

BRAZING ATMOSPHERE SYSTEMS

*Improving
productivity and
performance in
brazing operations
worldwide*



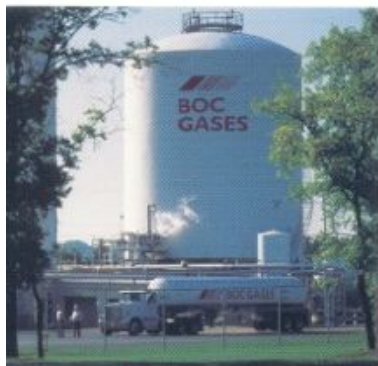
 **BOC GASES**

All brazing gases in all supply modes

Whatever gases you use in your brazing plant — nitrogen, hydrogen, argon, or helium — BOC Gases offers reliable, high-purity supply. Dew points as low as -130 °F (-90 °C), oxygen content in the parts per million range, and precision control of hydrogen content make our atmospheres more reducing than those generated by exothermic systems.

A recognized innovator in gas supply technology, BOC Gases can tailor a supply mode to fit your process requirements. We supply nitrogen to brazing plants ranging in capacity from under 500 scf/h (14 Nm³/h) to more than 75,000 scf/h (2,100 Nm³/h).

BOC Gases has merchant air separation plants strategically located near brazing customers worldwide. BOC's *Tel-Tank* telemetry system monitors product levels in your bulk liquid tanks, enabling us to optimize delivery schedules and avoid run-outs.



BOC has an extensive distribution network providing reliable, on-time delivery of nitrogen, hydrogen, and argon. Our remote *Tel-Tank* telemetry systems continually monitor product levels in your bulk liquid stations to ensure adequate supply.



Our brazing systems put you in control of your furnace atmospheres

Instead of burning natural gas with air, BOC's brazing system delivers a nitrogen-hydrogen atmosphere. The system comes complete with hydrogen supply, nitrogen supply, vaporizers, and mixing panel.

You can adjust the gas ratio to any composition. BOC's innovative zoning concept and *Nitrazone* system deliver hydrogen only where it is needed, minimizing hydrogen usage in other furnace zones.

Hydrogen has a lower density, greater convective heat transfer coefficient, and higher thermal conductivity than exothermic atmospheres. So you get higher heating and cooling rates with improved temperature uniformity.

Safety interlocks provide an automatic nitrogen purge in case of power failure, a drop in furnace temperature, or a decrease in nitrogen flow rate resulting in a loss of positive pressure in the furnace. The system meets local and national codes including NFPA safety standards, and can easily be customized to meet your process requirements.

BOC GASES OFFERS YOU A WIDE RANGE OF RELIABLE SUPPLY OPTIONS

Gas	Supply modes	Purpose
Nitrogen	Bulk liquid On-site generators Noncryogenic <ul style="list-style-type: none"> ■ PSA ■ membrane Cryogenic <ul style="list-style-type: none"> ■ Micro-LN ■ Micro-HN ■ Nova-N 	Inerting Air displacement
Hydrogen	Bulk liquid Tube trailers Cylinders	Reducing
Argon	Liquid	Extra inerting for special applications that cannot tolerate nitrogen
Helium	Cylinders Dewars	Leak-checking of brazed joints and increased thermal conductivity



BOC Gases offers a wide range of noncryogenic membrane generators and pressure swing adsorption (PSA) plants for producing your own nitrogen on-site.



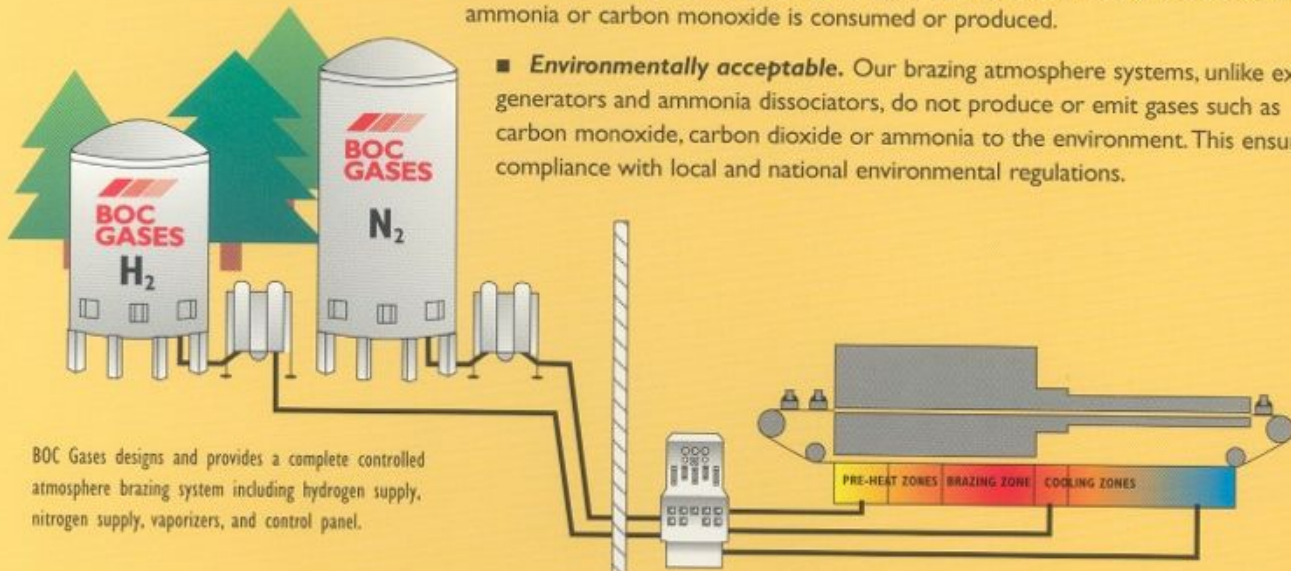
BOC's brazing systems give you these advantages...

- **Applications versatility.** Nitrogen-hydrogen atmospheres can be used in more applications than any other system. They are superior to dissociated (cracked) ammonia for stainless steel brazing. Exo generators can't be used at all with stainless. Nitrogen-hydrogen systems provide a better atmosphere than exo for mild steel, copper, and brass. And nitrogen is essential for higher quality aluminum brazing. Our systems perform well with *any* materials you need to braze — not only stainless steel, mild steel, aluminum, and high-tech alloys but also metal-to-nonmetal applications.
- **Capacity.** BOC can tailor a control system and gas supply to economically provide atmospheres for small or large brazing operations. And our control systems and supply modes can be easily expanded to meet future growth with minimal capital cost.
- **Reliable performance.** Many exo generators are plagued by low reliability, frequent downtime, and excessive maintenance requirements. BOC's nitrogen-hydrogen system is more reliable and more flexible, eliminating these performance problems. Backup systems for on-site generators minimize downtime. An automatic nitrogen purge prevents accidental oxidation of parts.
- **Better brazing.** BOC's brazing systems produce strong, clean, leak-tight joints. Both the surface quality and metallurgical characteristics of the finished product are enhanced. Use of the nitrogen-hydrogen atmosphere increases brightness and provides superior carbon control to prevent decarburization.
- **High-purity gas supply.** The consistency and purity of the nitrogen-hydrogen atmosphere ensures uniform quality of brazed parts. Conventional atmospheres lose consistency as the composition and dew point of hydrocarbon fuel gas supplies fluctuate.
- **Greater productivity.** Use of BOC's brazing atmosphere systems results in greater productivity than exo generators and dissociated ammonia. You have fewer rejects that have to be rebrazed or discarded. Yields and profits rise significantly.
- **Lower costs.** Since the bulk liquid storage tanks and on-site generators are leased, capital costs are minimal. Greater reliability than exo generators results in lower maintenance costs and minimal downtime. In addition, virtually no gas is wasted. You don't consume gas while the furnace is not processing parts, because BOC Gases' brazing atmosphere systems can be easily turned down or off.
- **Safe operation.** BOC's controlled atmosphere systems are safer and easier to operate than technologies based on ammonia or hydrocarbon fuel gas. The nitrogen atmosphere is inert and nontoxic. No ammonia or carbon monoxide is consumed or produced.

- **Environmentally acceptable.** Our brazing atmosphere systems, unlike exo generators and ammonia dissociators, do not produce or emit gases such as carbon monoxide, carbon dioxide or ammonia to the environment. This ensures compliance with local and national environmental regulations.



Panels provide accurate monitoring and control of gas flows to permit precision zoning.



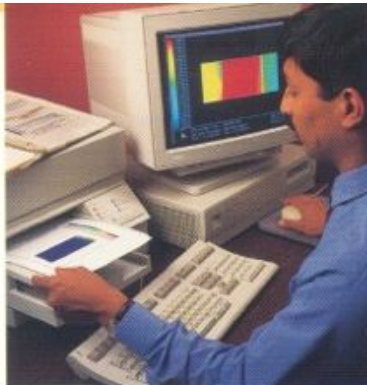
BOC Gases designs and provides a complete controlled atmosphere brazing system including hydrogen supply, nitrogen supply, vaporizers, and control panel.

Your partner in brazing success

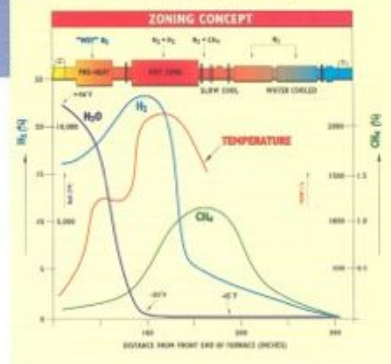
Our staff of highly trained scientists and metallurgists can conduct a thorough assessment and analysis of your current furnace operations to improve brazing performance. Our technical expertise includes

- process modeling
- process integration
- project management
- on-demand usage
- furnace design consultation
- installation
- commissioning
- atmosphere optimization through computer modeling

We work with you at every step, from initial design to installation, start up, and ongoing support. BOC Gases provides training, technical support, third-party asset management, service, delivery, and supply. In some cases, costs can be reduced through strategic alliances in which multiple customers share bulk stations and on-site generators.



BOC Gases' Nitraware furnace-modeling program (left) enables us to quickly and easily optimize furnace atmospheres and gas consumption using our industry-recognized Zoning Concept (below).



The BOC advantage

When it comes to enhancing furnace atmospheres, no supplier has a track record equivalent to that of BOC Gases. A long-time innovator in controlled atmospheres, BOC Gases is credited with developing the zoning concept, in which the composition of the atmosphere varies with each zone of the furnace to maximize performance.

Our Nitraware PC-based modeling software helps visualize atmosphere flow dynamics to optimize flow rates, gas composition, and zone temperatures in existing furnaces. Using computer modeling and the concept of "a mental walk through the furnace," we can help you design new furnaces ideally suited to your particular process.

We are continually working to improve your brazing results. BOC Gases recently designed an advanced Tel-Tank telemetry system for remotely monitoring furnace atmospheres as well as gas supplies. We've also developed a patent-pending, three-gas atmosphere system consisting of nitrogen, hydrogen, and argon. This atmosphere can be used to braze grades of stainless steel and other metals that cannot tolerate nitrogen pick up.

BOC Gases: The secret to better brazing

For decades, brazing plants worldwide have enhanced their operations and reduced costs with atmosphere systems from BOC Gases.

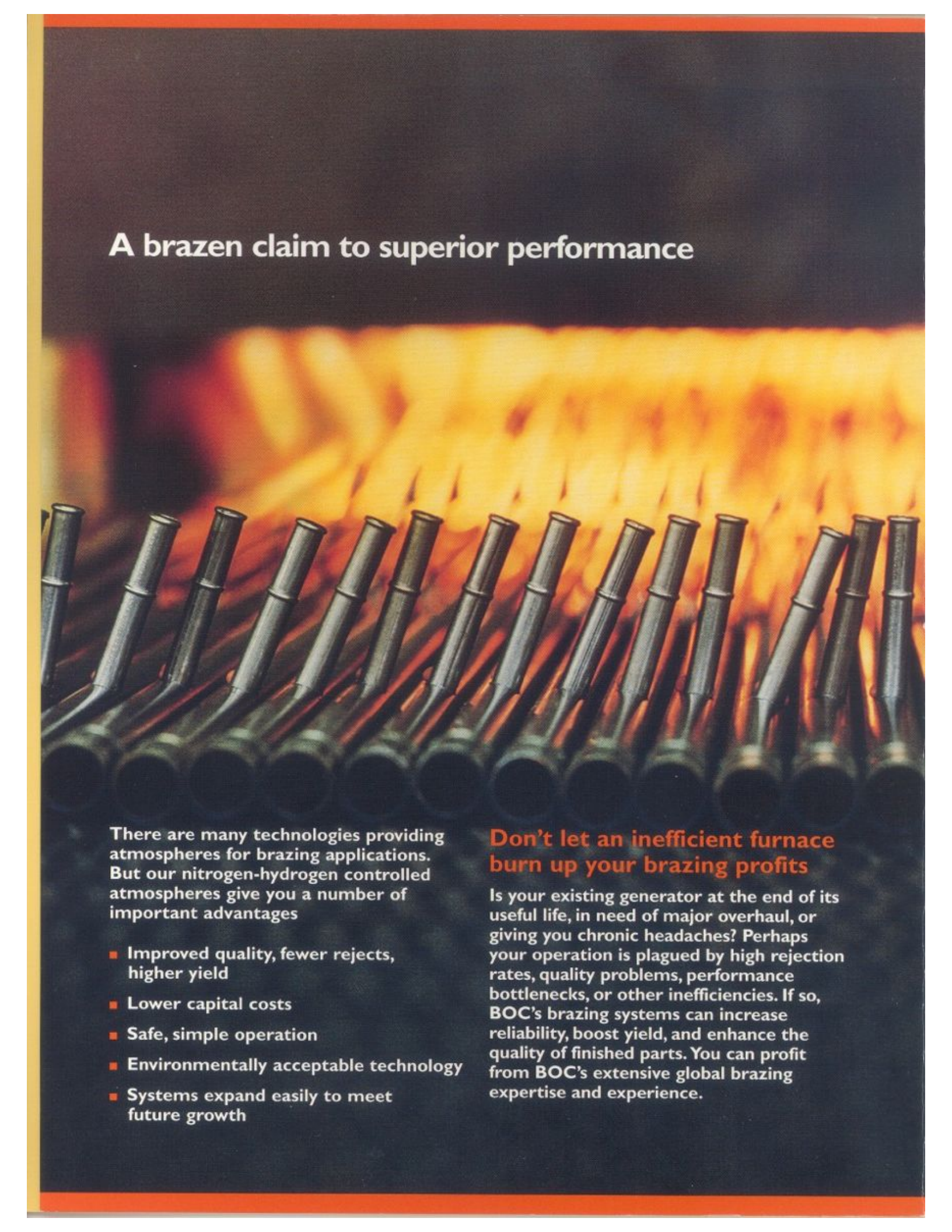
Our technology and expertise can help you produce better quality brazed joints with fewer rejects. So you enhance customer satisfaction. And increase your profits as never before.

For more information, call or write us today.



By providing better and more complete flow of filler material, BOC's brazing systems create joints that are strong and leak-tight.





A brazen claim to superior performance

There are many technologies providing atmospheres for brazing applications. But our nitrogen-hydrogen controlled atmospheres give you a number of important advantages

- Improved quality, fewer rejects, higher yield
- Lower capital costs
- Safe, simple operation
- Environmentally acceptable technology
- Systems expand easily to meet future growth

Don't let an inefficient furnace burn up your brazing profits

Is your existing generator at the end of its useful life, in need of major overhaul, or giving you chronic headaches? Perhaps your operation is plagued by high rejection rates, quality problems, performance bottlenecks, or other inefficiencies. If so, BOC's brazing systems can increase reliability, boost yield, and enhance the quality of finished parts. You can profit from BOC's extensive global brazing expertise and experience.



BOC Gases is a trading name used by operating companies within The BOC Group, the parent company of which is The BOC Group plc

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