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Praxair – A Wider Range of Options

Praxair is more than just gases. We have a wide range of services that help create value and improve the competitiveness of glass manufacturers around the world. Praxair has been working with the glass industry for years, developing advanced technologies that improve energy efficiency, environmental emissions and product quality.

From Gas Supply to Services

Gas Supply Systems Expertise:

Praxair's industrial gas supply leadership spans more than eight decades. Whether your manufacturing processes require oxygen, nitrogen, argon, hydrogen, helium or specialty gases, Praxair supplies it. Today, we offer a wide range of gas production and storage systems options for glass manufacturers, including cryogenic, pressure swing adsorption, membrane, and bulk liquid. Together we work to achieve one goal: to provide you with the most cost-effective supply method, tailored to your specific needs.

Core applications include:

- O₂: full oxy-fuel conversions, oxy-boosting, oxy-lancing, enrichment, enhanced glass production
- N₂: float furnace tin bath, bubbling
- H₂: float furnace tin bath, flame polishing
- Helium and other specialty rare gases: coatings



A Customized Approach with Computer Modeling:

Praxair uses the highly regarded Glass Furnace Model of Glass Services to perform Computational Fluid Dynamic (CFD) modeling studies for our customers. This tool allows us to build on the experience generated in the industry and customize our supply options for your furnace. And, the results are easy to understand and implement.

A Glass Team Driven by Your Needs:

Praxair's global glass technology team is composed of engineering and market specialists who are focused on our customers' goals and challenges. The team works with industry consultants, glass engineering companies, and educators to develop better technologies for the industry. We design, build, manufacture, start-up, and optimize each system we offer. The result is an integrated, well-planned, and more efficient system and industrial gas supply meeting your needs.



Praxair's specialists work closely with our customers to optimize furnace operations

Quality, Efficiency, Productivity and Flexibility:

In addition to supplying industrial gases, Praxair has developed technologies and combustion equipment to help you improve your operating flexibility, efficiency, productivity, and product quality. Equally important, our technologies can help conserve energy, reduce nitrogen oxide (NO_x) emissions, and carbon foot print in line with today's legislative requirements.

A Wider Range of High Value Combustion Technology

Whether it is for complete oxy-fuel conversion or for auxiliary burner applications, Praxair is the industry leader providing a wider range of gas supply, applications, and services to meet the glass industry needs.

Oxy-fuel Conversion of Glass Furnaces

More than 100 conversions prove the value of Praxair's oxy-fuel burner technology. It eliminates the major source of nitrogen from the combustion process, resulting in environmental benefits, significant fuel savings, and improved glass quality.

Oxy-Boosting and Partial Oxy-Fuel Conversions

Praxair's oxy-boosting burners have been installed on over 80 furnaces worldwide, delivering up to 25% increase in pull rate. They also improve glass quality, lower electric power input, and deliver fast transition, temporary conversion for checkers repair, and higher energy efficiency.

Dilute Oxygen Combustion (DOC) Technology

Conceived to maximize oxy-fuel benefits without compromising performance, Praxair's DOC technology for glass melting provides up to 10% fuel savings over conventional oxy-fuel

burners, with two main environmental benefits: low NO_x and low particulates. The DOC burner line includes the following for both oxy-fuel and oxy-boosting applications:

1. DOC Wide Flame Burner
2. DOC-JL Burner

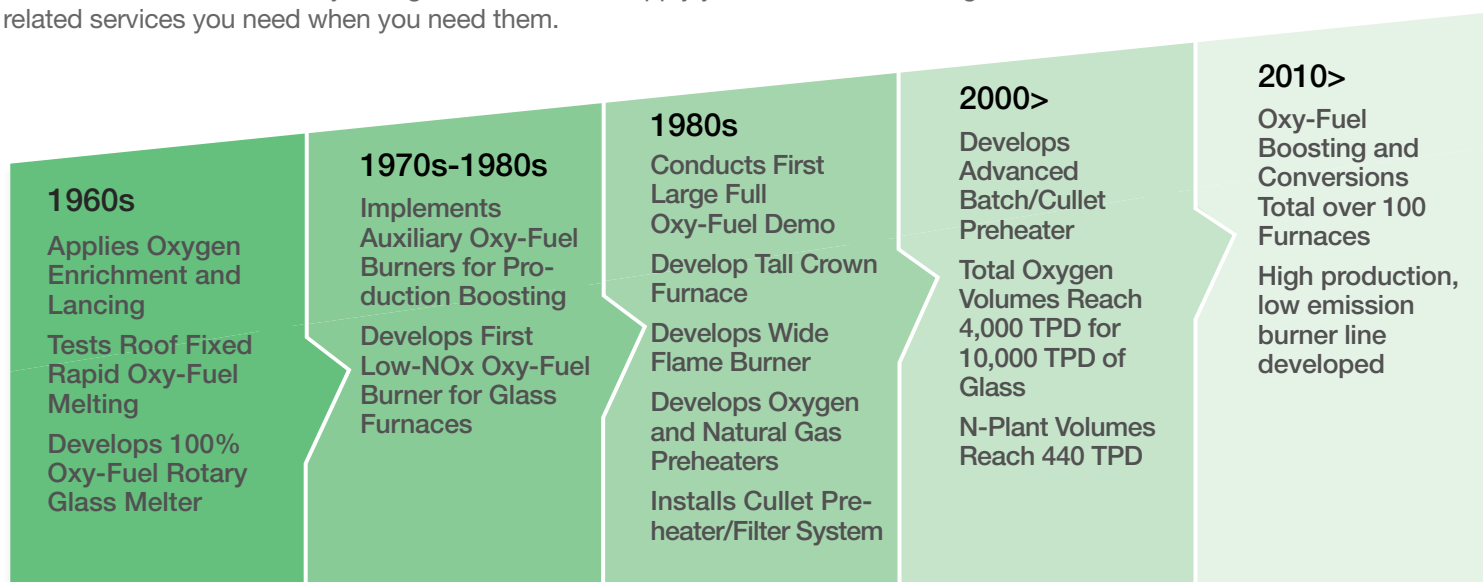


A strategic commitment with our environment

Sustainable development is an integral part of Praxair's business strategy. Environmental performance of our combustion equipment has always been a cornerstone of our design as evidenced by our DOC technology.

An Atmosphere of Excellence and Innovation

This timeline demonstrates Praxair's commitment to the glass industry-proving that we have the technical resources, flexibility, and global facilities to supply you with the industrial gases and related services you need when you need them.





A wider range of { gas supply
applications
services } for glass manufacturing

Safety and Reliability You Can Count On

When Praxair provides supply and process systems, we use advanced equipment and technologies to help ensure safe operation. All of our installations conform to applicable government and regulatory codes. For example, in our combustion system designs, all control logic must meet applicable codes for industrial furnace combustion systems as adapted for oxygen operation.

To help promote safety in operations involving our products, we provide relevant industrial gas instruction, safety literature, and videos.

A Global Leader

Praxair is one of the largest industrial gas companies in the world, and the largest in North and South America. We operate in more than 30 countries and serve one million customers in a wide variety of industries including: energy, manufacturing, chemicals, metal production, and healthcare.

To learn more about Praxair's gas supply expertise, call us at **1-800-PRAXAIR** or visit our website at www.praxair.com.

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