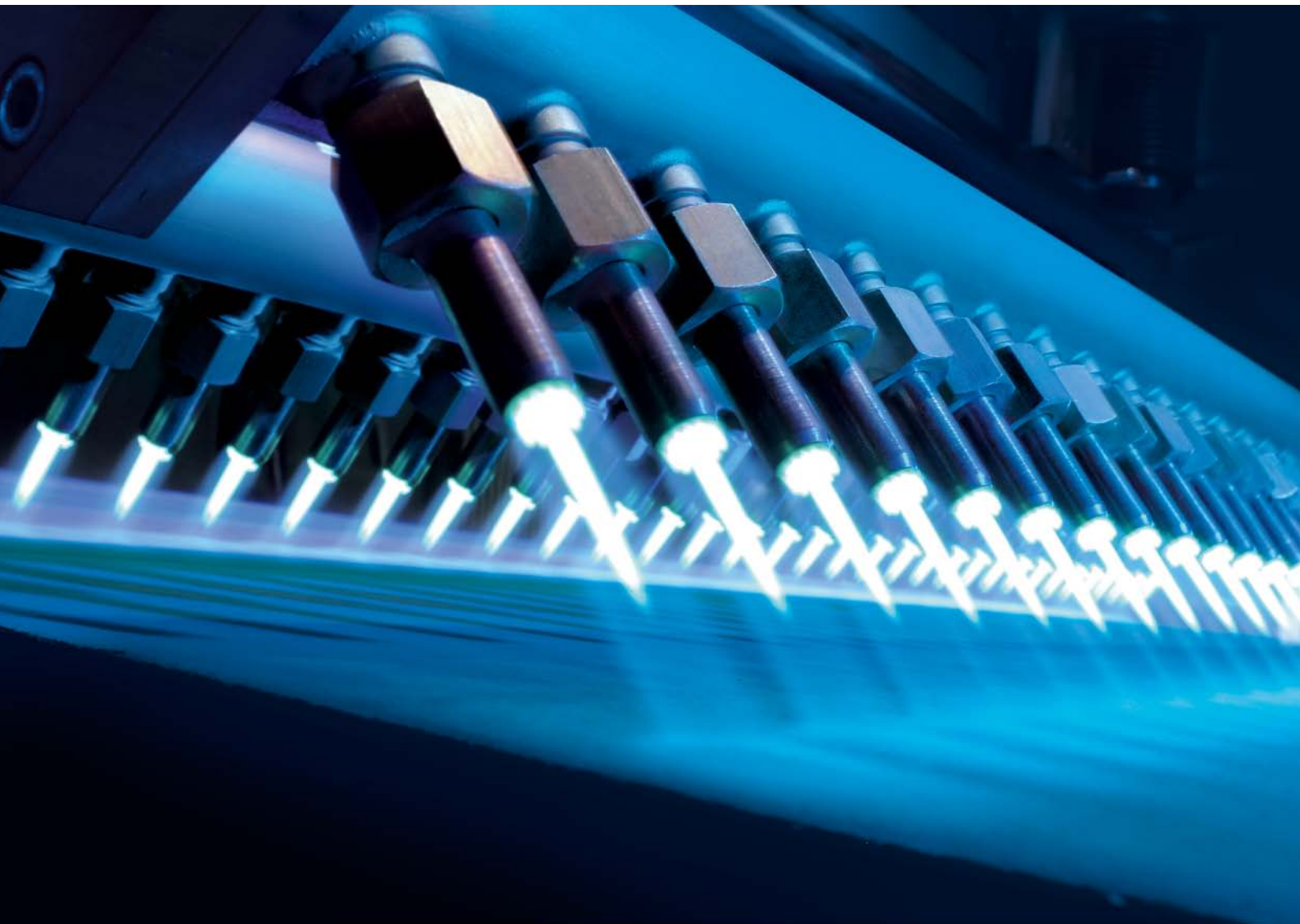


# LINDOFLAMM®

Flame solutions





## Complete solutions for complex tasks

LINDOFLAMM®

For pre-heating, post-heating, flame straightening, flame hardening, flame brazing, fusing or hot forming, you need to be sure you have the right gas and the best equipment. Our LINDOFLAMM® flame solutions deliver maximum performance at optimum cost.

Precision manufacturing processes call for tailored solutions. Standard, off-the-shelf equipment often gives an unsatisfactory result.

LINDOFLAMM® solutions are designed to fulfil your specific requirements, employing special burners whose shapes and capabilities are tailored to your application and matched to the right fuel gas mixture.

### LINDOFLAMM® benefits at a glance

- Higher productivity: optimum heat transfer to the work piece
- Lower processing costs: economical gas use
- Capacity for automation

### Our full service offer

The LINDOFLAMM® programme is the result of over 100 years experience. We are able to address any demands and provide you with complete solutions, including: correct gas and equipment selection; comprehensive support; reliable gas supply; and extensive process knowledge.

#### Process solutions

High-quality fuel gases, burner technology, automation systems and dedicated support for:

- Flame heating
- Flame straightening
- Pre-heating (welding and cutting)
- Post-heating (welding)
- Hot forming
- Flame brazing
- Flame hardening
- Fusing of flame-sprayed coatings

#### Supply solutions

- Reliable and cost-efficient supplies
- High-quality equipment and installation
- Next day and emergency delivery
- A variety of gas supply modes

#### Process expertise

- Applications training
- Assistance with customer R&D
- Process consulting
- Developing new technologies

#### Quality and safety services

- Integration management
- Installation and inspection services
- Burner maintenance
- Safety audits
- Safety training

# Oxygen and acetylene

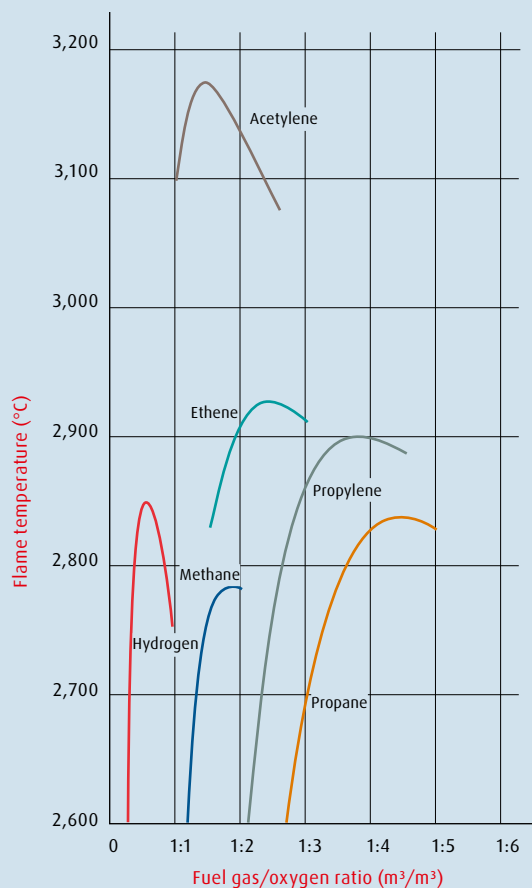
## The preferred gas combination

### Acetylene: the perfect fuel gas

For efficiency, precision and accuracy, there is no better choice than acetylene:

- Acetylene produces the highest flame temperatures, providing rapid and concentrated heating.
- The unique temperature distribution in an acetylene flame means that the energy is contained within the primary flame, allowing for precise heating.
- Acetylene has the highest flame propagation rate, increasing thermal efficiency.
- Exhaust gases have low moisture content, reducing corrosion.

Flame temperatures fuel gas/oxygen



Oxidising flame

Neutral

Reducing flame



Flame setting

## Oxygen: selecting the right supply

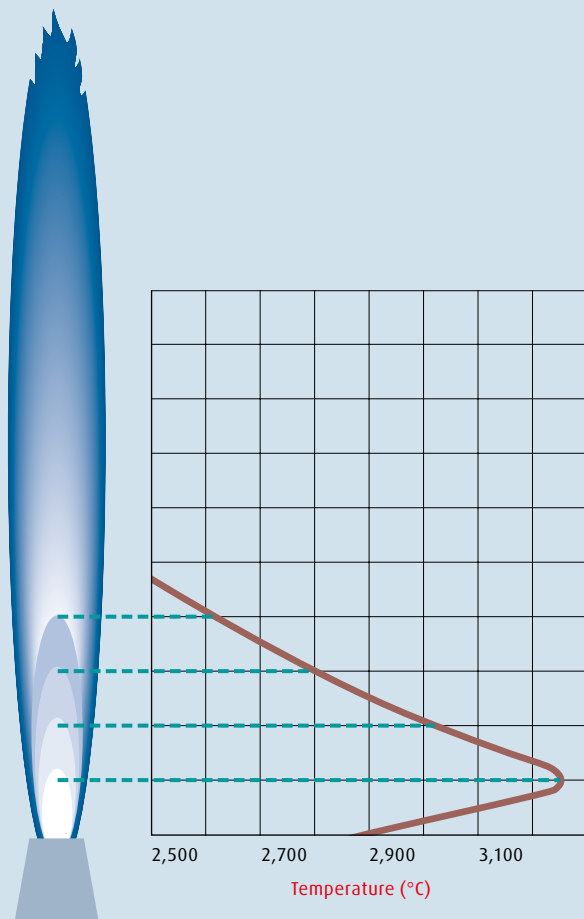
To achieve the correct heating of the work piece, flame properties have to be aligned to the specific application. The oxygen source (oxygen gas, compressed air, aspirated air) has to be selected carefully:

- Pure oxygen is used for hot forming, flame hardening, flame cleaning and for fusing sprayed coatings. It gives a rapid rise in temperature at the work piece surface and causes a build-up of heat with a high temperature gradient inside the work piece.
- Compressed air is used for pre-heating, post-heating, flame brazing and flame drying. It lowers the temperature and combustion speed, producing a mild and gentle, yet intense and economical

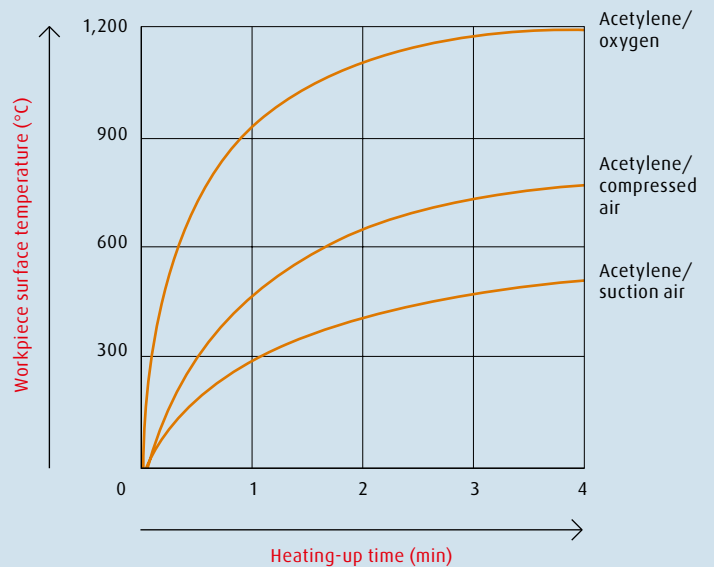
flame, which can be effectively controlled. The work piece is not as hot and the temperature gradient lower than when oxygen is employed. Instead, the work piece is heated through at a lower surface temperature.

- Aspirated-air burners are sometimes used for brazing. They provide lower surface temperatures, a very shallow temperature gradient and thorough heating.

### Temperature distribution within an oxy-acetylene flame



### Effect of oxygen source on workpiece surface temperature



# Designed for performance

## Manually guided and mechanised burners

The LINDOFLAMM® portfolio includes manually operated as well as automated burners. The special burners differ from off-the-shelf models as their shape and capacity are modified for the purpose at hand. The burners are usually gas-cooled. For heavy loads, however, water cooling can be employed. Mechanical special burners are used when heating processes are fully or partially automated. Using burners in mechanised systems requires a customised burner design with the heat delivery precisely matched to the work piece.

We work closely with customers to ensure that our technologies are seamlessly integrated into the production line and that our burner designs fully meet customer requirements.

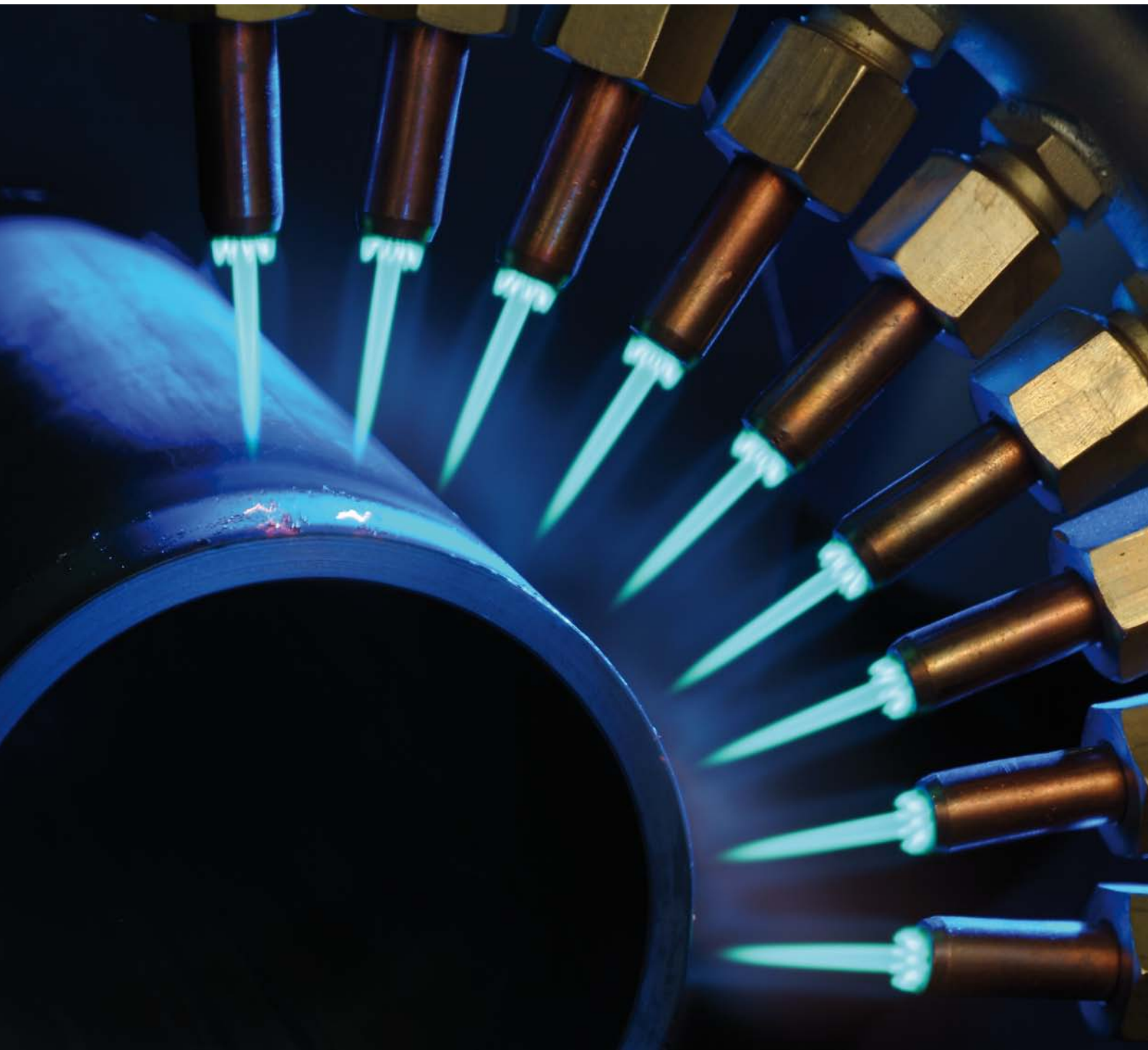
### Control panels: reliable automatic operation

Acetylene lends itself to automation. Electronics make it possible to adjust the flame and control the flow rates of acetylene and oxygen (or air).

BOC has developed control panels for automated flame ignition and consistent flame properties. They can be integrated into your machine controller or operated independently. For some applications, it may be necessary to heat a work piece to a certain temperature and then maintain this until the process is complete. This can be achieved by integrating a remote sensor with our control panels.

Reliable safety systems are critical. Our control panels can monitor gas and coolant flows, burner and coolant temperatures as well as pilot light status. Moreover, they ensure that flames always ignite correctly and, if any problems occur, they safely shut down the system.

Pipe pre-heating using air-acetylene LINDOFLAMM® burners





Acetylene trailer packs at a customer in Germany

## Always ready

### Continuous gas supply

BOC can provide you with a supply solution that meets your needs: from mobile cylinder packs, to trailer packs for acetylene and bulk tanks for oxygen. With our own fleet of vehicles making 7,000 gas deliveries a day, we can guarantee the highest level of supply reliability. Our emergency delivery service means we can react rapidly to unexpected changes in demand as well.

In addition, BOC offers the best supply equipment options. From single cylinder regulators to fully automatic solutions, we achieve the maximum withdrawal rates – and without any disruption to your process. For bulk deliveries, BOC's TelTank telemetry system takes hourly readings of your stock levels to plan the next scheduled delivery.



# Global knowledge from local experts

## Detailed process expertise

Bespoke solutions require extensive process expertise and experience. Our local technical experts provide the most detailed advice. They are supported by our state of the art Application Development Centre in Unterschleissheim, Germany, which houses our LINDOFLAMM® solutions development facility. Our expertise includes:

- Burner design
- Assistance with customer R&D
- Applications training
- Process consulting

Our highly-skilled engineering team is continuously developing and evaluating new technologies. This ensures that our customers are always equipped with the latest and most innovative solutions.





## With you all the way

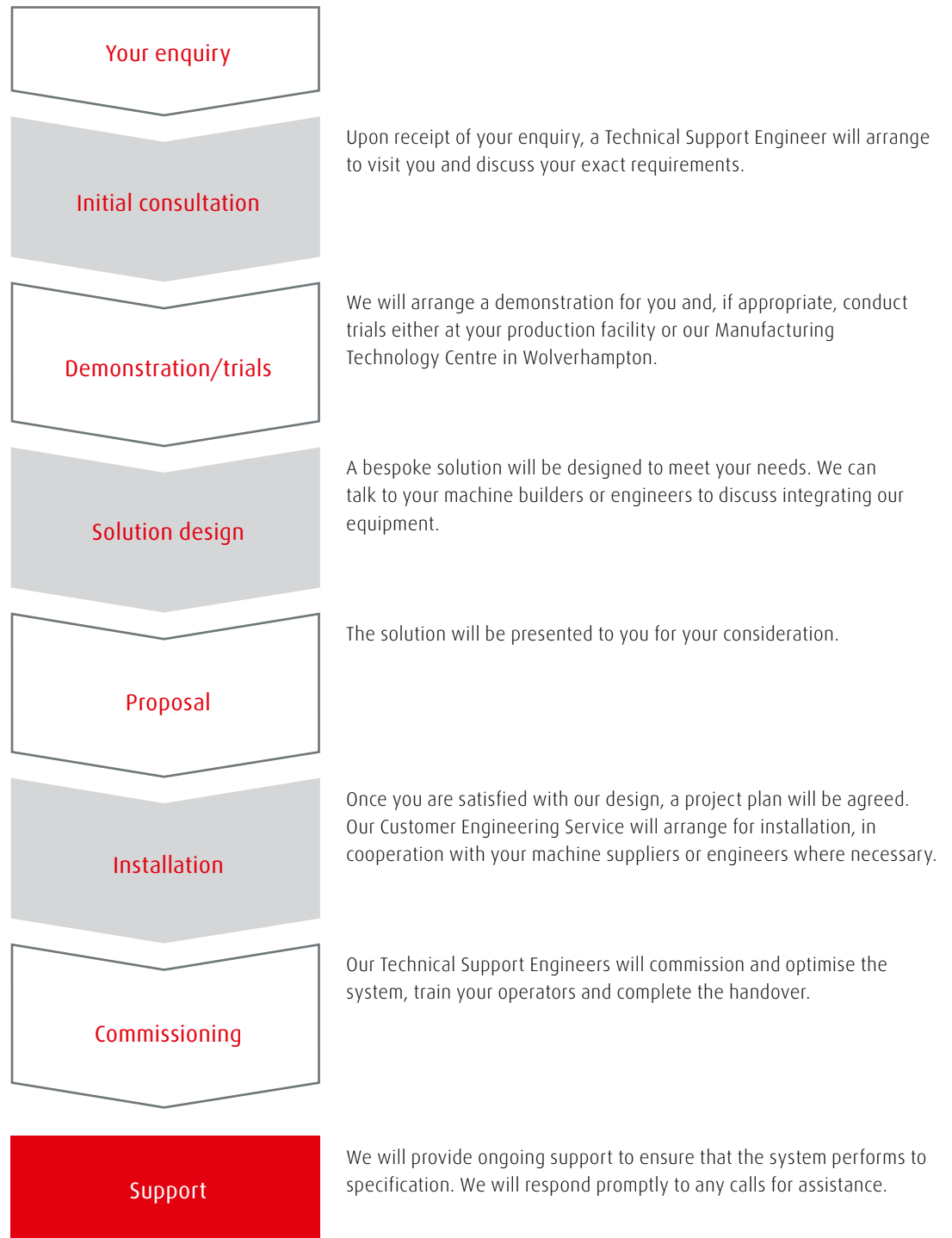
### Support services

To integrate LINDOFLAMM® solutions into your production process, take advantage of our full service offer. Our wide variety of services includes:

- Integration management
- Installation service
- Burner optimisation
- Burner maintenance and servicing
- Next-day deliveries
- Dedicated support
- Quality and safety audits
- Safety training

For further information on LINDOFLAMM®, please contact us at [lindoflamm@boc.com](mailto:lindoflamm@boc.com) or call your Customer Service Centre.

## Seven steps to a perfect flame



# BOC – turning ideas into solutions

BOC is a member of The Linde Group, the leading global gases and engineering company. BOC is the UK's largest provider of industrial, specialist and medical gases, as well as related products and services. As a leader in the application of technology, we are constantly looking for new ways to provide our customers with high quality products and innovative solutions.

At BOC we help our customers to create added value, clearly discernible competitive advantage and hence greater profitability. To achieve this we have a comprehensive range of products and services, and technical support which can be customised to meet the individual requirements of our clients.

To keep ahead of the competition in today's market, you need a partner for whom quality, service, process and productivity optimisation are an integral part of customer support. We are there for you and with you, helping to build your success.

BOC's reputation has been forged through partnerships – with customers, with relevant regulatory authorities and with key suppliers. In this way, we deliver comprehensive and consistent benefits to you.

**BOC – world-leading knowledge and resources adapted to local requirements.**

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