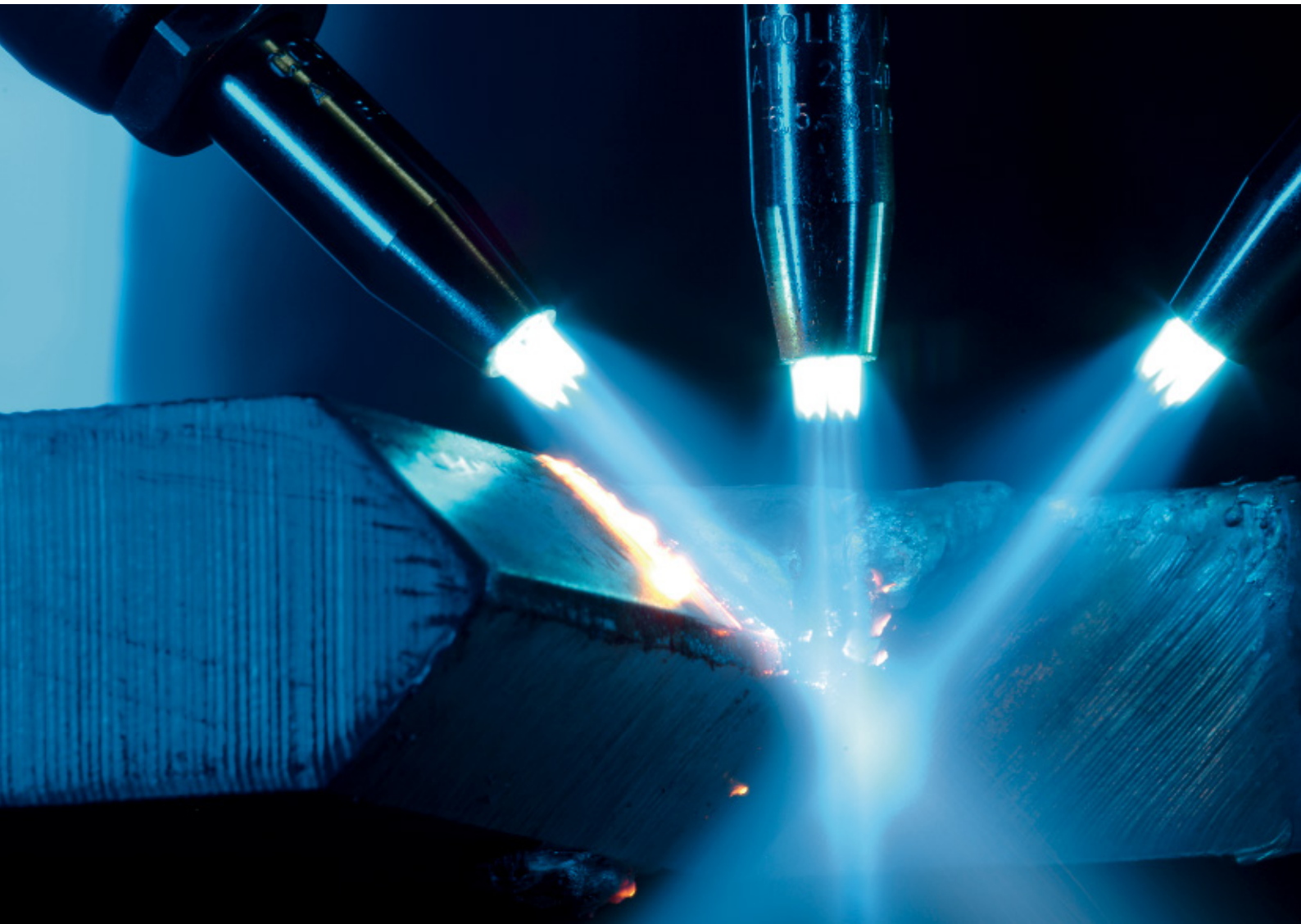
THE LINDE GROUP

Linde

Acetylene

The fuel gas of choice.



Consult the experts. Finding the fuel gas that works best for you.

Your choice of fuel gas is fundamental to the quality, safety, efficiency and cost-effectiveness of your fabrication processes. Whether you are cutting, brazing, heating, cleaning, gouging etc., you need to be sure that you are using the best fuel gas for your business. However, there are many fuel gases available: LPG (propane), natural gas (methane), acetylene and so on. So how do you select the correct fuel gas for your needs?

Linde can help you make the right decision. With our extensive application experience and know-how, we can give you concrete advice and offer you the best solution from our comprehensive range of gases, equipment and services.

Our fuel gas solutions are designed to:

- Reduce your costs
- Improve the performance of your processes
- Enhance the quality of your products
- Ensure the highest level of safety

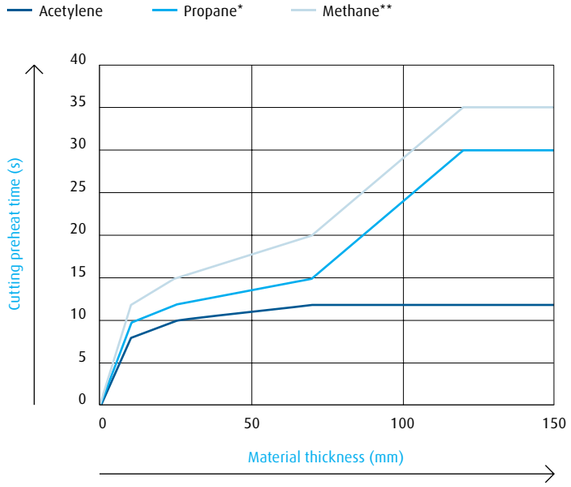
High speed, lower costs. Profit from the many benefits of acetylene.

Most manufacturing applications require rapid and concentrated heating and preheating of the workpiece for efficient operation.

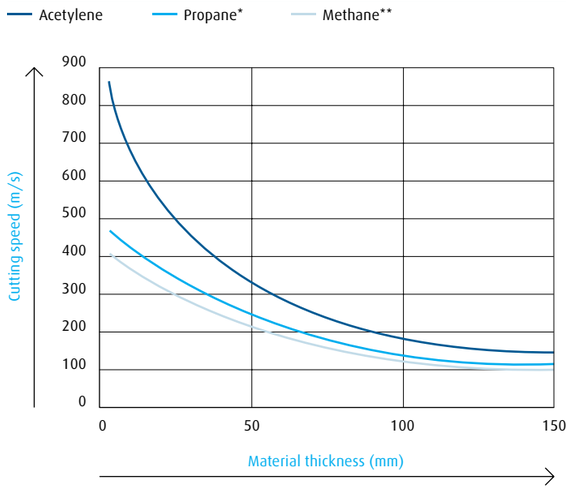
The primary flame of acetylene heats up the surface of the workpiece faster than any other fuel gas, reducing the preheat time considerably. Acetylene is therefore the best solution for cutting, welding and related applications, which require a fast transfer of heat from the flame into the workpiece. Due to its unique properties and high efficiency, acetylene also allows for faster processing, leading to a significant reduction in time and costs.

Other industrial fuel gases such as LPG and natural gas vary in purity and composition. This means that the performance changes and it is not possible to optimise the setup of your process.

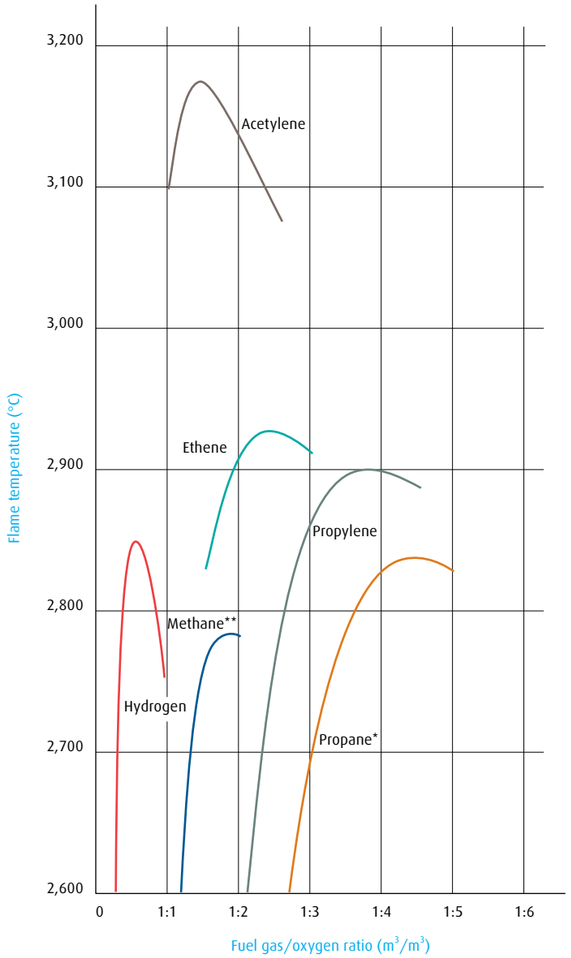
Oxyfuel preheat times for mild steel



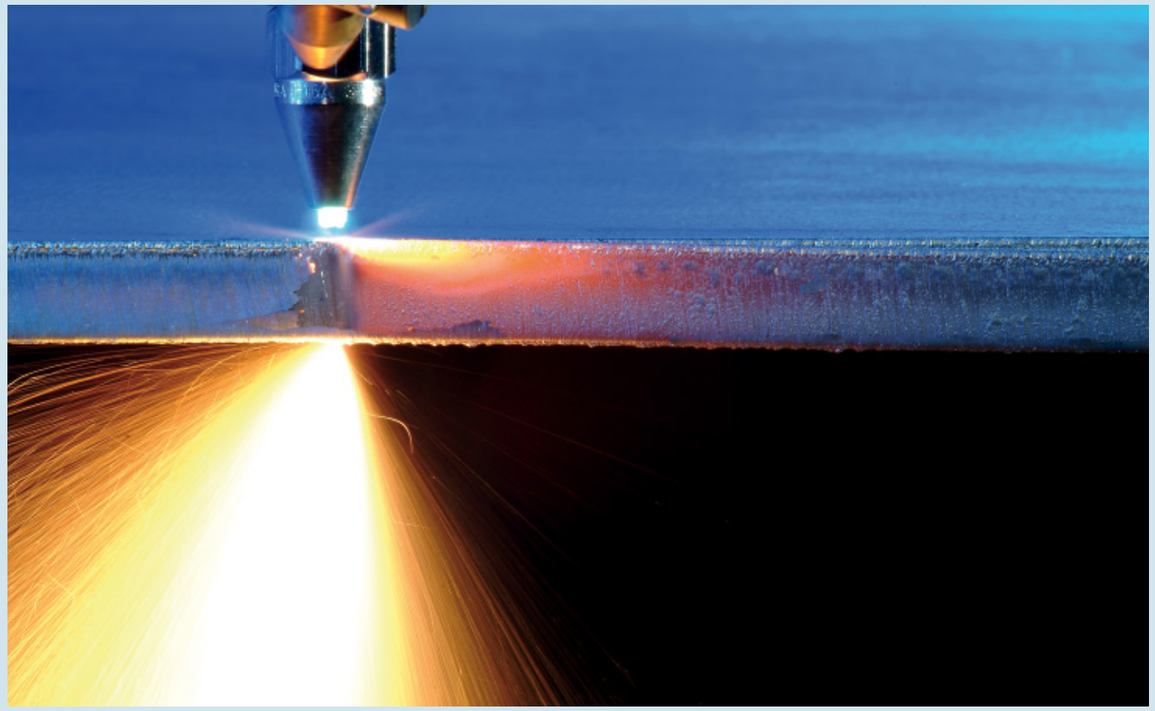
Oxyfuel cutting speeds for mild steel



Flame temperatures fuel gas/oxygen



* LPG is low-grade propane whose composition and purity are not constant
** Natural gas is low-grade methane whose composition and purity are not constant

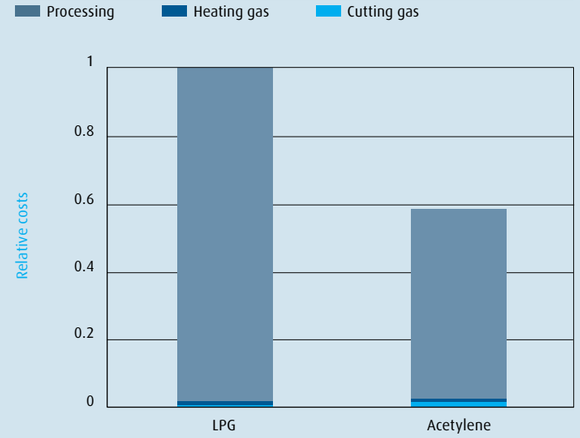


Mechanised oxy-acetylene cutting

Case study: Mechanised oxyfuel cutting of 25-mm mild steel with 45° bevel

	LPG	Acetylene
Fuel gas (l/m)	31.67	19.52
Heating oxygen (l/m)	125	25.24
Cutting oxygen (l/m)	316.67	171.43
Cutting performance (m/h)	12	21
Processing cost reduction (%)	-	42.85
Total cost reduction (%)	-	42.54

Comparison of costs for cutting case study



When less means more. Reduced gas consumption with acetylene.

When reducing processing costs, total gas consumption is an important factor to consider. In this regard, acetylene is the best fuel gas you can get.

When using acetylene, there are two savings. On the one hand, you need less fuel gas, due to the shorter preheat time and faster processing. And on the other hand, you also save oxygen, as a lower mixing ratio of acetylene and oxygen is necessary to generate a normal cutting flame (see table below).

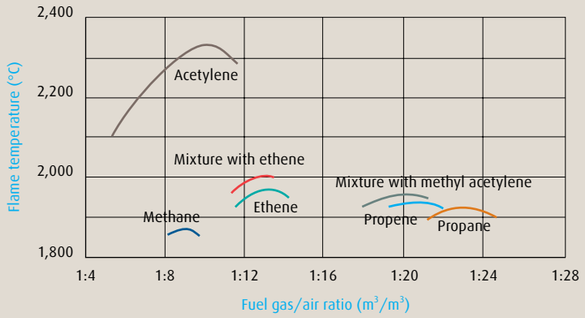
Some processes, such as brazing and preheating, do not require such high temperatures. For these applications, it is possible to use acetylene with air instead of oxygen, maintaining the precision and fast heat transfer while making more savings.

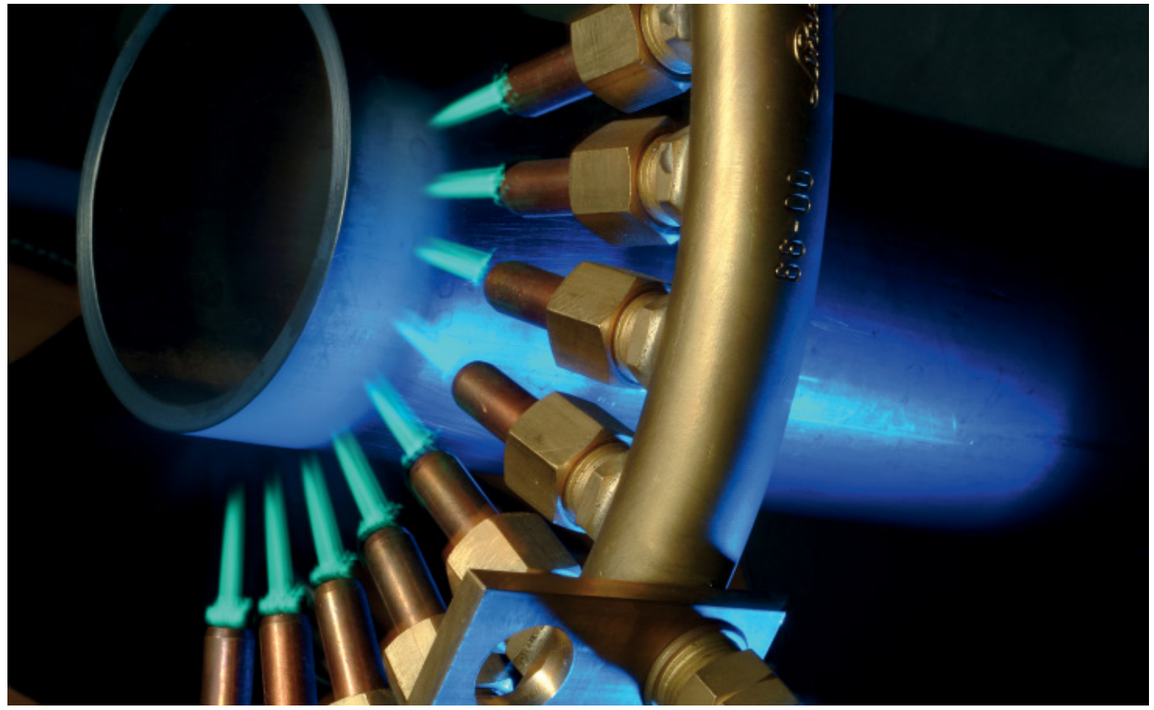
In preheating applications, the shortened time taken to reach the desired temperature with oxy-acetylene allows the system to be shut down during short breaks, saving even more gas. This is normally not possible with other fuel gases, such as propane and natural gas, as the preheat time is too long to be economical.

Comparison of mixing ratios

Fuel gas	Mixing ratio (oxygen flow/fuel gas flow)
Natural gas (methane)	1.8
LPG (propane)	4.0
Acetylene	1.1

Flame temperatures fuel gas/air



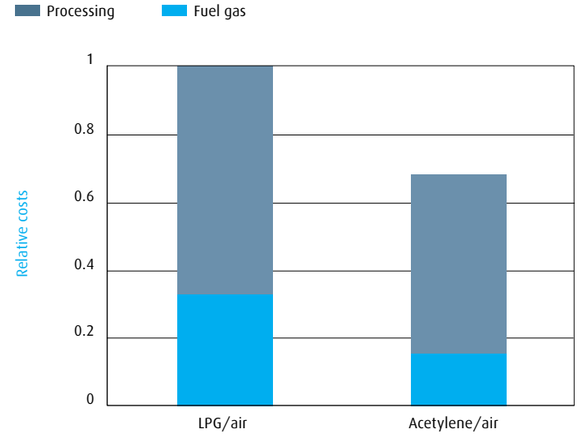


Pipe preheating using air-acetylene LINDOFLAMM® burners

Case study: Oxyfuel preheating of orbital weld (high-strength steel pipe, 43 mm, diameter: 2,900 mm)

	LPG	Acetylene
Processing duration (h)	9	7
Fuel gas demand (m^3/h)	16.3	12.6*
Total fuel gas demand (m^3)	146.7	23.0**
Fuel gas cost reduction (%)	-	53
Processing cost reduction (%)	-	22
Total cost reduction (%)	-	32
Notes		* Maximum flow. Acetylene flow reduced after initial heating.
		** Additional savings from being able to shut down gas during breaks.

Comparison of costs for preheating case study



Water puddles formed on a cool plate during oxy-propane cutting. Moisture leads to corrosion and causes problems when preheating, brazing or welding.

Results that make the difference. Achieve a superior performance with acetylene.

Acetylene enhances the performance of many applications and thus helps achieve the high-quality results that keep you ahead of your competition. Below are a few examples:

- Compared to other fuel gases, acetylene produces very low moisture levels, making it the only suitable gas for preheating, welding or brazing high-strength materials.
- Thermal welding and cutting processes induce residual stresses in the workpiece that lead to distortion. Only an acetylene flame can produce the precisely concentrated heat distribution required for successful flame straightening. Other fuel gases heat up a larger area and do not achieve this state.
- Rust scales are efficiently removed by oxy-acetylene flame cleaning. Flame-cleaned surfaces ensure excellent adhesion of paint finishes and coatings.
- A neutral flame setting is crucial, especially when welding steel, in order to avoid undesirable reactions in the molten pool. Only acetylene can provide the necessary flame temperature and flame output for melting and welding steel with a neutral setting.

Comparison of moisture contents

Fuel gas	Moisture content in flame (%)
Natural gas (methane)	41
LPG (propane)	32
Acetylene	3

The right gas for the right application

Application	Acetylene	LPG	Natural gas	Other fuel gas	Oxidising gas
Steel burning					
Cutting	+++	++	++	Propylene	Oxygen
Gouging	+++				Oxygen
Powder cutting	+++	++			Oxygen
Oxygen lancing					Oxygen
Melting					
Welding	+++			Hydrogen	Oxygen
Brazing	+++	++			Oxygen, air
Soldering	++	++			Oxygen, air
Fusing	+++				Oxygen
Spraying	+++	++		Propylene, hydrogen, ethene etc.	Oxygen
Material heating					
Hot forming	+++	++			Oxygen
Preheating	+++	++	+		Oxygen
Postheating	+++	++	+		Oxygen
Hardening	+++	++			Oxygen
Cleaning	+++	+			Oxygen
Texturing	+++	+			Oxygen
Straightening	+++	+			Oxygen
Distortion control	+++	+			Oxygen
Asphalt heating		+++			
Paint removal	++	+++			Oxygen, air
Roofing	+	+++			
Friction reduction					
Carbon coating	+++			Propylene	
Space heating					
Room heating		+++	++		

Safety features come built in. Wherever you are, you can rely on acetylene.

When using fuel gases in confined spaces or underground, acetylene is the only fuel gas considered suitable. This is due to its physical properties, i.e. it is 10 % lighter than air. Therefore, a dangerous accumulation of flammable gas at ground level is prevented.

As with all fuel gases, acetylene needs to be treated with respect. Fuel gas applications are associated with potential sources of hazards, such as fire and fumes, requiring special care as well as corresponding safety systems and equipment that meet the specific conditions of each individual industry. Gas cylinders, cylinder bundles and tanks used for gas supply need to be handled prudently and require appropriate accident prevention measures.

When working with Linde, you are always on the safe side. We can offer you advice, publications, services and products that help you protect your most valuable assets.

Efficiency you can rely on. The right supply solution.

The best fuel gas has to be complemented with the right supply mode. Using our years of experience, we will offer the most cost-efficient solution – from small cylinders to road trailers.

In addition, we will also provide you with the necessary equipment (automatic changeover manifolds and point-of-use regulators) and design, install and maintain gas distribution systems that comply with current safety standards.

No matter how much gas you demand, we can ensure a flexible and reliable supply – with minimum disruption to your production. With our SECCURA® automatic gas supply service, we look after your gas management, taking the effort out of your gas supply.

SECCURA® is a registered trademark of The Linde Group.

Gas supply point: three trailers for acetylene and liquid tanks for argon, carbon dioxide and oxygen.

Saving time and effort for your core business.
Add our tailored services to your gas solution.

Today's market is becoming increasingly competitive, meaning that you need to concentrate on adding value to your business.

At Linde, we offer you more than supply services. We have a whole portfolio of service offers to make your life easier and ensure that you are up to date with the latest technology and safety standards. We can also provide assistance with production issues and help you run your business as efficiently as possible.

For those applications where an off-the-shelf solution is not available, Linde also offers LINDOFLAMM® flame solutions.

Administrative Efficiency: Your direct connection to success
We understand that you need easy-to-use, intuitive tools that focus on the key requirements of your inventory management as well as your purchasing and payment processes. Therefore, we have designed several online tools that make the interaction with us easier and more transparent for you. Our service offer for more administrative efficiency:
- → ACCURA® cylinder management (tracking and tracing of individual cylinders)
- → Electronic orders
- → Customer self-service (delivery notes, invoices etc.)

Supply Reliability: No more surprises
For your production processes, you need a reliable and efficient gas supply. With our gas supply services, you don't need to worry about your gas deliveries anymore and unscheduled interruptions will be a thing of the past for you. Our service offer for more supply reliability:
- → Express and emergency deliveries
- → SECCURA® automatic gas supply
- → Design and installation of gas supply systems
- → Curative and preventive maintenance of gas supply systems
- → Equipment maintenance

Quality and Safety: Staying safe, healthy and competitive
At Linde, safety has top priority in everything we do. We care about your health, safety and security as much as we care about our own. At the same time, we can ensure the high quality of gases that you need to stay competitive in your industry. Our service offer for more quality and safety:
- → Safety trainings
- → Safety audits
- → Gas certificates

Process Know-how: Knowledge is the key
When it comes to new and efficient gas applications, our application specialists stay on top of the latest developments. With our extensive global network of local experts and our global development department, we are able to support you with our application know-how all over the world. Our service offer for more process know-how:
- → Gas application trainings
- → WELDONOVA® process consulting
- → Customer R&D

Please contact your local Linde sales representative or customer service agent to find out more about the 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 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.

Für Sie einheitlich erreichbar – bundesweit in Ihrer Nähe.

Vertriebszentren/Kundenservice allgemein

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