

THE LINDE GROUP

Linde

The right choice.

REDLINE[®] equipment for
specialty gases supply systems.





Looking for a specialist? Profit from the REDLINE® equipment range.

The application of specialty gases demands well-founded expertise and professional know-how. With HiQ® solutions, we offer to you guaranteed precision for measurements, calibration and analysis: HiQ® solutions combine gas supply systems, equipment, services and support, creating a perfect package with a single objective – helping you to achieve the most accurate result. Planning, building and operating a specialty gas supply system is a complex set of tasks. In order to perform these tasks efficiently, working with a partner who knows all about specialty gases can be the key to success. Ideally, this should be a company that not only provides these gases, but also the special engineering skills and high-quality hardware needed to build and maintain appropriate supply systems. The good news is: Linde is such a company.

Solutions for a broad range of industries

Offering gases, services and hardware as well as comprehensive engineering know-how and global industrial contacts, Linde is a specialty gases all-rounder – and, at the same time, an experienced specialist for your individual tasks. That's why, across a broad range of areas as diverse as pharmaceuticals, chemistry, petrochemistry, metallurgy, vehicle construction or environmental protection, as well as for universities and research institutes, Linde is the global company to go to when you need to build and run a modern specialty gas supply system.

REDLINE® – the equipment of choice

As a major part of our HiQ® products, REDLINE® equipment is the hardware of choice for your specialty gas supply system. Why? Because with REDLINE® gas panels, points of use and cylinder regulators, you're not only buying the right equipment, you're benefiting as well from our long experience as one of the most innovative gas and engineering companies worldwide, and also from our global position as a one-stop solution provider for all specialty gas projects. REDLINE® equipment is integrated into an efficient network of perfectly coordinated, well-designed products that help you concentrate on your primary objectives.

REDLINE® supply systems at a glance

- Specialty gas equipment for complete supply systems
 - Gas panels
 - Points of use
 - Cylinder regulators
 - Gas control components
- Design, engineering, installation and maintenance

Fully equipped, fully supported, fully focused. REDLINE® equipment.

We want you to be able to concentrate on your core business. That's why we support you, from the beginning, with our professional consulting services, so that you can make all the right decisions when using our HiQ® specialty gases, equipment and services. Our experts have access to our global knowledge base to help you achieve your objectives quickly, economically and successfully.

When you buy REDLINE® equipment, you profit all the way from the benefits that automatically come with HiQ® solutions:

Your needs, our top priority

Your specialty gas supply system is based on a specific requirement analysis, which we compile both from an economic and safety point of view. Right from the start, we work closely with you in order to find the solutions that are right for you, from the complete specialty gas supply system right down to the last REDLINE® point of use. Moreover, our teamwork frequently results in us assuming total project responsibility, not only for the design of the system, but for the gas delivery as well. And as Linde is a globally active company, your next sales office for HiQ® specialty gases and REDLINE® equipment is never far away.

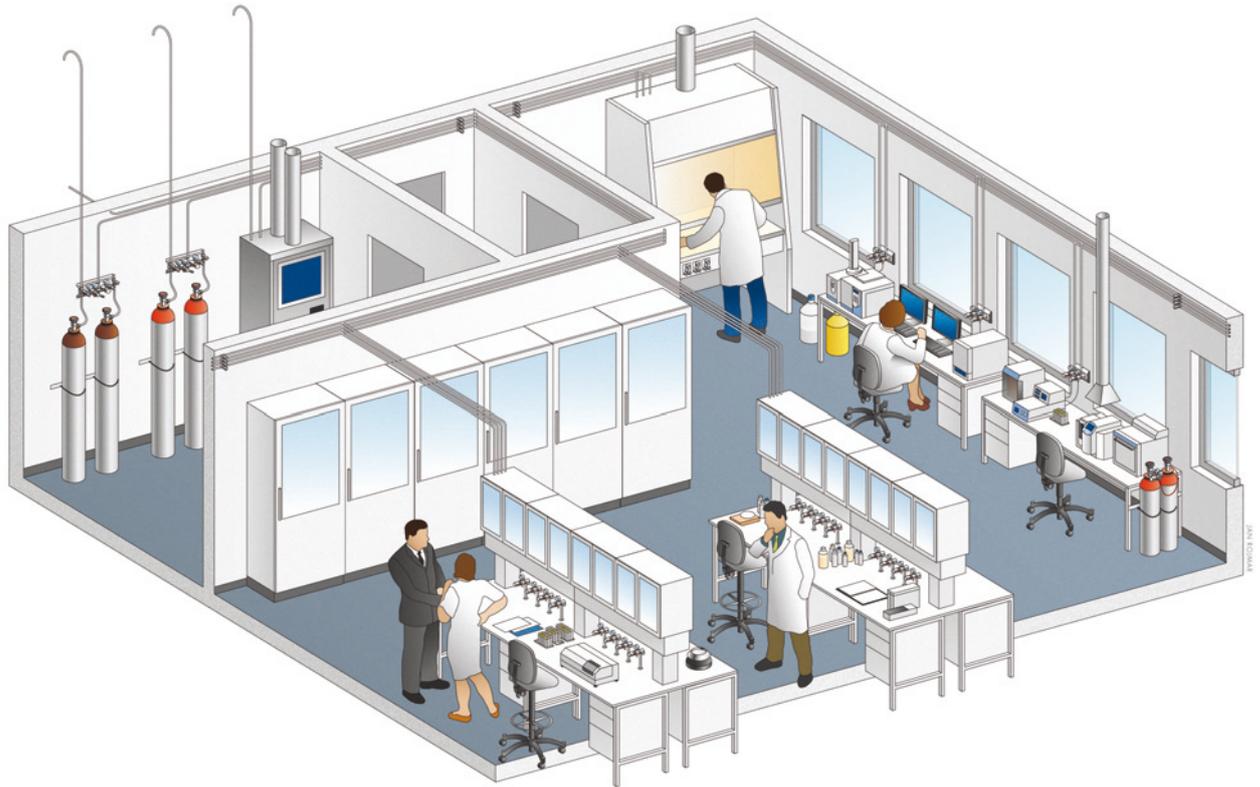
Premium products for premium users

REDLINE® gas supply equipment is the natural choice for high-performance and purity-sensitive specialty gas installations around the world. As our leading product programme, it has helped a broad range of industries to meet the new millennium better equipped than ever. In order to maintain this position, the REDLINE® product programme is under constant development.

How specialty gases differ from industrial gases (example: nitrogen)

Gas example	Purity	Max. impurities	Equipment
Industrial nitrogen 2.5	99.5 %	5000 ppm	Industrial regulator
Nitrogen 4.6	99.996 %	40 ppm	BASELINE® regulator
Nitrogen 6.0	99.9999 %	1 ppm	REDLINE® equipment

Optimal solutions for your success. The benefits of using REDLINE® supply systems.



In your laboratory or production facility, quality, safety, efficiency, reliability, ergonomics and economy are vital to success. A central specialty gas supply system built with REDLINE® equipment and high-quality gas piping for specialty gases ensures that all these factors are covered. As a one-stop solution provider, Linde designs and installs these systems in accordance with your requirements.

High safety standards, easy operation

In a central gas supply system, the gas cylinders are collected at one location, usually in a separate room or building. This not only facilitates the delivery, exchange and removal of the cylinders, it also reduces the risk of accidents, as there is no need to handle the cylinders within working areas. In order to minimise the hazard potential and facilitate operations, only low-pressure equipment and small gas quantities are present at the work stations. The outlets positioned at every work station are safe, convenient and easy to use.

Improved efficiency, ergonomics and economy

To lower costs for gas, cylinder rentals and transport charges, a continuous gas supply system should be used. This means less wasted time and fewer interruptions when changing the cylinders. Having larger and fewer gas cylinders which supply all users together also leads to a more effective emptying of the cylinders. In addition, storage monitoring and purchasing can be centralised and rationalised. And with the gas cylinders out of the way, the working areas can be designed more appropriately and ergonomically.

Choice of materials

The choice of materials for gas supply systems is determined by the gas to be distributed and the level of contamination that can be accepted in the gas. The inner surface finish of a system's components is therefore of great importance to the final purity of the gas at the point of use. A better surface finish will also make the pipe system easier to clean and reduces the risk of particles being released into the gas stream. The past years have shown that stainless steel has become the number one choice of material for pure gas applications, as the material is resistant to corrosion.



The REDLINE® equipment programme is well tailored for a broad range of areas, such as pharmaceuticals, chemistry, petrochemistry, vehicle construction or environmental protection. As well as for universities and research institutes.

Engineered and installed by specialty gases experts

For stainless-steel piping systems, we use automatic, computer-controlled orbital welding equipment. This is in order to produce a tight gas system that can maintain demanding purity requirements. An orbital welded system has a smooth surface and lacks the “pockets” that collect impurities and particles in a fitted system. The expected life time of a welded system also exceeds other options. An orbital welded REDLINE® system is your insurance to guarantee that the integrity of the HiQ® specialty gas in your system is not jeopardised.

Tested for reliability, integrity and safety

Pressure testing is carried out according to applicable standards and a corresponding protocol is compiled. The complete system is purged and analysed to determine the humidity and oxygen content. To guarantee that the system is tight, we carry out a helium leak detection test, which is documented in a certificate of tightness. A complete system, however, does not only contain tubing and components, it also consists of various engineered safety features. For instance, flammable gases such as hydrogen require flame arrestors and excess flow valves. Most systems are also equipped with safety and check valves. Some installations also require fixed and personal gas alarms combined with computerised surveillance systems.

Fully documented for your convenience

Every gas supply system that we build is fully documented to describe how the system is designed, what materials and components were used and how the system is operated and maintained. The list of documents handed over to you upon successful acceptance test may include the following documents:

- System specification including equipment list
- Analysis certificate (where applicable)
- Layout document (shows the entire supply system design)
- Tightness certificate (where applicable)
- Operating and servicing instructions
- Pressure testing protocol
- Technical information covering all components
- Spare parts list

Precision matters in everything we do.

REDLINE® equipment for you.

The complex processing and analysis requirements in today's industry demand products of the highest quality to maintain peak operational performance. Specialty gas supply systems built with REDLINE® equipment are used in various industry applications, for example:

- In the **automotive industry**, our REDLINE® gas panels, points of use and other REDLINE® components play an important role in the quest for more efficient and eco-friendly engines. Car companies develop the engines and vehicles of tomorrow and therefore need calibration gases to continuously monitor car exhaust compositions.
- The **chemical industry** uses our solutions for process control applications, where samples from the process are carried to the lab for continuous monitoring and quality testing.
- **Research institutes and universities** use our central gas supply systems for chromatographic carrier, make-up and fuel gases.



Double gas panel D 204

REDLINE® equipment is a modular system which allows maximum flexibility when designing, installing or retrofitting your individual specialty gas supply system:

Gas panels

In central gas supply systems, gas panels are used to reduce the high primary pressure in gas cylinders or cylinder bundles to more manageable secondary pressures. Linde offers three types of REDLINE® panels: single, double and semi-automatic.



Point of use B 40 B for bench mounting

Points of use

Together with the gas panel, the point of use guarantees a stable outlet pressure. Each REDLINE® point-of-use assembly can be individually equipped with the functions "shut-off", "pressure regulation" and "flow regulation". That way, the points of use at the work stations can be retrofitted any time to meet new requirements. Linde offers various REDLINE® point of use models for different installation types, e.g. wall, bench, panel or fume cupboard mounting.



One-stage cylinder regulator C 12hv/1

Cylinder regulators

Cylinder regulators represent the most compact gas supply system. They are used when central gas systems are not applicable, for instance for mobile calibration in environmental applications, where maximum mobility is a prerequisite. There are several types of REDLINE® cylinder regulators, for instance: one-stage, two-stage and vacuum dosing.



Working with Linde.

Your satisfaction, our goal.

Your business is in a constant state of change. The technology you depend on is ever more advanced, environmental and safety regulations are becoming stricter, resources are becoming limited, and all over the world the business climate has never been tougher. And you have to keep up with it all, or your business is at risk. We have the flexibility to meet increasing quality and purity requirements and to quickly react to the development of emerging markets and new applications.

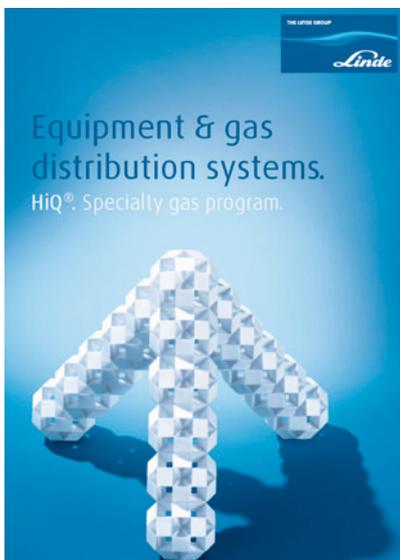
Contact

Would you like to talk to us about our REDLINE® portfolio, our HiQ® specialty gases solutions or any other gas and engineering topic? Just get in touch with your local Linde sales office. Our experienced staff will be glad to help you and will quickly bring you together with our experts. For more information, visit us at <http://hiq.linde-gas.com>.

HiQ® equipment catalogue

Want to know more about our REDLINE® equipment for specialty gas supply systems? Our HiQ® equipment catalogue contains detailed information about the REDLINE® equipment programme, including gas panels, points of use, cylinder regulators etc., helping you make the right choices in terms of the appropriate hardware for your specific specialty gases application.

The HiQ® equipment catalogue is downloadable at <http://hiq.linde-gas.com>.



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.

Linde AG

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