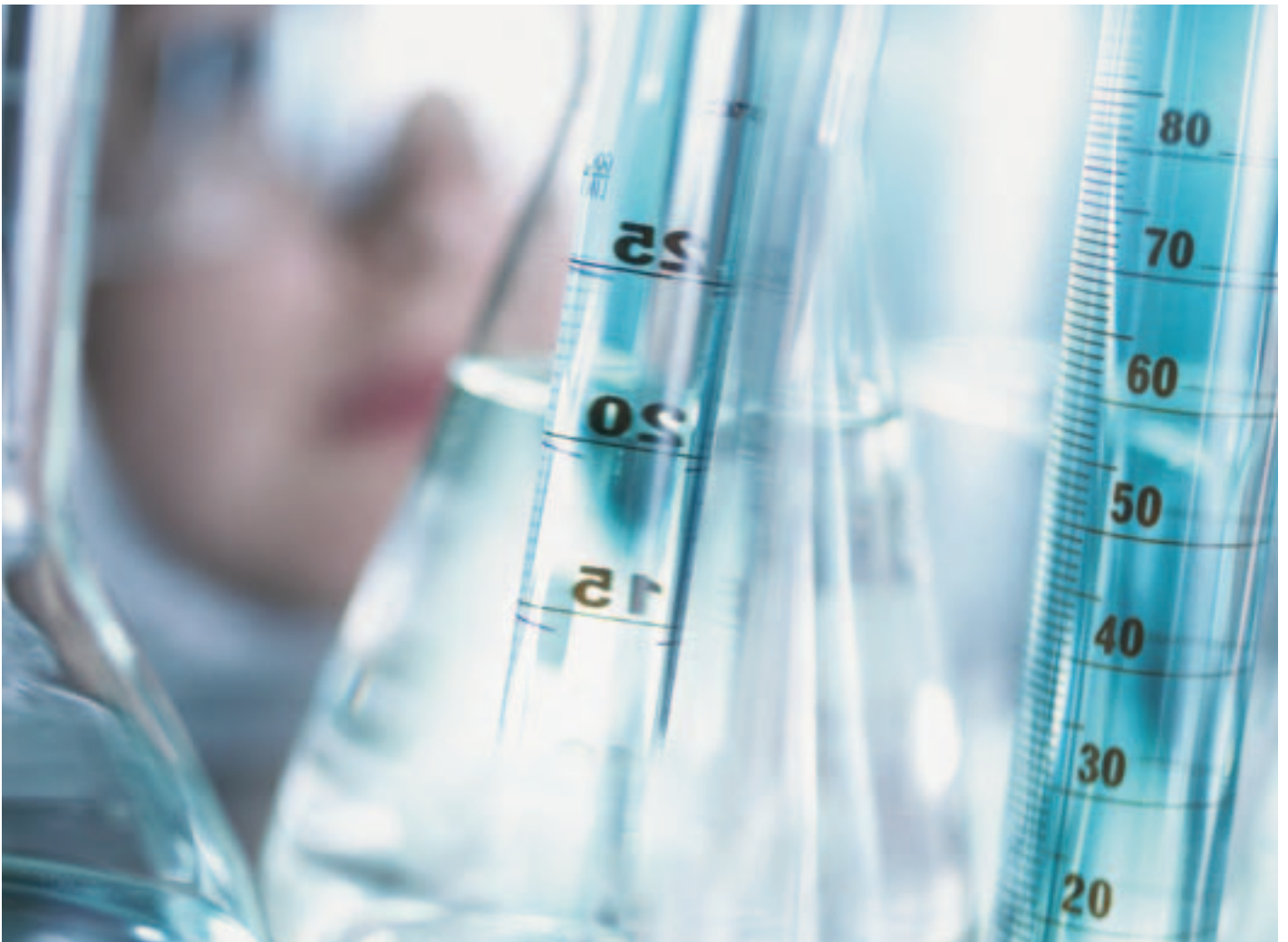
In order to ensure that your gas supply system perfectly matches your requirements, Linde provides a broad spectrum of products and services, from the analysis of your current supply situation, to a review of required services, to the hand-over of turnkey gas supply systems.

Standardised concepts for a number of applications are adapted to design tailor-made gas supply systems for any volume demand. Furthermore, our secure supply solutions meet your current and prospective needs, avoiding unnecessary interruptions of your production.

Engineering expertise

The design of Linde's supply systems reflects actual market needs and is mostly based on an in-depth understanding of your individual needs. The expertise of our highly skilled engineers secures that up-to-date technical standards are implemented in a way that fulfils current legal requirements and is advantageous for you as our customer.

Safety awareness and security of supply are key to sustainable supply system solutions. This is why, in addition to our maintenance services, we offer training packages for your employees that are aimed to increase their knowledge about safe handling of chemical gases.





Moving forward by taking responsibility. Safety, health, environment and quality.

SHEQ

At The Linde Group, we place the highest value not only on the quality of our products, but also on environmental protection and the health and safety of our employees and all who come into contact with our business. That's why we follow our SHEQ (safety, health, environment and quality) policy in everything we do.

We expect the behaviour of our employees to reflect our SHEQ policy at all times. This is why we want everyone at Linde to think through the safety, security, health and environmental aspects of every decision they make at work, at home and when travelling, and help others to do likewise.

Furthermore, Linde also assists your company to meet its safety, health and environmental protection responsibilities and to comply with the relevant legislation – in the most cost-effective way without compromising operations. Our services in this area include:

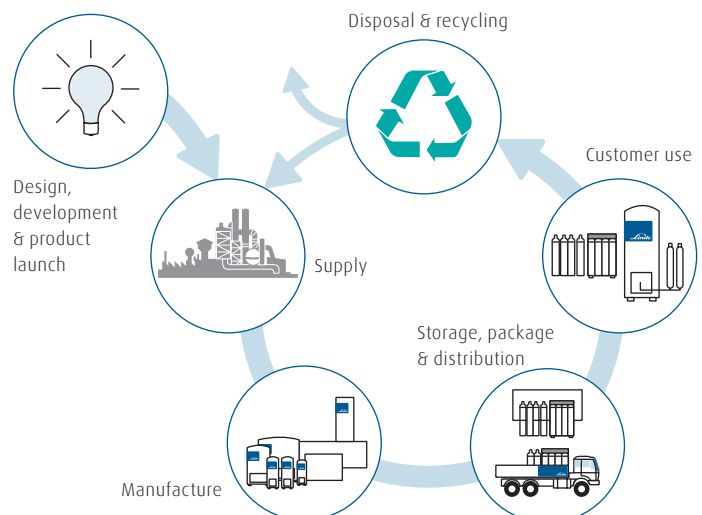
- On-site customer safety audits
- Tailored gas management
- Safety training packages
- Safety and emergency regulations management and tracking
- Risk assessment along the supply chain
- Specialised emergency response solutions

Product stewardship

All manufacturing industries face constantly rising expectations to continuously improve the safety and environmental performance of their product. Linde's product stewardship concept ensures that all of our products meet or exceed these expectations and that they comply with all national or international legal requirements.

From the development and production stages all the way to the proper use and disposal/re-use of our products, we therefore provide transparent product information and offer extensive support to anybody who comes into contact with them, including our customers, business partners, employees and the media.

That way, we ensure that, across their entire life-cycle, the safety, health and environmental protection issues relating to our products are understood and thus effectively reduce the risk of harming people, property and/or the environment.



Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages, and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation, and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – ideas become solutions.

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