With WasserMaxx, you can prepare your drinks to your own personal taste, adding as much or as little fizz and concentrate as you wish.

Add a bit of sparkle to your life

Linde supplies natural CO_2 for WasserMaxx home-carbonation drinks system

Tired of lugging crates of soda bottles from the local store? Sick of tripping over empty bottles waiting to be returned? There's an easier way! With WasserMaxx, you can turn tap water into amazing sodas in a matter of seconds. Forget about the crates, forget about the returns, now you can have fresh, sparkling water or tasty sodas on tap!

All you have to do is fill the WasserMaxx bottle from the tap, attach it to the carbonizer and press the button. To turn your fizzy water into a flavored drink, you can choose from a wide range of concentrates, each bottle enough to make 13 liters of flavored soda.

All-natural CO_2 from Linde
To ensure the highest levels of purity for the carbon dioxide (CO_2) used to carbonate the water, WasserMaxx partnered with Linde. Linde delivers "food grade" CO_2 with purity levels of 99.9%, captured exclusively from natural sources. Each month, Linde fills 130,000 CO_2 cylinders (290 grams) and the trend is clearly upward. The cylinders are refilled and handled to the highest possible standards of hygiene.

One gas cylinder produces 40 liters of soda water, making WasserMaxx a cost-effective, environmentally sound and extremely convenient alternative to ready-carbonated bottles of soda. WasserMaxx is proving to be a major hit across Europe.

PUBLISHING DETAILS

PUBLISHER
Linde AG
Linde Gas Division
Seitnerstraße 70
82049 Höllriegelskreuth
Germany
www.linde-gas.com

EDITORIAL WORK
Dr. Thomas Hagn
Phone: +49 (0)89 7446-1158
Fax: +49 (0)89 7446-1230
thomas.hagn@linde-gas.com
Capella & McGrath GmbH, Munich

DESIGN
Pro Design, Munich

PHOTOGRAPHY
Oliver Jung, Munich

PRINT
Alfred Aumaier GmbH, Unterhaching

Knowhow is available free of charge.
To subscribe, please send an e-mail to
thomas.hagn@linde-gas.com

3|2003

knowhow

Magazine for Customers and Business Associates

Linde Gas

The invisible hand

The perceptions and classification of medical gases are changing to the benefit of the patient

- Fish farmers turn to Linde
- French brothers take to the skies

"Nature provides the master plan but success is often down to precision."

Diana Anica, lab assistant at TiMAR, Portugal

EDITORIAL

Subtle but significant shift

We have been using gases for medical purposes for almost 200 years. In fact, most of us never stop to give medical gases a second thought. Which seems odd given their amazing healing, anesthetizing and life-giving properties.

In this edition of knowhow, you'll see what a difference medical gases can make to our well-being and why they are increasingly being reclassified as pharmaceutical-grade products.

Thanks to liquid oxygen, for example, people suffering from what used to be debilitating diseases can now remain active, even pursuing action sports such as mountain climbing and cycling.

This is also the issue for you if you're curious to read the story behind that delicious filet of salmon on your table. Across Europe, Linde is helping fish farmers optimize farming conditions and alleviate the environmental burden of fish farming.

Lennart Selander
Vice Chairman of the Operational Board Linde AG,
Business Segment Gas and Engineering

CONTENTS

04 **The invisible hand**
Changing perceptions of medical gases

07 **Hydrogen Day**
Linde and VDI bring together key hydrogen players

08 **Plenty more fish in the sea**
Increase in fish farming relieves burden on the ocean's resources

10 **Let's get crazy**
On the slopes of Sweden

11 **54 hours and 1596 km later**
Linde propels French brothers' gas balloon to success once again

12 **Success takes shape**
Hollow parts replace solid plastic and metal in cars

Clever Claus
Enabling more environmentally friendly fuels

13 **New-generation URTF increases capacity by up to 50%**
Efficient aluminium production

14 **Perfect mix**
Linde supplies nitrogen to dilute gas flowing to Dutch households

Full steam ahead for eBusiness at Linde Gas USA
Extensive web ordering and e-services

15 **Linde Gas expands across Europe**
Several new plants in Europe

Things heat up in Spain
Spanish customers benefit from new frits furnace

16 **Add a bit of sparkle to your life**
With the WasserMaxx home-carbonation drinks system

THE INVISIBLE HAND

Changing perceptions of medical gases

COPY_LARS KÄLLSÄTER, HEAD OF AGA LINDE HEALTHCARE

Sometimes it's what you don't see that counts. Take medical gases, for example ... we don't see them or smell them, but try having a tooth pulled or delivering a baby without them! Perhaps it's precisely because we can't see or smell medical gases that we take them for granted? But behind that invisible exterior lies a very interesting story – one of real substance. You may not see it, but you'd better believe it!

The father?

Many attribute the birth of medical gases to a young English scientist called Humphry Davy. Around 1800, he made a very interesting discovery. When he breathed nitrous oxide ("laughing gas", as it came to be known), he suddenly found that the pain of an erupting wisdom tooth was not only considerably diminished but accompanied by a feeling of exhilaration.

Humphry Davy in 1800
"Nitrous oxide may someday be used to advantage in surgical operations."

People suffering from what used to be debilitating diseases such as COPD (Chronic Obstructive Pulmonary Disease) can enjoy a better quality of life and remain active with liquid oxygen from Linde.

No longer viewed as low-value commodities, something that just "comes out of the wall", medical gases are increasingly being heralded as pharmaceutical products in view of their healing, anesthetizing and life-giving properties.

Humphry may have been some 40 years ahead of his time, but he was right. Nitrous oxide is now widely used to relieve pain, during childbirth in particular. In fact, for over 150 years, medical-grade gases have been used for a broad spectrum of therapies in both institutional and home-based care. They relieve pain and discomfort, facilitate breathing among patients with respiratory problems and speed general recovery. You may be surprised to learn that gases as common as oxygen (O_2), nitrogen (N_2), helium (He) and carbon dioxide (CO_2) can all help to cure diseases and save lives.

Main medicinal gases used in hospitals:
- **Oxygen**
- **Nitrous oxide (laughing gas)**
- **MEDIMIX® (50 % oxygen, 50 % nitrous oxide)**
- **Medicinal air**
- **Carbon dioxide**
- **Lung-function test gases**
- **Helium, argon, nitrogen**

Shifting perceptions

For decades, medical gases were regarded by the healthcare community as low-value commodities, something that "came out of the wall" to be reordered when necessary. But this is changing rapidly. To combat the general lack of awareness and information surrounding the pharmaceutical properties of gases, regulatory authorities are pushing for tighter controls and a shift in classification from medical gases to pharmaceutical-grade products. This change promises far-reaching benefits by shifting the focus of responsibility from technicians and purchasers to doctors, hospital pharmacists and therapists. It will also add complexity for the companies who make these products as it requires compliance with manufacturing standards; levels of documentation previously reserved for drug products, and the generation of supportive efficacy and safety data. This will ultimately be to the advantage of the patient.

Ahead of the field

Gas companies such as Linde Gas play a pivotal role in enabling and accelerating this change in perception. AGA Linde Healthcare, the healthcare business unit of Linde Gas, leads the field and is determined to fulfill and exceed new regulatory requirements. It has taken various proactive measures to enable traceability by documenting the quality, safety and efficacy of its gases. As part of this move, Linde Gas recently opened a new pharmaceutical-grade gas cylinder filling plant in Rotebro in Sweden. Perhaps even more importantly, however, AGA Linde Healthcare is driving a new partnership model with the medical community.

Partnering for greater patient safety

This new model places patient safety center stage. To achieve this, AGA Linde Healthcare is moving closer to the caregivers – hospital pharmacists, anesthetists, doctors and nurses, promoting a bi-lateral exchange on the applications, indications and optimization of medical gases. This is being achieved through training sessions, face-to-face meetings and, more recently, the compilation of Oxygen Guidelines. This single-source compendium is a first-ever in the medical gas business, collating and synergizing the

INOtherapy™ is based on the inhalation of nitric oxide (NO). It is used in adjunct with other treatments to treat term and near-term newborn babies with hypoxic respiratory failure.
The establishment of inhaled nitric oxide as a potential therapy (INOmax™) is attributable to the efforts of three researchers: Robert F. Furchgott, Louis J. Ignarro and Ferid Murad, who were awarded the Nobel Prize in Physiology or Medicine in 1998. Louis Ignarro is a member of the Scientific Advisory Board of INO Therapeutics, a subsidiary of AGA Linde Healthcare.

Prize-winner Dr. Tadeusz Malinski (right) and Professor Louis Ignarro at the GEMI Fund Award Ceremony in Boston.

vast and previously fragmented body of information and experience in the field. AGA Linde Healthcare has also added therapy specialists to its sales teams.

Out and about

It's not just in institutional care that Linde is moving closer to the patient. As part of its drive to improve the overall welfare of homecare patients (at the same time helping national health authorities and organizations to lower healthcare costs), Linde Gas is expanding its "single-source" homecare offering beyond oxygen, also specializing in complementary services such as durable medical equipment and infusion therapies.
As part of its core offering, the Homecare division of AGA Linde Healthcare delivers a broad range of oxygen home therapy solutions to meet individual needs and improve quality of life. These range from concentrators through gas cylinders of all sizes to liquid oxygen. Thanks to liquid oxygen, people suffering from what used to be debilitating diseases such as COPD (Chronic Obstructive Pulmonary Disease) can enjoy a better quality of life and remain active, pursuing even action sports such as mountain climbing and cycling.

Driving tomorrow's innovations

Despite the fact that medical gases have been in use for over 150 years, they still represent a relatively new and unexplored scientific field. Linde Gas is also committed to helping and promoting ongoing innovation and medical research. One of the best examples of this is the GEMI Fund (Gas Enabled Medical Innovations). This was founded by AGA Linde Healthcare in cooperation with Harvard Medical International of Boston, USA and the Karolinska Institutet of Stockholm, Sweden in 2003. Every other year, it will award USD 1 million to worthy applicants worldwide.

The first GEMI Fund grant ceremony took place in Boston, USA, on Thursday October 23, 2003. Seven research grants were distributed to support various projects within the area of gas-enabled medical innovations. The grantees are active at research centers in the US, Germany and Portugal. □

Lars Källsäter, Head of AGA Linde Healthcare
lars.kallsater@linde-gas.com

GEMI Fund Ceremony

"The GEMI Fund seems to be a win-win situation. I believe there is genuine goodwill on the part of AGA Linde Healthcare and that it will be perceived by the medical and scientific community as a company that is furthering the science of gas-enabled medical solutions ... AGA Linde Healthcare is showing itself to be a trailblazer and I hope it's a model that other pharmaceutical companies will follow."

Ms. Nikki Zapol, Legal Council for Partner Healthcare Systems at the recent GEMI Award Ceremony in Boston

"We need to collaborate across all layers of the media, industry, government and science to push forward the hydrogen economy."

Dr. Wolfgang Reitzle,
Head of the Executive Board at Linde AG

A DAY TO REMEMBER

Linde and VDI host first Hydrogen Day in Munich

COPY_DR. JOACHIM WOLF
EXECUTIVE DIRECTOR HYDROGEN SOLUTIONS, LINDE AG

All eyes in the energy community turned to Munich on October 1, 2003. Linde hosted the first Hydrogen Day in conjunction with VDI-Wissensforum GmbH, the educational institution of the Association of German Engineers. Media, industry and government representatives came together to discuss the development of an economically viable hydrogen supply structure and synergize efforts in this area. A center of hydrogen research and innovation, Munich was the perfect venue for this international event.

Hydrogen Day explored answers to the questions: What fuel will be powering our children's cars? How safe is hydrogen? Can hydrogen replace fossil fuels? What sort of a future does hydrogen face?

Step up investment levels

Dr. Wolfgang Reitzle, Head of the Executive Board at Linde AG, urged all key players to step up investment levels and open up new areas of growth and opportunity. Jeremy Rifkin, a leading American environmental activist, presented a convincing paper on hydrogen's core role in creating a more equitable world economy and democratizing energy supply.

Speeches were also given by representatives from DaimlerChrysler, BMW, LB-Systemtechnik, the German Safety Inspectorate (TÜV), TOTAL, the International Association for Hydrogen Energy and the German Ministry for the Environment.

Linde is the leading constructor of hydrogen plants in the world. Since 1910, Linde has been supplying hydrogen for a diverse range of applications in chemical, petrochemical, food and other industries. The Linde Group is also constantly exploring new hydrogen technologies, including innovative refueling stations and tank systems developed in close cooperation with leading automobile manufacturers. □

Dr. Joachim Wolf, Executive Director Hydrogen Solutions, Linde AG
joachim.wolf@linde.de

In bringing together representatives from the media, industry, government, safety and environmental organizations, Linde and VDI gave concrete insights into the type of collaboration and networking required to push forward the hydrogen economy.

Linde Gas helps TiMAR in Portugal to combat dropping prices by increasing productivity and reducing production costs. TiMAR produced 1,500 tons of market-size fish in 2002.

PLENTY MORE FISH IN THE SEA

Increase in fish farming relieves burden on the ocean's resources

COPY_HEIKO ZACHER,
MANAGER MARKET DEVELOPMENT FOOD, LINDE GAS

The aquaculture industry is expanding. Fish consumption is rising, fuelled by the much-publicized health benefits of fish. However, consumers are not just demanding more seafood, they want more consumer-friendly products – cuts, portions and dishes that are quick and easy to prepare. Fish farming is emerging as an increasingly efficient way of meeting these demands by enabling a consistent, predictable and uniform supply of seafood products. Across Europe, Linde is helping fish farmers to maximize production efficiencies and reduce the environmental impact of fish farming.

Fish or farm?

Fish farming offers a number of benefits over traditional fishing techniques. Sophisticated technologies allow fish farmers to comply with stringent health, purity and safety regulations. Not only do aquaculture farms dramatically reduce production and labor costs, they also enable a steady supply of fish in the quantity and quality demanded by the market. Farm seafood prod-ucts are generally uniform in size and quality, making them ideal for consumer-friendly processing and marketing. Perhaps one of the biggest advantages of fish farming, however, is that it ensures a steady food supply without depleting the ocean's natural resources.

The role of technology

Fish farming does not come without its own environmental challenges. Many of these can be met, however, through sophisticated process technologies and industrial gases. Linde Gas works closely with its fish-farming customers across Europe to maximize the effectiveness of water treatment and recycling systems on fish farms.

The home of the closed circuit

In France, for example, increasingly strict legislation forced some large plants to close due to unacceptably high ammonia output. In 1992, Linde helped a French fish farmer build the first closed-circuit plant in Europe. Not only do closed circuits minimize environmental impact and water consumption, they also allow the farmer to improve feeding habits and increase production capacity by enabling tighter control over breeding conditions (such as temperature and oxygen content). Linde custom-developed a special oxygen monitoring and delivery system, enabling fish farmers to maximize return on their investment in industrial gases.

Main farm fish in Europe:
Salmon, trout, eel, sea bream, sea bass, gilthead, turbot, halibut, cod

Strong consumer focus

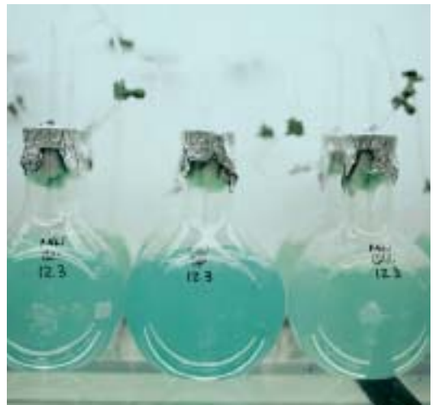
In Italy, the market is shaped by stiff competition from countries such as Greece and Turkey. Linde's R&D service works closely with local breeders and fish-farming associations to explore ways of increasing production efficiencies. To meet rising consumer demands for convenience, many farmers have formed cooperatives where the fish is marketed as ready-made specialties.

The pioneers

Or take Norway, a country traditionally positioned at the forefront of fish-farming innovations. Here also, there is a growing interest in moving fish farming out of the fjords and on to the shore to combat rising ammonia levels. Due to the abundant supply of fresh and sea water in Norway, the emphasis is on treating waste water with oxygen and microbiological filters rather than on closed circuits. Focusing on the overall breeding tank environment, Linde Gas has developed a number of efficiency-enabling oxygenation systems that allow farms to cut oxygen needs by as much as 75 %.

To ensure that it continues to offer its fish-farming customers the very latest technologies and solutions, Linde Gas is in the process of opening a dedicated test and research center in Norway. The experts working at the center will liaise directly with the market development team for food at company headquarters. Linde Gas is the only gas company worldwide to set up a proof-of-concept center such as this. □

Heiko Zacher, Manager Market Development Food, Linde Gas
heiko.zacher@linde-gas.com



Indoor event with the thrill of the great outdoors thanks to liquid nitrogen from Linde.

17-year-old Simon Dumont won the freeski contest, pulling off the rare cork 540 jump, spinning like a helicopter and landing backwards. Thanks to the steep in-run, the skiers picked up speeds of up to 70 km/hour, lifting as much as 17 meters off the ground.

To ensure sufficient snow for both events, more than 300 tons of water was turned into 550 m^3 of artificial snow using 200 tons of liquid nitrogen (as coolant) supplied by Linde's Swedish subsidiary AGA Gas AB. The snow was made by spraying water and compressed air into rectangular tents. Liquid nitrogen supplied by Linde kept the temperature inside the tents at -20°C, which meant that the water droplets were converted into snow. □

Let's get crazy

Ice cool weekend thanks to Linde

Stockholm was the place to be on November 8 and 9 this year. That was when some of the world's biggest names in snowboarding and skiing came together to thrill viewers with the latest tricks, feats and daring stunts. Hosted in the Globe Arena, this action-packed, two-day event attracted thousands of spectators.

Superstars take to the air

The weekend kicked off on Saturday 8 with the Megastar snowboard contest. This was followed on Sunday by the world's premier indoor freeski contest, King of the Globe. Superstars such as Terje Haakonsen, Ingemar Backman, Wille Yli Luoma and Romain De Marchi took to the air to the hottest r'n'b and hip hop sounds in Scandinavia. American

54 hours and 1596 km later

Linde propels French brothers' gas balloon to success once again

In 1906 newspaper tycoon Gordon Bennett inaugurated the first international balloon race from Tuileries Gardens in Paris, France in front of a crowd of 200,000. For almost a century, the Gordon Bennett Cup has drawn the boldest and most skilled pilots worldwide.

The goal of this age-old competition is to catch the winds that will take the team the farthest distance from the launch site, flying around the clock, dodging storms and fighting fatigue.

Twenty balloons entered this year's 47th Gordon Bennett Cup. On September 13, a balloon lifted off every 3 minutes from the Saline Royale d'Arc-et-Senans in eastern France. Inflating each balloon with approximately 1000 m^3 of helium at a rate of about 3000 m^3/hour is no easy task. To ensure that the balloons all take off on time, the gas supply and inflation equipment must be absolutely reliable.

A little lift from Linde

Once again, Linde was chosen to supply the gas, supporting infrastructure and technical support. Helium was chosen because the French authorities did not allow the use of hydrogen. Linde provided a secure container with 26,000 m^3 of liquid helium at -269°C. It also delivered 13 cylinder bundles of gaseous helium as well as the equipment to vaporize the liquid helium and the connecting tubes between the container, heaters and cylinders.

After almost 54 hours of flight and 1596 km, the French Leys brothers landed on the Portuguese coastline to claim the title for the third year running. This was a particularly exciting victory for the brothers. Because France has won the title three times in a row, the brothers get to keep the cup forever.

The French team was followed by the US and Belgium teams. Linde is delighted to have made such a successful contribution to this challenging and inspiring event. □

Powered by liquid helium supplied by Linde, the balloons in this year's Gordon Bennett Cup took off from the impressive Saline Royale d'Arc-et-Senans (Royale Saltworks of Arc-et-Senans) in France. Built in 1775 during the reign of Louis XVI, the saltworks were supposed to provide a blueprint for "an ideal city".

Success takes shape

Smooth finish with gas injection molding

Even in economy-class cars, drivers are looking for elegance and substance. Hard to imagine, therefore, that these needs are increasingly being met with "hollow plastic" parts! Injection molding using industrial gases is providing precisely the flexibility, accuracy and quality needed for sophisticated and complex automotive parts.

Gas injection molding (GIM) is proving increasingly popular in the automotive industry where it is being used to replace a growing number of solid plastic and metal parts such as door handles, armrests, mirror frames and gas pedals.

By enabling more lightweight designs, GIM is making a valuable contribution towards fuel efficiency. It also gives manufacturers more design flexibility. Complex parts can be produced more easily and cost-effectively than with metal processing techniques. Not forgetting, of course, the aesthetic aspect. Drivers often see their cars as image statements and are looking for perfection in every detail. GIM-engineered parts have a smoother, more professional finish than solid plastic parts.

Gas injection molding (GIM)

- Gas injected at high pressure into melted polymer mass
- Nitrogen (gas of choice) forms hollow channels
- Polymer directed away from core to mold surface
- Gas released from cavity after solidification
- Result: improved quality, lower costs, lighter weight, faster process, less materials

Through the automotive supply network, Linde delivers the nitrogen used to make plastic parts found in the cars of most major automobile manufacturers. To maximize efficiency, Linde developed a unique, patented booster system (DESY™ 300/100). By compressing liquid nitrogen, DESY 300/100 minimizes the energy required to supply very pure, high-pressure injection gas, thus maximizing cost efficiencies.

Clever Claus

Enhanced sulfur recovery for more environmentally friendly fuels

In response to increasingly stringent legislation, oil refineries are challenged to produce fuels almost free of environmentally damaging sulfur compounds. First invented over 100 years ago, the Claus process for sulfur recovery has become the industry standard. This multi-step process recovers elemental sulfur from the organic sulfur compounds in crude oil. The final step involves oxidation of hydrogen sulfide.

Oxygen enrichment is a powerful way of substantially increasing the sulfur recovery capacity of Claus plants. In addition, oxygen enrichment results in more efficient decomposition of noxious compounds. It also allows plant operators to adjust output upwardly in the event of an outage in a parallel plant, thus maintaining consistent production levels.

Linde has in-depth expertise in this area. It has built oxygen-enriched Claus plants and helped numerous customers to revamp existing plants, thus contributing to more environmentally friendly fuels. To facilitate revamp efforts, Linde and LD Duiker jointly developed a purpose-designed Claus burner. It supports both air and oxygen-enriched operation, is highly compact and ensures excellent mixing results.

Claus plants help the environment by converting poisonous sulfur compounds into harmless elemental sulfur.

New-generation URTF increases capacity by up to 50 %

Stena Aluminium AB is the dominant supplier of high-quality casting aluminium in Sweden and Denmark. As consolidation intensifies in the aluminium industry, competitive pressures continue to rise. Like many other companies, Stena Aluminium was looking for ways to increase production efficiencies while keeping emission levels to a minimum.

On consultation with its long-term partner, Linde, the company decided to install Linde's new generation of oxygen-based furnaces for secondary aluminium extraction – URTF (Universal Rotary Tiltable Furnace).

Capacity at Stena Aluminium is up 50 % thanks to URTF. At both of its URTF furnaces at Älmhult, Sweden, the company can now produce 50,000 tons/year of high-quality casting aluminium from scrap material.

With URTF, Stena Aluminium can now produce a higher volume of aluminium at lower cost thanks to a combination of increased capacity, higher metal output and lower energy consumption. Equally important for Stena Aluminium, however, is the environmental factor. URTF has lowered emission levels and halved the landfill waste produced by the company. In addition, Stena can now use a higher percentage of low-grade scrap. Not only does this benefit the environment, it also lowers the cost of raw materials.

Nitrogen is pumped into the mixture in stages until the correct calorific value has been attained.

Perfect mix

Linde keeps natural gas flowing to Dutch households with nitrogen

A prominent natural gas supplier in Europe, NV Nederlandse Gasunie prides itself on the fact that it has never experienced a serious disruption in service delivery over its 40-year history. Gasunie goes to considerable lengths to maintain those high standards of quality.

The calorific value of natural gas depends on its composition. This is determined by the extraction location. Gas burners in most Dutch households are set to the relatively low calorific value of 35.17 megajoules/m³ (in keeping with the calorific values of the giant Groningen gas field near Slochteren). However, partly due to imports, the volume of high-calorie gas (40 MJ/m³) arriving in the Netherlands is on the increase. To serve the Dutch market, this gas must be diluted to 35.17 MJ/m³.

Uniform supply

Gasunie turned to Hoek Loos, the Dutch subsidiary of Linde Gas, to resolve this challenge. Hoek Loos' air separation plant at IJmuiden supplies nitrogen used to dilute the natural gas. Nitrogen is ideal because it is cost-effective, inert (i.e. non-flammable) and of stable composition. In addition, it is found in natural gas. Gasunie supplies the nitrogen-diluted gas to Dutch households. A separate pipeline is used to supply high-calorie gas to factories, gas companies and power stations both on domestic and foreign markets.

Full steam ahead for eBusiness at Linde Gas USA

To make it easier for customers and distributors to browse product listings and place orders, Linde Gas USA offers an online catalog with its gas, equipment and welding/cutting hardware products. Constantly being improved and expanded, the catalog now lists some 70,000 items.

Based on Haht Commerce software, the catalog is linked directly to Linde's SAP system for maximum accuracy and automated content management. To enhance usability, gas products are organized by type, grade and container size. Equipment and welding hardware are grouped logically with the OEM supplier as the last level. Listings have been extended to include details such as OEM numbers and technical details. Linde also offers customer-specific online catalogs.

Orders can be placed directly from the catalog ... watch this space for more about web ordering and e-services!

You can check out Linde Gas USA's online catalog at www.us.lindegas.com by clicking on Product Lines, followed by Complete Product Catalog.

Linde continues to dynamically expand its gas business across Europe

Construction is already underway for the parts to build a new €50 million on-site air separation plant in Tornio in northern Finland. When completed in 2005, the plant will supply the steel mills of AvestaPolarit, a major Finnish stainless steel producer, with oxygen, nitrogen and argon.

In addition, Linde Engineering is currently constructing an air separation plant for Linde Gaz Romania S.R.L. in the Romanian town of Ramnicu Valcea (approx. 180 km north west of Bucharest). This plant will supply the chemical company Oltchim SA with oxygen and nitrogen by pipeline.

Springboard for south-east Europe

Business is also booming in south-east Europe with the recent opening of a new carbon dioxide plant in Becej in Serbia and Montenegro. The plant has an hourly capacity of 10 tons of liquid CO_2 and is an approved CO_2 supplier for CocaCola thanks to its "food grade" gas rating. This new state-of-the-art plant strengthens Linde's foothold in Serbia and gives it an ideal springboard for south-east Europe.

Things heat up in Spain

With new frits furnace

Ever heard of frits? If you have ceramic glazed tiles or a ceramic pavement, you're probably walking on them. To make frits, cristallic substances are fused at very high temperatures.

To improve the melting and fusing of frits, Linde's Spanish subsidiary, Abelló Linde, has developed a new non-stop tilting furnace. Based on 100% oxy/fuel burners, "HFAL" furnaces are supported by a tilting structure. This allows the melted frit to be poured quickly into the casting.

Abelló Linde specializes in turnkey "HFAL" projects comprising the furnace, automatic combustion equipment, burners, controllers, data readers and oxygen.

As already demonstrated by one of Abelló Linde's customers, this new furnace reduces energy consumption by at least 35%, lowers production costs, increases productivity by 40% upwards and cuts emission levels.