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System Overview
Ultra Low NOx LEx Rapid Response
Bulletin 4215

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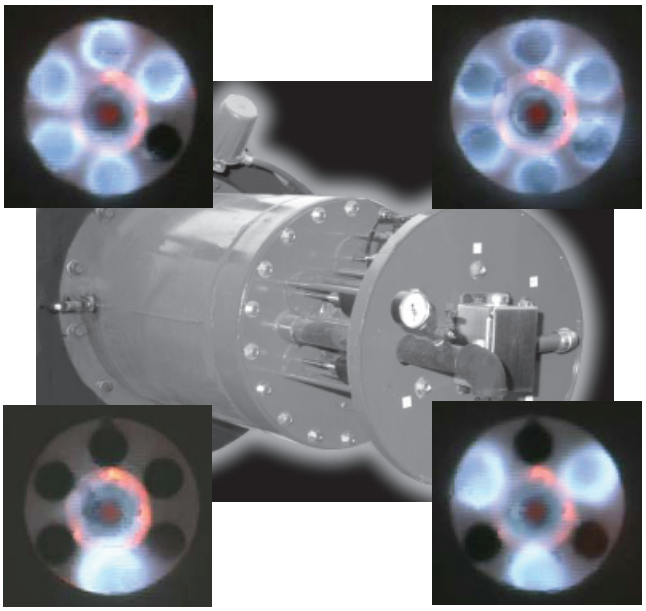
Features:

- **Ultra low NOx and CO without FGR**
- **Low to high fire in under 10 seconds**
- **Short, intense flame allows significant reductions in chamber size**

Applications:

- **Through air dryers**
- **Yankee dryers**
- **Food ovens**
- **Aggregate dryers**
- **Gypsum dryers**



The Magna-Flame LEx Rapid Response system offers quick response to changes in process demands. An array of firing rates within the turndown range can be achieved in seconds by simple control of the burner-body-mounted staging system. Smooth, rapid transitions between operating points provide changes in heat input while maintaining continuous operation.

Magna-Flame LEx systems greatly reduce the typical pollutants (NOx and CO) from natural gas combustion. Utilizing lean premix technology, the patented burner produces NOx emissions of less than 10 ppmv in many applications. CO emissions of less than 10 ppmv are achievable with the LEx burner reaction chamber installed with the burner. With over 80% of the combustion occurring in this specially designed reaction chamber, the compact flame geometry allows for a significant reduction in combustion chamber size and an overall lower installed cost.

Operation

The burner incorporates patented internal mixing elements that premix the fuel and air prior to combustion in the reaction zone. By completing a majority of the combustion in the burner reaction chamber, the low emissions of the burner are protected from process influences.

The burner is designed to operate at a nominal 10"wc main air pressure and 8 psig of gas pressure at high fire. Emissions performance is relatively insensitive to changes in firing rate. Overall thermal turndown of 15:1 is standard in most applications.

Control

The burner incorporates independently controlled linearly- actuated valves into the framework of the primary mixing elements. The valves provide rapid, smooth transition to distinct firing rates. A characterizable mass flow ratio control system is recommended for optimum emissions tuning and finer firing rate control.

Ignition and Flame Supervision

A spark ignited, separately controlled radial flame burner serves as the pilot. This integral system operates during standard LEx operation and acts to anchor the main flame, providing stable combustion at all firing rates. A single UV scanner monitors both the main and radial flame.

Burner Construction

The burner is of robust construction suited for industrial applications. Separate bosses for the radial flame igniter and UV detector can be positioned in any of several locations.

The linearly-actuated mixer control valves are housed in a protective structure, and are easily removed for maintenance. The lifetime of the valve has been tested to 250,000 cycles.

Other Fuels

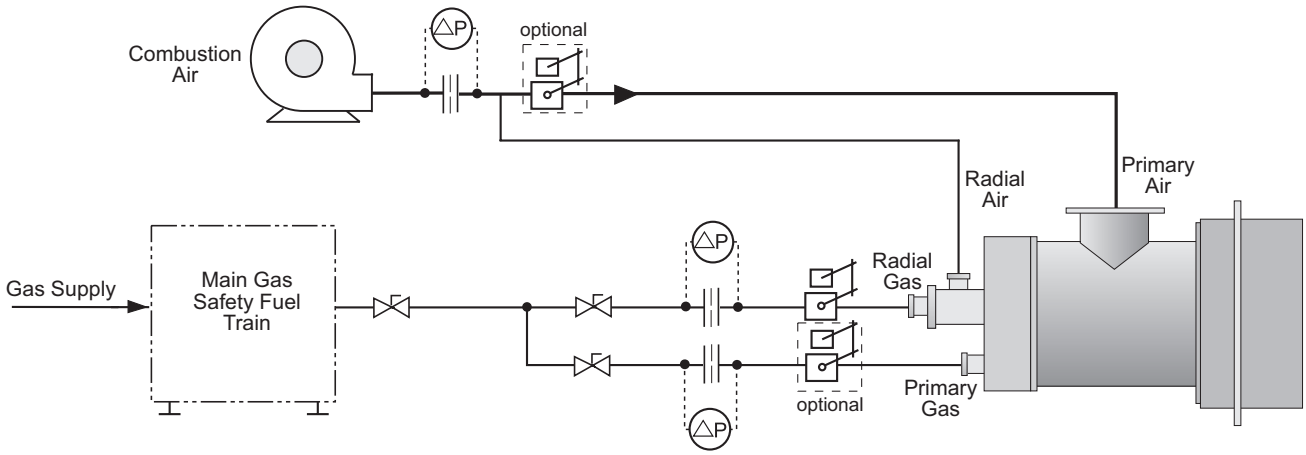
The LEx burner can fire many gaseous fuels with similar low emission performance. The LEx burner with an appropriately designed reaction chamber makes it extremely effective for firing low Btu gases. Consult your North American Sales and Application Engineer for your specific needs.

NOx and CO Emissions Comparison
process temperature at 1200°F

	Emissions at High Fire		Emissions at 5:1 Turndown	
	Typical cold air burner	**LEx Rapid Response**	**Typical cold air burner**	**LEx Rapid Response**
NOx	82	9	107	13
CO	20	5	200	5
Emissions ppmv, corrected to 3% O_2				

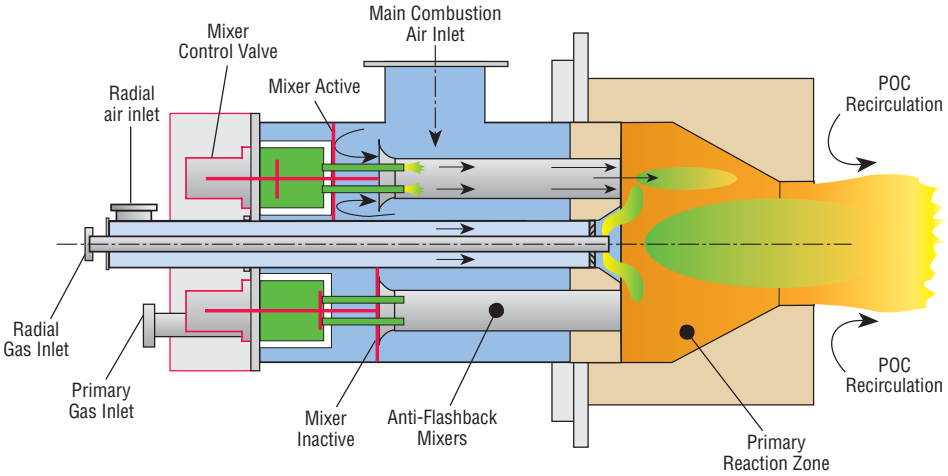
Flow Control Concept

Figure 1. Typical Control Concept for Single Burner MAGNA-FLAME™ LEx Combustion System.
A characterizable mass flow ratio control system is recommended for tailoring burner ratio through turndown.

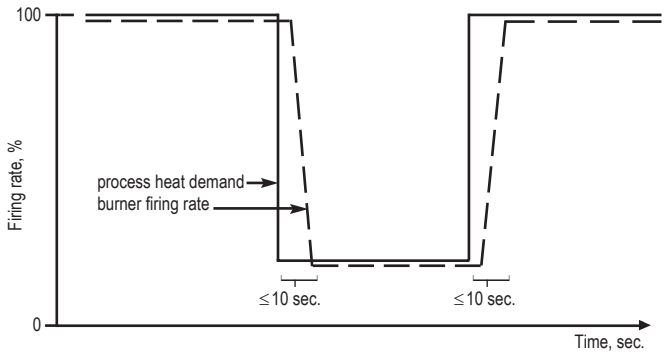


Simplified Burner Design — No FGR

Figure 2. The Magna-Flame LEx uses patented premix technology to establish a lean premix and then combusts the mixture in a controlled reaction zone without the use of FGR or complex staging devices. The fuel and air are introduced separately into the burner where they are intimately mixed within anti-flashback mixers. This mixture is then directed into the reaction region where lean combustion takes place.



Rapid Response Time



WARNING: Situations dangerous to personnel and property may exist with the operation and maintenance of an combustion equipment.The presence of fuels, oxidents, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc.,are inherent with any combustion application. Parts of this product may exceed 160F in operation and present a contact hazard. Fives North American urges compliance with National Safety Standards and insurance Underwriters recommendations, and care in operation.

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