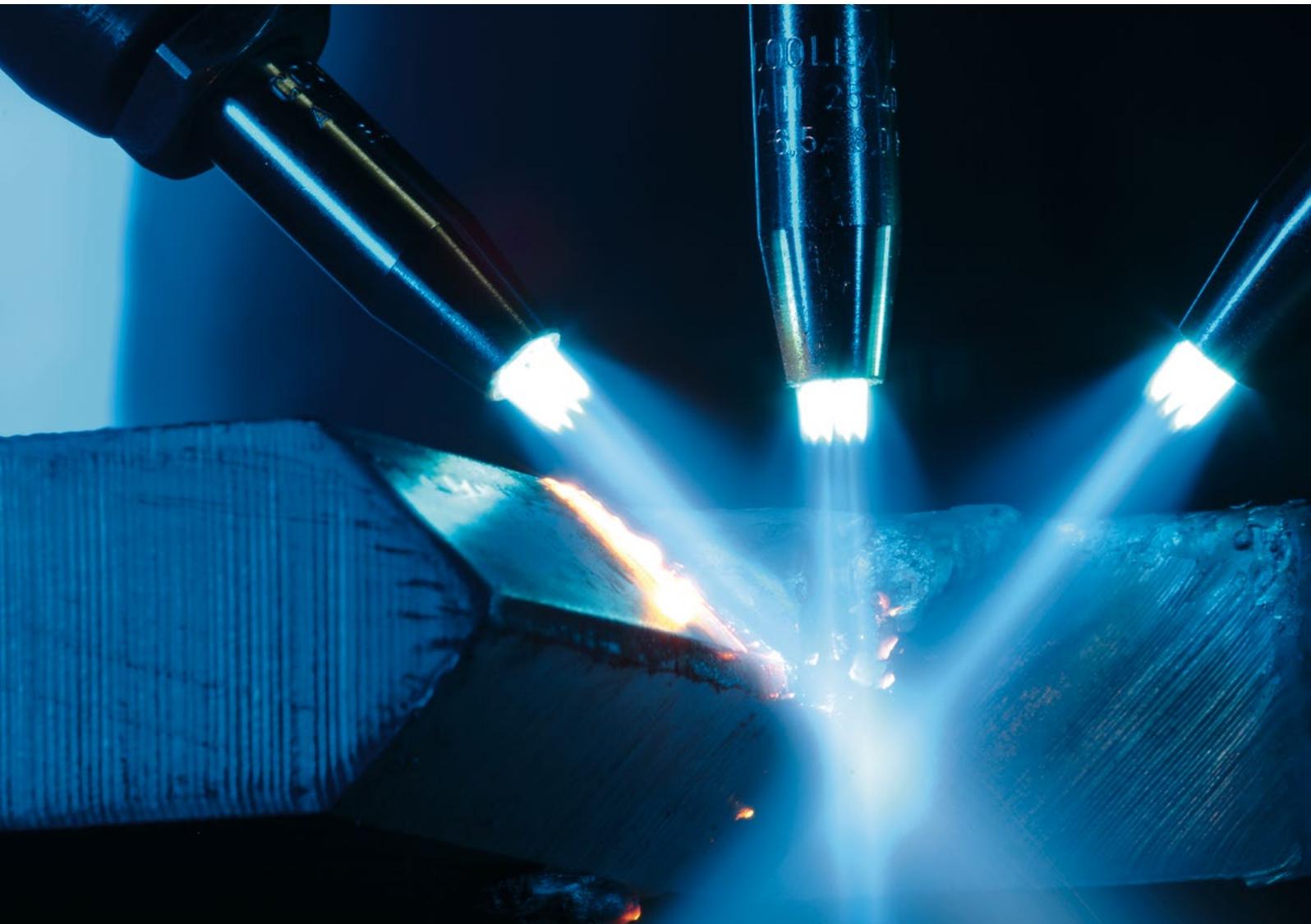


Acetylene

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?

BOC 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.

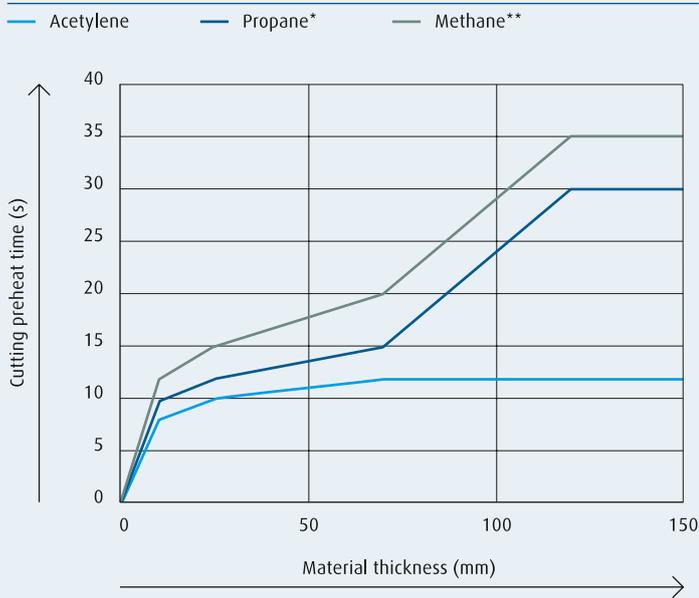
Most manufacturing applications require rapid and concentrated heating and preheating of the workpiece for efficient operation.

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

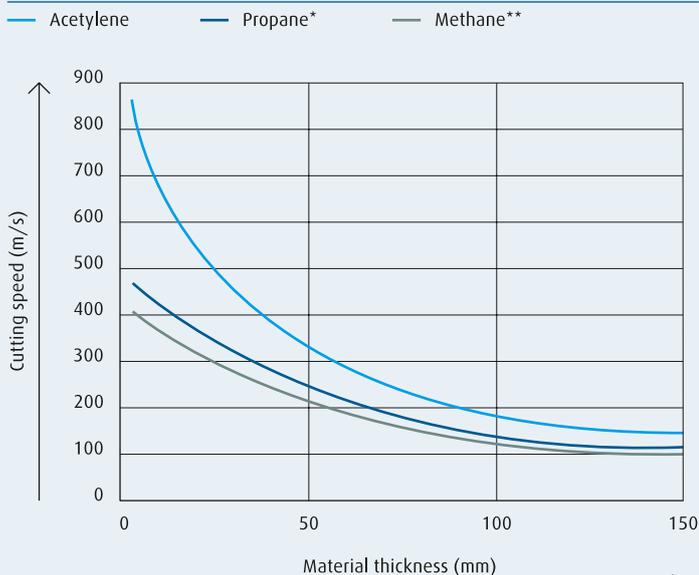
into the workpiece. Due to its unique properties and high efficiency, acetylene also allows for faster processing, leading to a significant reduction in time and costs.

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.

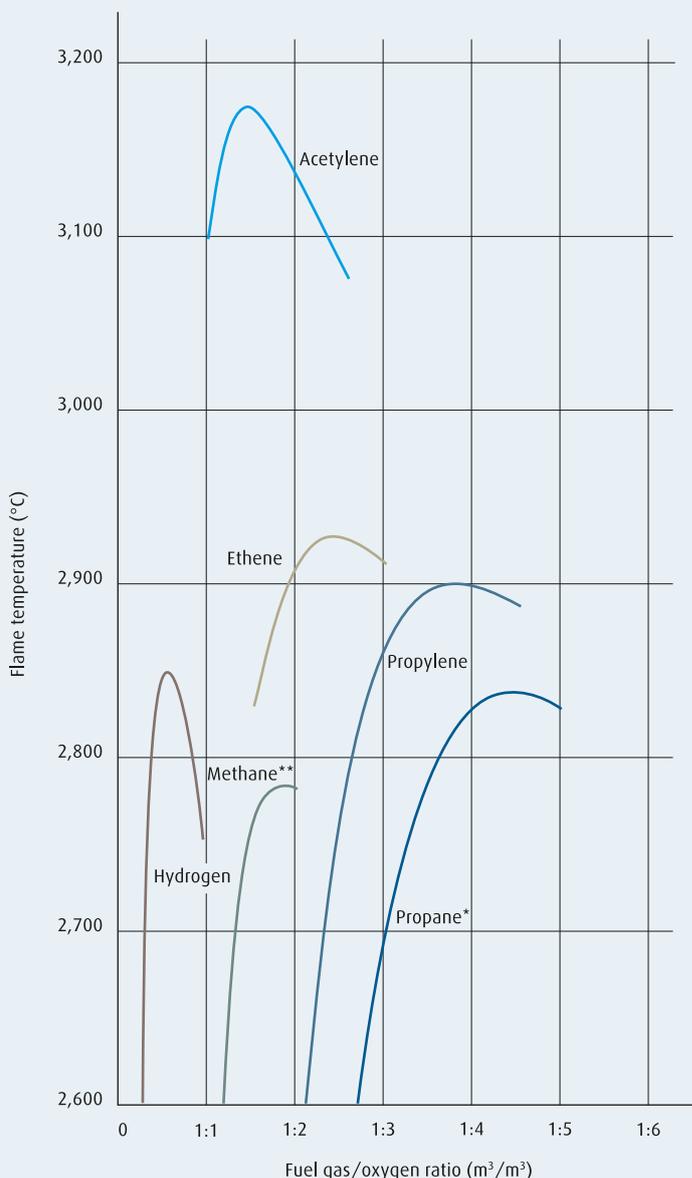
Oxyfuel preheat times for mild steel



Oxyfuel cutting speeds for mild steel

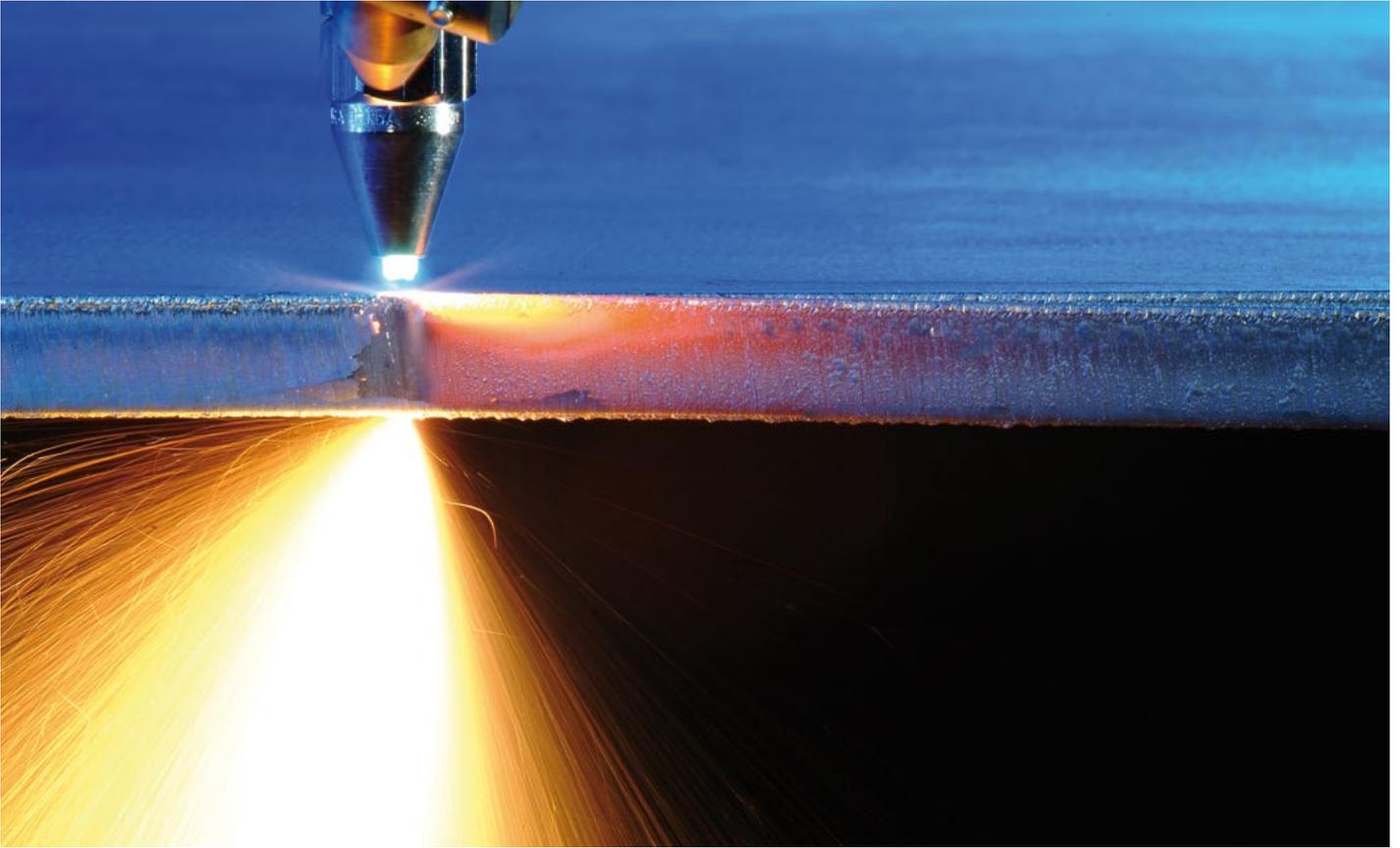


Flame temperatures fuel gas/oxygen



* 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



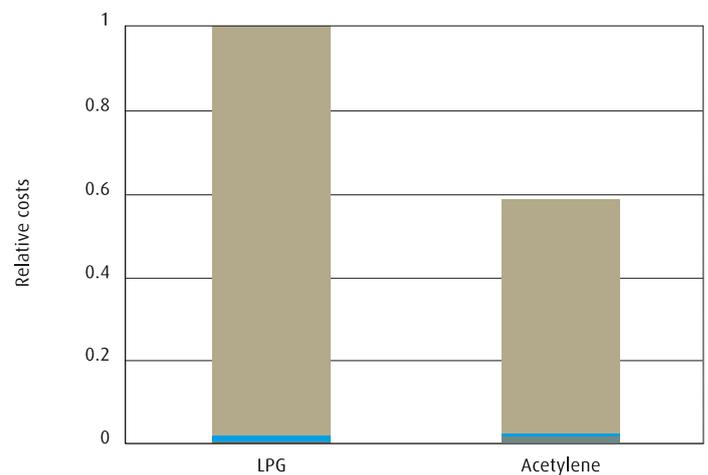
Mechanised oxy-acetylene cutting

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

	LPG	Acetylene
Fuel gas (l/m)	31.67	19.52
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

■ Processing ■ Heating gas ■ Cutting gas



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).

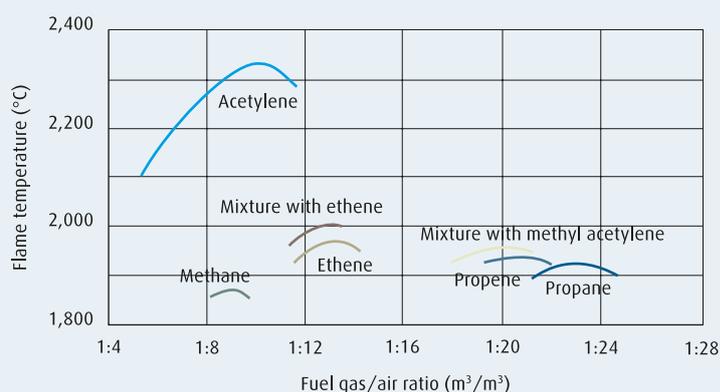
Some processes, such as brazing and preheating, do not require such high temperatures. For these applications, it is possible to use acetylene with air instead of oxygen, maintaining the precision and fast heat transfer while making more savings.

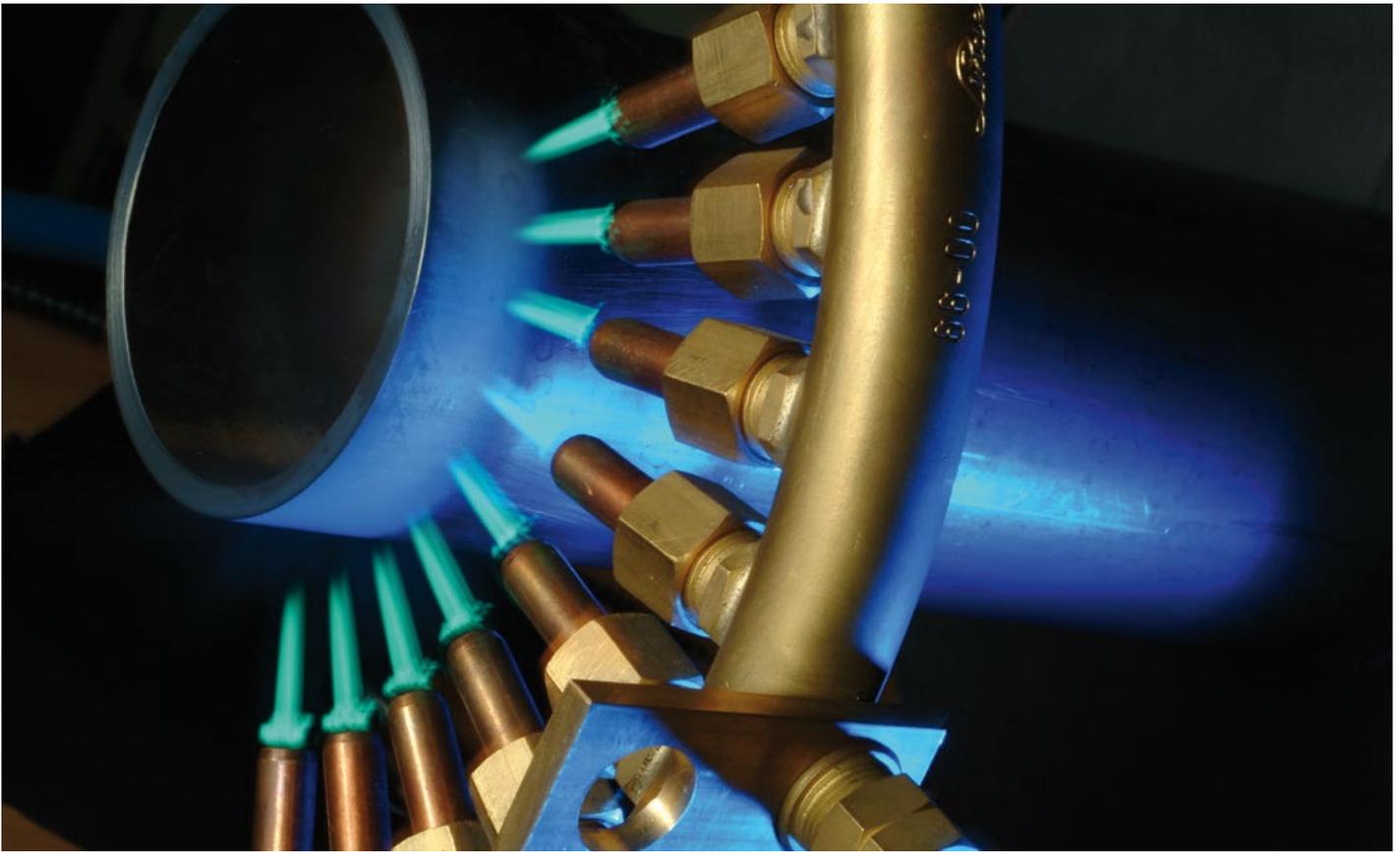
In preheating applications, the shortened time taken to reach the desired temperature with oxy-acetylene allows the system to be shut down during short breaks, saving even more gas. This is normally not possible with other fuel gases, such as propane and natural gas, as the preheat time is too long to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

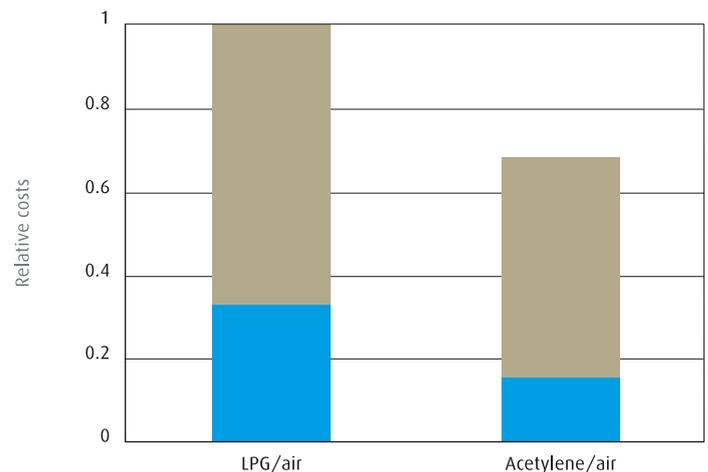
Notes

* 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

■ Processing ■ Fuel gas



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.



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

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/Propane	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 BOC, you are always on the safe side. We can offer you advice, publications, services and products that help you protect your most valuable assets.



Complementing the Right Gas. Services.

BOC services portfolio



Supply reliability

It is our goal to eliminate all unscheduled interruptions to your delivery, ensuring you get the right gases when you need them.

- Delivery services - we know you can't always predict exactly when and how much gas you will need. Express and emergency delivery, delivery to point-of-use and cylinder connection are some of our services offers available to you.
- Complete supply options - Whatever the process used we have a supply mode to meet your needs. Compressed gas cylinders, mini bulk and bulk cryogenic gases - we supply them all without any effort to you.
- (online shop)

Quality and safety

Safety is a priority for BOC and most likely for you too. BOC can provide you with know-how in the safe use of your gases.

- Safety training - we offer practical courses designed for the users of gases. These can be delivered at a customer site or at open workshops enabling all levels of personnel to meet their individual needs.
- Gas analysis - professional analysis of gas in the lab or on site guarantees the high and consistent quality you need in your processes.
- Preventive maintenance contracts - we offer a regular check of your gas-supply system, to ensure its safe operation and, if required, maintain and repair the system.

Process know-how

BOC is part of a global solution-provider committed to the gases industry. With our outstanding global team of application engineers, we have high competence in all gas related processes.

- Application training - you can benefit from our experience in welding and cutting applications to ensure that the skill levels of your workers are as high as possible.
- Process consultation - our application engineers can look at your gas consumption and optimise it for your processes.

Administrative efficiency

Not only do we deliver high-quality products as standard, but we make it simpler and easier for you to order your gas when you need it.

- Customer Service Centre - BOC offers you a one-stop-shop for all your gas supplies, equipment needs and all the associated products and services you need for your business. We are there for you all day, everyday.

Notes.

BOC is a Linde company, the Leading Global Gases and Engineering Business with a Mission to Make the World More Productive

We are the UK and Ireland's largest provider of industrial, medical, and special gases as well as related equipment, engineering services, and solutions to support them.

We produce, package, and distribute thousands of different types of gases to our customers every day. Our unrivalled range includes atmospheric gases, high purity gases and mixtures, refrigerants, and chemicals, for applications as diverse as cooling magnets in hospital MRI scanners to fuelling zero emissions vehicles and much more.

BOC offers tailored supply solutions for every size of customer; our cylinder customers enjoy a nationwide delivery and collection network; bulk customers the reassurance of 24/7 delivery; and for our high-demand customers we offer onsite production or dedicated pipeline supply.

And all of this is backed up by industry leading customer service, expert technical support and best-in-class levels of safety and environmental performance – the basis on which we have earned our reputation as a reliable and trusted partner.

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