

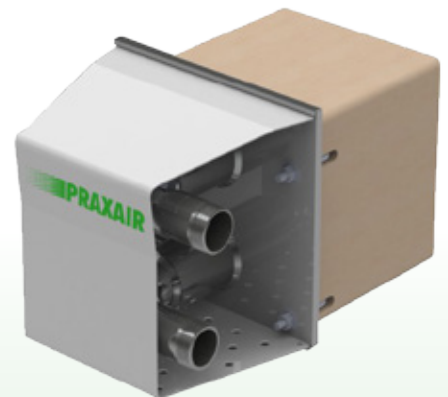


OPTIFIRE™ JL Burner

Praxair's OPTIFIRE JL oxy-fuel burner provides a rounded, straight flame pattern for glass melting or metallurgical heating furnaces and has been installed in over 50 furnaces worldwide.

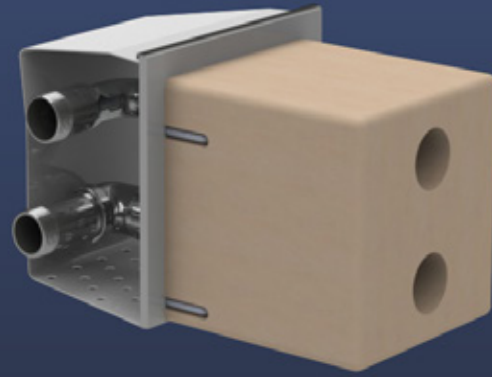
Based on Praxair's patented Dilute Oxygen Combustion (DOC) technology, the burner features a unique two-zone flame for ultra-low NOx emission and partial furnace atmosphere stratification. The upper fuel-rich primary zone produces a high luminosity stable flame for high heat transfer efficiency.

The lower secondary oxygen zone helps control flame geometry and temperature profile. This produces a higher oxygen concentration and reduced water vapor content atmosphere over the glass-melt surface, minimizing volatilization of alkali species. Flue gas emission of NOx are low due to deep oxygen staged combustion. NOx emission from the OPTIFIRE JL burner are up to 90% lower than conventional oxy-fuel burners.



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With proper placement, Praxair's OPTIFIRE JL burners minimize alkali volatilization and particulate formation from the glass melt, which significantly reduces furnace refractory corrosion and promotes longer furnace life.



The burner can operate with a variety of gaseous, liquid, and solid fuels.

Benefits

- No burner cooling required
- Minimal maintenance
- Oxygen staging allows:
 - Flame stability
 - Flame length and temperature profile adjustments
 - Atmosphere stratification control
 - Ultra-low NOx operation
- Multi-fuel burner
- Volatilization control

Flame Characteristics

The OPTIFIRE JL burner has the following geometrical characteristics:

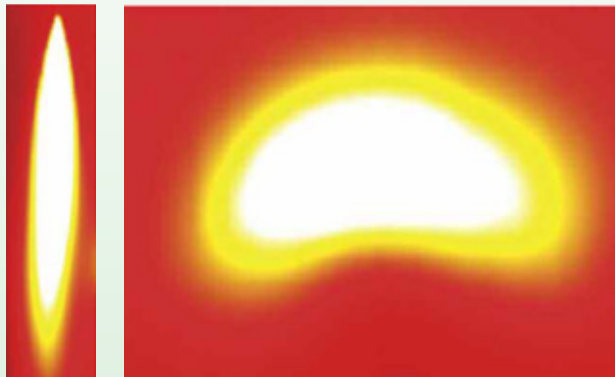


Figure 1. OPTIFIRE JL burner top(left) and front (right) views. Note: Images not to scale

Flame Length, Width, Input Rate

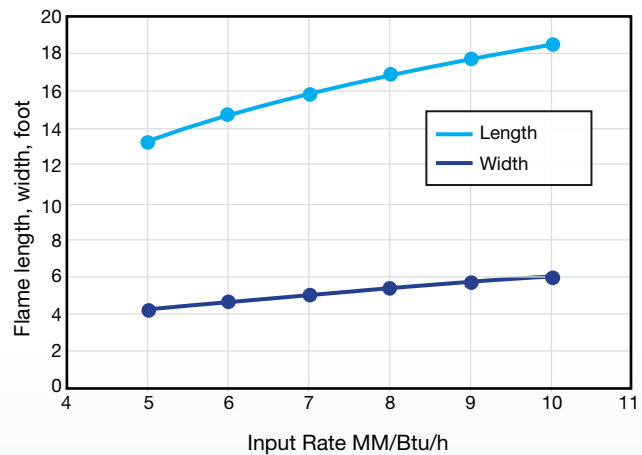


Figure 2. OPTIFIRE JL burner flame length and width as a function of firing rate.

At Praxair, not only are you selecting one of the leading suppliers of industrial gases worldwide, you are also selecting a support team that includes years of experience in the glass industry. Praxair understands the impact of oxygen supply parameters, like pressure and purity, on combustion system design, performance, and cost. As your oxygen supplier, we will work with your engineers and procurement specialists to design a fully integrated package that meets your specific oxy-fuel combustion needs.

For more information about the OPTIFIRE JL burner contact us at **1-800-PRAXAIR**, or visit our website at **www.praxair.com**.



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