Magna-Flame™ G-LE
Sub -10 ppm NOx and undetectable CO without the use of FGR

Situation
A Kern County, CA, oil producer recently added a new 50,000 lb/h steam generator to his facility.
To meet the steam generator permit requirement of 30 ppm NOx with a conventional gas burner would require the use of flue gas recirculation (FGR), incurring additional capital cost and operating expense of approximately $12,000 annually.

Solution
A 62.5 MM Btu/h Magna-Flame G-LE Ultra-Low NOx burner was provided by North American. This burner uses a lean premix primary zone and dilute secondary combustion to achieve less than 10 ppm NOx without the need for FGR.
While many other gas burners require the use of exhaust O2 levels above 4% to achieve even 12 ppm NOx, the Magna-Flame G-LE can reach that level at less than 2% O2. This reduced need for excess air to achieve low NOx provides efficiency gains which can lead to utilities savings exceeding $15,000 annually.

In many low emissions gas burners, CO and VOC emissions increase as NOx emissions decrease. In contrast, the Magna-Flame G-LE’s lean premix technology provides simultaneously low NOx, CO, and VOCs.
The flame envelope of the Magna-Flame G-LE for this application is approximately 6 feet in diameter and 18 to 20 feet in length—ensuring highly effective radiant heat transfer.

NOTE: All emission levels corrected to 3% O2
Results
Certified laboratory testing of this Magna-Flame G-LE over a 3:1 turndown range, with an energy efficient 1-2% exhaust O\textsubscript{2} level, showed NO\textsubscript{x} emissions of 11-13 ppm as shown on graph on first page.

NO\textsubscript{x} emissions below 10 ppm were achieved at 3% exhaust O\textsubscript{2} and above.

Throughout the test period, CO emissions were undetectable on a 0-10 ppm scale.

Typical Installation

Typical Operation

- Mass flow control of air and primary gas
- Secondary gas flow in constant proportion to primary gas flow
- Center gas jet to stabilize burner at low fire
- Stack O\textsubscript{2} trimmed to maintain 1%