

# AireJet® Low NO<sub>x</sub> Burner

For Lower Emissions and Higher Efficiency

In its ongoing research efforts to develop technological advancements in emissions reductions, Babcock & Wilcox (B&W) initiated a multifaceted program to achieve additional significant nitrogen oxides (NO<sub>x</sub>) reductions from pulverized coal-fired boilers. Our research led to the development of a unique burner, fundamentally unlike any other low NO<sub>x</sub> burner available. Benefits of the AireJet® burner, B&W's latest offering in low NO<sub>x</sub> burner technology, have been commercially demonstrated in many applications.

■ **B&W's AireJet burner offers:**

- Significantly reduced NO<sub>x</sub> levels compared to previous low NO<sub>x</sub> burner technology
- Much cleaner burning so it requires less excess air to minimize carbon monoxide (CO) and unburned carbon
- Higher boiler efficiency and improved plant heat rate
- Excellent flame stability and turndown



B&W's ongoing research indicated that little additional  $\text{NO}_x$  reduction was attainable using traditional low  $\text{NO}_x$  burner technology. Based on extensive evaluation using both computational fluid dynamics (CFD) modeling and physical testing, B&W engineers designed the AireJet burner with an innovative burner structure — a burner built around a center jet of air, encircled by the fuel stream, and then wrapped in additional combustion air.

With the AireJet burner design structure, ignition takes place from the inside out and from the outside in. Combustion is intensified by supplying oxidant directly to the core of the flame rather than waiting for air around the exterior to mix with the fuel stream. The AireJet burner was specifically developed for use with overfire air (OFA) to create an integrated system for the most effective overall  $\text{NO}_x$  reduction.

Mechanically, the AireJet burner assembly is similar to the DRB-4Z<sup>®</sup> burner configuration, B&W's previous generation low  $\text{NO}_x$  burner, with an excellent reputation for durability. The coal nozzle/core air assemblies are lined with ceramic materials to resist wear.

■ **Features of B&W's AireJet burner**

Applications include new boiler installations as well as retrofit of units with suitable furnace geometry in combination with overfire air systems

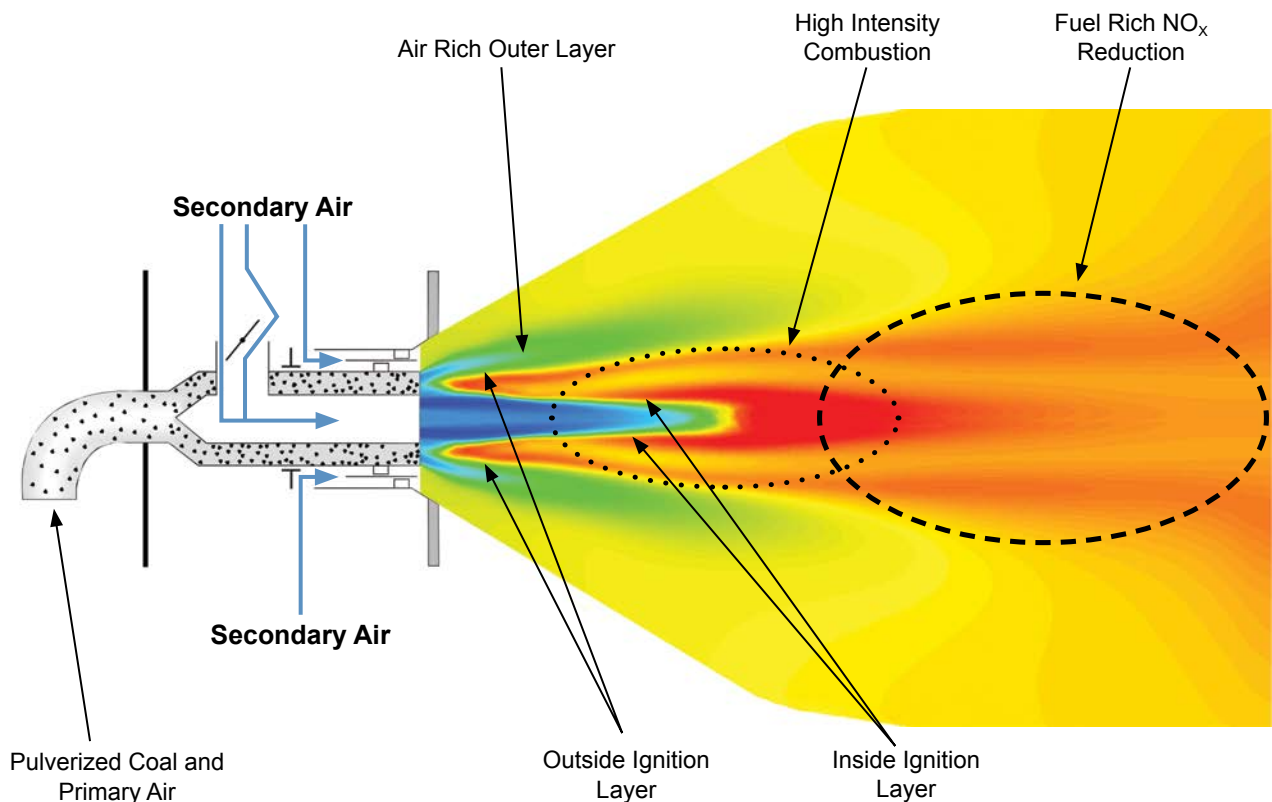
Uses the same auxiliary equipment (elbows, scanners, igniters) as B&W's other burners

Existing burner throat is generally suitable in retrofit applications without pressure part modifications

Reliable, dependable and durable

Low excess air for higher efficiency and low emissions

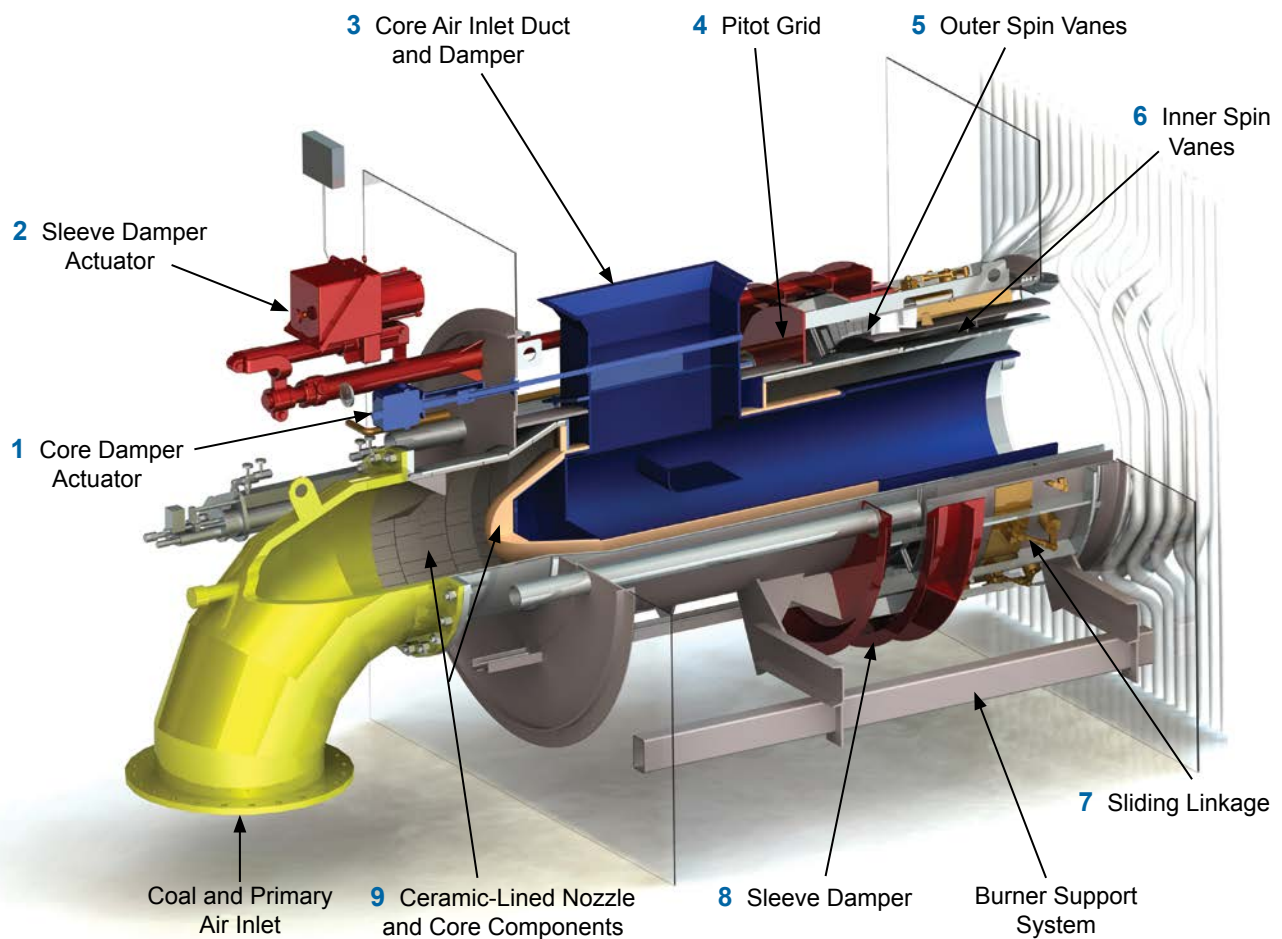
**Low  $\text{NO}_x$  AireJet Coal-Fired Burner Combustion Zones**



*With its unique design, the AireJet burner allows inside-out and outside-in combustion for lower excess air and CO, optimized  $\text{NO}_x$  reduction, and an exceptionally stable flame. This CFD-generated graphic shows burner flame temperatures during testing.*

## Low NO<sub>x</sub> AireJet Burner — Mechanical Design Features

Component	Features/Functions
1 Core damper rotary actuator	Adjusts core air flow to minimize emissions, and for idle/cooling position
2 Sleeve damper linear actuator	Adjusts secondary air flow to main burner assembly for normal operation, light-off, or idle/cooling conditions
3 Core air damper	Controls secondary air flow to center core air zone of burner
4 Pitot grid	Provides a relative indication of secondary air flow to the main burner assembly using a 30-point impact/suction device to facilitate balancing air flow during commissioning
5 Fixed and adjustable vanes in outer zone	Fixed vanes improve peripheral air distribution; adjustable vanes are tuned during commissioning to minimize emissions
6 Fixed spin vanes in inner air zone	Provides proper swirl to secondary air through inner air zone for ignition
7 Sliding linkage	Heavy-duty, non-binding, lever arm movement to adjust outer spin vanes
8 Main sleeve damper	Regulates secondary air flow to inner and outer air zones of the burner, independent of swirl
9 Ceramic-lined core elements and coal nozzle	Ceramic protection against erosion on core components inside the coal nozzle and for the coal nozzle



*The AireJet burner was developed from extensive evaluation using computational fluid dynamics modeling and physical testing in B&W's Clean Environment Development Facility.*

The AireJet burner is just one example of B&W providing the best available low NO<sub>x</sub> technology to the power and steam generation industry. For more information about the AireJet burner or our complete line of emissions reduction systems, contact your nearest B&W sales or service office.



Used with an overfire air system, B&W's AireJet burner provides the ultimate solution for low NO<sub>x</sub> emissions.



The DRB-4Z burner remains B&W's lowest NO<sub>x</sub> burner in applications without overfire air systems or where existing boiler geometry is not suitable for use of the AireJet burner.

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