

# VARIFLAME & DYNASWIRL-LN BURNERS

## Low NOx, High-Efficiency Burners for Watertube Boilers

### Proven NOx Reduction for Single-Burner Boilers

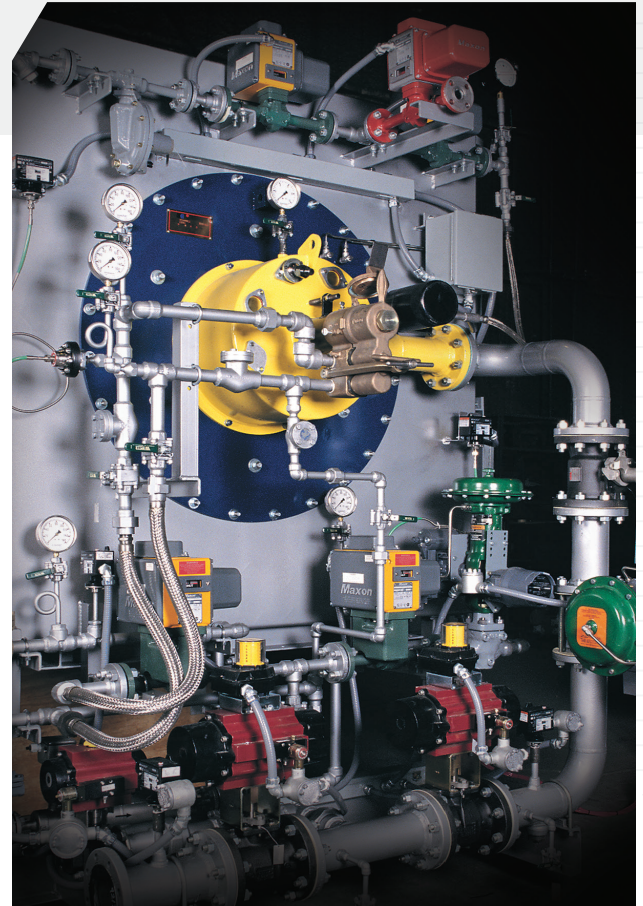
The Variflame™ burner delivers high-efficiency performance in gas-fired package boilers with NOx emissions as low as 20 ppm (41 mg/Nm<sup>3</sup>) at 3% O<sub>2</sub>. Using advanced air-fuel staging techniques, the Variflame burner can operate with or without flue gas recirculation (FGR).

- Reduces NOx, CO, VOC and particulate emissions
- Robust and reliable combustion performance
- High turndown for maximum operating flexibility
- Reliable flame with a wide range of excess air operation
- Simultaneous gas and oil firing capability
- For gas- or oil-fired boilers with heat inputs from 30 to 400 wMMBtu/hr (8.8 to 117 MW) per burner
- Advanced air-fuel staging and FGR for cost-efficient low NOx performance
- Advanced oil tip design with low atomizing steam usage
- Quick ramp rate provides a rapid response to load swings

### Clean Combustion Made Simple

With no moving parts during operation, the Variflame burner utilizes a simplified design that delivers reliable performance, even in the toughest applications.

- **Air Register:** Turbulence-free axial airflow, the optimized shape minimizes pressure loss through the burner and maximizes velocity.
- **Swirler:** Produces stable flames and enables thorough mixing.
- **Throat:** Precisely matched with the register and swirler design to provide an aerodynamically stabilized flame.
- **Gas Burner:** Unique injector orientation provides fuel staging within the flame envelope, reducing thermal NOx formation.
- **Oil Burner:** Advanced oil gun tip designs achieve precisely controlled flame geometry.



## Unrivalled Experience and Expertise

We have the most burner installations for industrial steam generation, making Coen and Hamworthy Combustion brand burners a preferred choice for reliable, proven low NOx performance.

- Advanced design
- Rugged construction
- Reliable operation
- Single or multi-burner applications

The John Zink Research and Development Test Center is the largest and most advanced testing complex in the industry. This exclusive resource allows us to push innovation, gain expertise and measure performance in a near full-scale setting under real-world conditions.



### **Dynaswirl-LN™ Low-NOx Gas / Oil Burner for Multi-Burner Boilers**

Improve your overall boiler performance while lowering NOx emissions with the high-efficiency, gas / oil-fired burner that's built to last. Designed for heat inputs ranging from 30 to 300 MMBtu/hr (8.8 to 88 MW) per burner, the Dynaswirl-LN burner is capable of simultaneous gas and oil firing. CFD modeling guarantees equal distribution of combustion air and FGR for remarkably efficient operation.

- Up to 50% NOx reduction over conventional burners; and up to 90% reduction when combined with FGR, over-fire air (OFA) or burners out of service (BOOS)
- Operable with stack O<sub>2</sub> levels of 0.5% or less
- Extremely stable combustion minimizes boiler vibration
- Reliable flames with FGR rates as high as 45%
- High turndown of 8:1 on oil and up to 20:1 on gas
- Low CO, particulate and opacity emissions
- Reduced downtime, maintenance, fuel and operating costs

### **Pneumatic Air Slide — Providing Reliable On / Off Control**

The pneumatic air slide allows for simplified “on / off” air-flow control, eliminating the need for complex modulating devices. The heavy-duty slide closes the air inlet to burners out of service, allowing control of furnace excess oxygen levels through the remaining burners. When closed, cooling air flows through the register to prevent front-end components from overheating. The results? Proven reliability, reduced maintenance and lower operating cost.



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