

There is no protection without detection.

HiQ[®] Specialty Gases, Equipment and
Services for Environmental Monitoring.



HiQ® Pure Gases and Calibration Gas Mixtures. Giving you the green light for success.

You need absolute confidence in your measurement results. That is why Linde introduced HiQ®. HiQ® represents the best there is in the world of high purity gases, process and calibration gas mixtures, precision engineered gas supply solutions, and the high quality services needed for optimum results. Delivered in a form and frequency tailored to each application. In a highly complex and specialised business sector, our vision is simple: we provide precisely what our customers need, whenever and however they need it.



Governmental agencies, private laboratories, and industrial facilities around the world choose Linde as their supplier of environmental gas standards



Portable ECOCYL® cylinder – the complete and convenient package for gas detection and remote calibration

International accords such as the Montreal protocol, or Kyoto accords call on industries to monitor, control and reduce their emissions before discharging them into the environment. There are a number of different particulate and gaseous emissions which result from smoke stack emissions in many industries including manufacturing, chemical and petrochemical, and power generation. The increasing use of renewable fuels also reduce the vehicle exhaust emissions significantly.

Areas of key measurement include:

- Carbon monoxide (CO) from industrial processes and incomplete combustion of wood, oil, gas and coal
- Carbon dioxide (CO₂), sulfur dioxide (SO₂), and nitric oxides (NO and NO₂) from combustion of gas, oil and coal
- Hydrogen sulfide (H₂S) and methyl mercaptan (CH₃SH) from pulp and paper mills
- Hydrocarbons resulting from incomplete combustion of fuels
- Volatile Organic Compounds (VOC) from chemicals, petrochemical, pharmaceutical and manufacturing industries where solvents with low vapour pressures are used
- Carbon monoxide (CO), carbon dioxide (CO₂), propane (C₃H₈), nitric oxide (NO) and oxygen (O₂) from vehicle exhaust emissions
- Methane (CH₄), carbon dioxide (CO₂), hydrogen sulfide (H₂S), oxygen (O₂), hydrogen (H₂) and ammonia (NH₃) for process control of biogas production plants

Air Quality and Stack Emissions Monitoring

HiQ® instrument gases and environmental calibration gas mixtures are used to zero and calibrate a variety of gas chromatography detectors such as flame ionisation detector (FID), photo ionisation detector (PID) and electron capture detector (ECD) along with gas specific sensors for low levels of acid rain and greenhouse gas emissions. These calibration gas mixtures can be used for ambient air monitoring in locations remote from the emissions or continuous emission monitoring systems (CEMS) at smoke stack where the emission takes place.

Air pollution control regulations require daily zero and span calibrations for CEMS. The CEMS must be zeroed with a pure gas that is free of the pollutants being measured. HiQ® CEM Zero grade air and nitrogen are analysed for moisture, oxygen, carbon monoxide, carbon dioxide, nitric oxides, sulfur dioxide and total hydrocarbons.

Solvent and VOC Monitoring

In order to reduce VOC emissions for environmental benefits and recover valuable solvents for economic benefits, the emission levels of VOCs need to be monitored and measured. VOCs can be some of the most difficult environmental pollutants to identify and measure. Such measurements require dedicated analytical instruments such as GC-MS (Gas Chromatography - Mass Spectrometry). HiQ® specialty gases and calibration gas mixtures play a vital role in the operation and calibration of these instruments.

Soil and Water Measurement

Contamination of soil and water can come from many areas, including acid rain, pesticides, industrial waste, landfill, and raw sewage. Analytical procedures include LC-MS (Liquid Chromatography - Mass Spectrometry) and GC-MS. HiQ® specialty gases used as carrier gas and to purge analytical equipment will be required along with environmental compliance mixtures including VOC and BTEX calibration standards.

Process and Quality Control of Biogas Plants

Biogas is a renewable fuel used for mobility, power plants and heating, offering a lower carbon footprint than traditional fuels. The number of biogas plants have risen in recent years and the growth seem to continue. HiQ® specialty gases and calibration mixtures are used for calibration and measurements in process and quality control as well as for testing of gas detection equipment. Depending on the source for the biogas production, impurities such as methane, carbon dioxide, hydrogen sulfide, oxygen, hydrogen and ammonia are analysed for.

Maximum precision for quantifiable success. HiQ® Reference Materials and other accredited calibration gas mixtures.

HiQ® Specialty Gases. The pre-eminent supplier of calibration gas standards for the environmental market.

Our customers' needs vary from the percent level to the parts per trillion (ppt) level, and may involve monitoring stack emissions, auto emissions, or ambient air as well as process and quality control of biogas production. Regardless of the application, Linde's drive for innovative processes such as proprietary cylinder passivation, high quality manufacturing techniques, and the latest in analytical testing, provide you with superior calibration gas standards.

SPECTRA-SEAL® Calibration Gas Mixtures

SPECTRA-SEAL® leverages technology that has been perfected over a 30 year period and guarantees the long term accuracy, reliability and stability of parts per billion (ppb) and parts per million (ppm) component level reactive gas mixtures and backs up this stability promise with a five year shelf life guarantee. SPECTRA-SEAL® calibration gas mixture components include moisture, carbon monoxide, hydrogen sulfide, carbonyl sulfide, methyl mercaptan, sulfur dioxide, nitric oxide and nitrogen dioxide. Given the nature of these gas mixtures, SPECTRA-SEAL® products are always supplied in premium quality aluminium cylinders.

HiQ® 60 Specialty Gases

The 60 here refers to 60 months guaranteed stability for gas mixtures and high purity gases. 60 months also means 5 years - exactly the same shelf life as SPECTRA-SEAL®. The HiQ® 60 product range extends the SPECTRA-SEAL® stability guarantee beyond low level reactive gases in aluminium cylinders to the full range of inert and flammable gas components in mixtures at higher percentage level concentrations and also includes high purity gases.

HiQ® Accredited Calibration Gas Mixtures

In an age of global trade, analytical measuring results have to be comparable. This requirement is meanwhile satisfied by a large number of international directives and standards, e.g. DIN EN ISO/IEC 17025. Such regulations call for the metrological traceability of measuring results using certified reference materials as the basis for comparability. Traceability is the possibility of verifying measuring results through calibration with measuring instruments of a known accuracy which are linked to acknowledged measurement standards. In the world of physical metrology, such standard measures are the internationally recognised embodiment of the relevant SI units. These principles form the basis for the analytical results of test and calibration laboratories.

HiQ® Reference Materials

ISO Guide 34 defines reference materials as mixtures of substances with an extremely precise composition, which are linked to the international (SI) Units System by complete metrological traceability and a specified level of measurement uncertainty. Reference materials used for the calibration of measuring instruments form an essential part of analytical chemistry.

SPECTRA VOC Standards

Volatile Organic Compounds (VOCs) can be some of the most difficult environmental pollutants to measure and identify. VOCs can represent environmental and health hazards at very low levels down to parts per billion (ppb). SPECTRA VOC Standards are calibration gas mixtures that are engineered, produced and certified to meet the most sophisticated environmental measurement methods: TO 14A, 15 and 17. SPECTRA VOC standards have included up to 109 components in a single cylinder, and other standards with concentrations of each component at the single digit ppb levels. SPECTRA - world class innovation and technology that our customers have come to expect from The Linde Group.



HiQ® calibration gas mixture cylinder for gas chromatograph calibration



HiQ® Certificate of Guinness World Records - 110 components calibration gas in one single cylinder

US EPA Protocol Gas Standards

Advanced environmental calibration gas mixtures for criteria pollutants that are produced in accordance with, and for use in applications that comply with various environmental requirements, such as the US EPA (United States Environmental Protection Agency) protocol. Linde's protocol gas standards include all compounds and ranges that are listed in the US EPA Protocol. In addition, Linde also produces Green House gas standards to include standards for mercury, ammonia, hydrogen chloride, nitrous oxide and formaldehyde.

Linde North America has two production sites that are registered participants in the US EPA Protocol Gas Verification Program (PGVP) for stationary source monitoring and ambient air monitoring. All Linde US EPA Protocols that are produced at the Alpha, New Jersey and Whitby, Ontario sites are certified to be manufactured in strict accordance with US EPA protocol requirements. All Linde cylinders containing an US EPA Protocol gas are delivered with a detailed Certificate of Accuracy containing our manufacturing site US EPA Vendor ID number. Precision matters in everything we do.

SPECTRA Gaseous Mercury (Hg⁰) Calibration Standards

With current and proposed worldwide regulations mandating the monitoring and/or control of mercury emissions, it is extremely important to have a reliable standard for required periodic calibration of the monitoring equipment. Through the efforts of Linde's research and development program, and our propriety cylinder passivation procedures, a stable gaseous mercury calibration gas standard is now available. Linde supplies mercury calibration gas in high pressure, high volume cylinders. The mercury is present in the metallic state, Hg⁰, in a balance gas of research grade air or research grade nitrogen.

Hydrogen Chloride Standards

Linde supplies both hydrogen chloride (HCl) in nitrogen and HCl spiked with sulfur hexafluoride (SF₆) in nitrogen for use as a calibration standard for US EPA Methods 26, 26A and 321. With our propriety cylinder passivation procedures, Linde guarantees a 12 month stability period for HCl and HCl/SF₆ standards.

Portable HiQ® Specialty Gases Packages

Analytical calibration is not limited to the laboratory. Other areas include facility monitors, perimeter emission monitoring, remote exhaust monitoring, stack emission sensor calibration and many more. These calibrations require specialty gases available in a portable, easy to use package that is user friendly, and safety conscious.

ECOCYL® cylinder

This portable package range represents innovative, refillable, sustainable packaging for specialty gases. All ECOCYL® models are equipped with an integral valve and flow regulation device to avoid the need to purchase and fit separate valves and pressure regulators. The various models include OSQ for on-demand flow of calibration gas mixtures for gas detector testing and the RSH for flow controlled dispense of high purity specialty gases and gas mixtures. The ECOCYL® range are modern alternatives to more traditional small disposable cylinders.

HiQ® MINICAN and HiQ® MAXICAN

HiQ® MINICAN and HiQ® MAXICAN are disposable cylinders favoured for their ultra light weight and their commercial and operational simplicity. As the name suggests, the HiQ® MINICAN is a small disposable cylinder option and the HiQ® MAXICAN is our largest disposable cylinder option. They are typically used for calibration gas mixtures, especially for testing of gas detectors.

HiQ® MICROCAN

The HiQ® MICROCAN is a high pressure cylinder of truly micro proportions... however, because it is a high pressure cylinder it contains a surprisingly large amount of gas. The name HiQ® MICROCAN links to one of the main applications for this cylinder which is for carrier gases such as Helium or Nitrogen in modern micro-GCs. These micro-GCs and the HiQ® MICROCAN have many innovative features in common, including light weight, compact design and portability for remote field applications.

High class outside, high purity inside. HiQ® Specialty Equipment.

When using specialty gases for analysis and high-tech production, it is essential to maintain the integrity of the gas between the cylinder and your instrumentation. The quality of the gas supply can be no better than the quality of the gas distribution system. Therefore, it is very important to design and plan a specialty gases system carefully. HiQ® specialty equipment and gas distribution systems have been developed to meet our customers' various supply conditions while maintaining gas purity and performance.

Linde's complete range of cylinder regulators, gas supply panels, and point of use regulators are designed to meet our customers' purity requirements.

REDLINE® gas supply panels, cylinder regulators, and point of use are designed to meet purity requirement up to 99.9999%. REDLINE® is a modern, carefully designed range of gas supply equipment developed to match the fast increasing demands of today – and tomorrow.

BASELINE® gas supply products are our entry level for the world of specialty gas equipment. Designed for gas purities up to 99.999%, BASELINE® offers stability and operational value that industrial regulators cannot offer.

HiQ® Cylinder Storage solutions ensure gas cylinder safety. Choose from indoor single cylinder type to a full size outdoor storage container complete with ready-to-use gas supply systems to ensure a protected environment for gas cylinder storage and handling.

Linde G-TECTA™ Portable Gas Detection range has been designed to ensure a safe environment for people working with gases or at risk from gases produced from a process. Linde G-TECTA™ instruments are easy to use, robust and can easily be seen on the operator. The instruments are designed to protect people in multiple environments and there is a wide range of gases that can be specified. G-TECTA™ instruments are designed to be used with Linde's portable specialty gas range, including ECOCYL® and disposable small cylinder packages.

HiQ® Laboratory Gas Generators – for laboratories where storage or the use of gas cylinders may be unsuitable. Small and reliable, these generators provide gas on-site for instant use and will shut off the gas supply automatically if there's a power failure. Variable flow rates are available, dependant on the gas purity required.

Air samples may be collected using sample bags or containers and analysed using gas chromatography. When only a single calibration event is required and there is no need to purchase a cylinder of gas for repeated use, HiQ® PLASTIGAS can be a perfect solution. Simply, it is a plastic bag that you can fill with the relevant calibration gas mixture or sample for analysis. The size is small and the pressure is low, so the amount of gas you can put into it is also very small. But, if you only need a little, why carry a lot? The HiQ® PLASTIGAS container is also ideal for sample collection in the field to bring gases back to the laboratory for testing and analysis.



More than just gas delivery. Enjoy the benefits of Services from Linde Gas.

It's not only quality that makes the difference between any gas and HiQ® specialty gases. We want to make gas handling as easy and safe as possible for you. Therefore we offer a variety of Services to help you to increase safety and improve efficiency.

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.

Product stewardship is a holistic approach to product responsibility. It involves identifying and evaluating the possible hazards and risks that may stem from a product throughout all stages of its lifecycle – from research and development through manufacturing, storage, transport, retail and usage to recycling or disposal. The risk potential is assessed in relation to employees, neighbours, customers and the environment. The aim is then to avoid or reduce these risks as far as possible.

Safety Training

No matter whether gas usage is a large or seemingly small part of your total operations, knowledge about the properties and potential risks of different gases can lead to increased levels of safety. With over 150 years in the gas business, Linde instructors are the experts when it comes to gases and gas safety. Allow our highly trained instructors to teach you how to safely use, store and handle different compressed and liquefied gases.

If you require customised safety training, please contact your local Linde sales representative to learn more about the different solutions we can offer. We often create customised safety training courses on specific gas applications – we can even integrate internal facility or company regulations into the training.

Administrative Efficiency

Administrative processes, such as inventory management, ordering products or controlling deliveries and invoices, are activities which do not create value for your customers. Although you desire to reduce costs through quick and easy processes, you need a high level of transparency to ensure that your costs are under control. At first glance, these goals may seem to contradict each other.

With our experience as a supplier of goods and services, we are able to translate these seemingly contradictory goals into solutions that simplify your purchasing and payment processes. We understand that you need easy processes that focus on your key requirements. Therefore, we offer you tailor-made solutions which make your processes easier and more transparent.

ACCURA® Cylinder Management allows for full traceability and control of the gas cylinders you have at your site.

Supply Reliability

For your analysis, you need to ensure constant availability of gases. At the same time, you want to focus on your main tasks and not worry about the gas supply. Therefore, you need a partner who is able to deal with your unique delivery requirements and is able to support you when you have to react to an unforeseen demand.

With Linde by your side, you can concentrate on your core business. We strive to ensure that unscheduled interruptions will be a thing of the past for you – in gas delivery as well as gas supply. If anything unexpected happens, you can count on us. We are there to serve you!

SECCURA® Automatic Gas Supply for Cylinders relieves you of all activities related to the availability of gas in your gas distribution system like monitoring gas levels, ordering gas, managing on-site transport and changing cylinders.

Please contact your local Linde sales representative to find out more about specific service offers available in your area.

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 standardized as well as customized 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 optimization, 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.

