



Advanced Overfire Air Systems for Corner-Fired Boilers Economically Reduce NO_x Emissions

As the holder of the first patent for an overfire air (OFA) system - a patent issued four decades ago - The Babcock & Wilcox Company (B&W) has successfully installed low NO_x combustion systems on more than 108,000 MW of new and retrofit coal-, oil- and gas-fired boilers. Most recently, B&W has applied this experience and proven capability to retrofit corner-fired boilers burning coal, gas or oil.

Our cost-effective systems are in operation achieving significant levels of NO_x reduction while maintaining boiler thermal performance.

B&W's staged combustion system for corner-fired boilers offers these benefits:

- Proven NO_x reduction
- Proven design approach with unit-by-unit customization
- Maintains boiler thermal performance
- Design simplicity for ease of construction and maintenance
- Minimal modifications to structural members, sootblower arrangement and platforms
- Superior mechanical reliability and operation
- Operational flexibility
- Rugged design and fabrication for reduced maintenance

B&W provides a simple and flexible design to reduce NO_x levels in corner-fired boilers. Our proven overfire air solutions cost less than modifications that are limited to the corners.

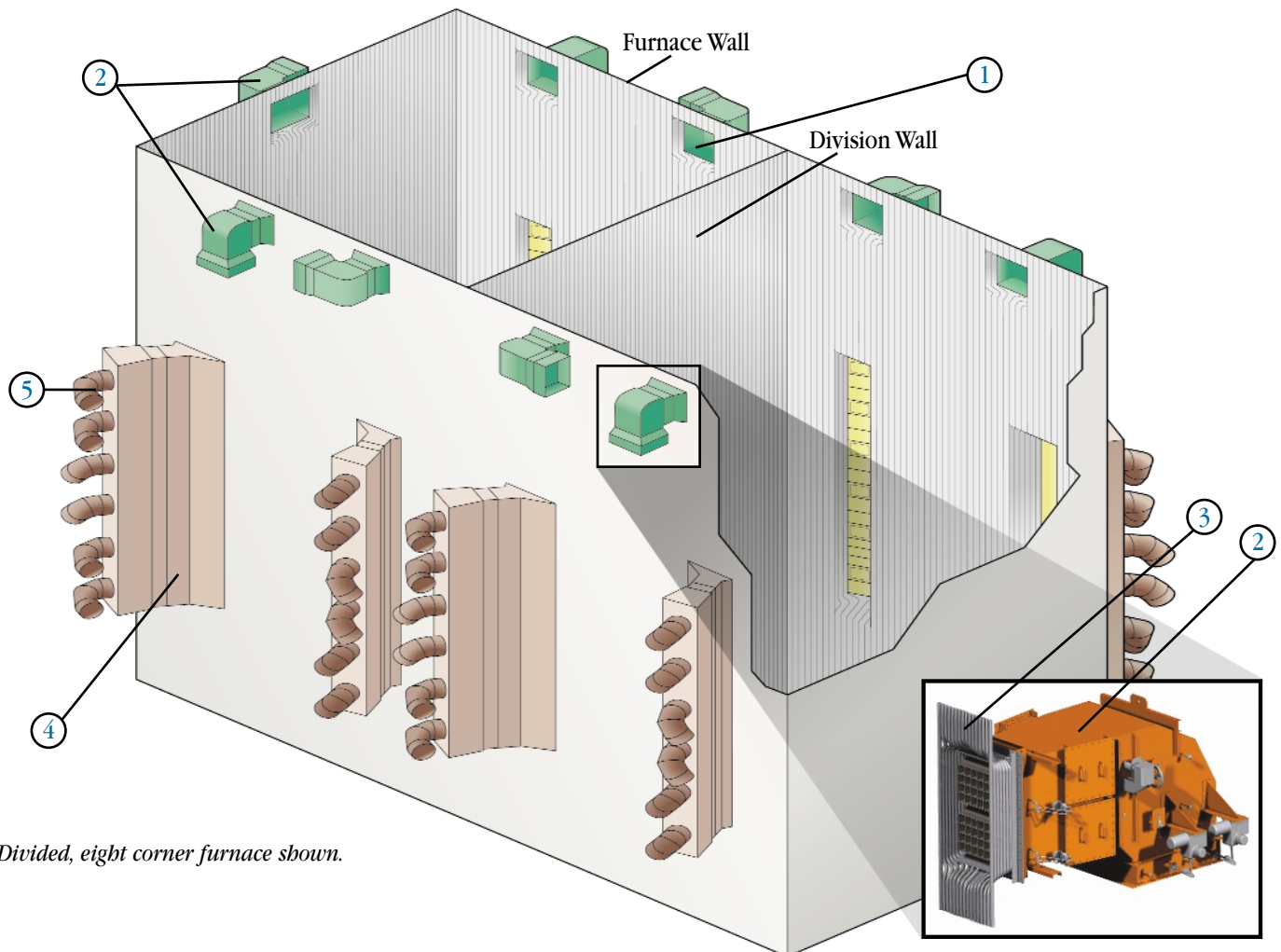


B&W's Design Features a Simple and Flexible Arrangement

B&W has developed its innovative overfire air system for corner-fired boilers using proprietary computational fluid dynamic (CFD) modeling and experience gained from full-scale

commercial applications. B&W's advanced systems are customized on a unit-by-unit basis to reflect site specific parameters and NO_x reduction requirements.

A full range of boiler and OFA equipment options are available and tailored to meet customer requirements for additions and modifications to existing combustion equipment.



Divided, eight corner furnace shown.

Equipment or Boiler Components

Functions/Benefits

1. Overfire Air (OFA) Ports	Arranged on furnace walls or in furnace corners to maximize NO _x reduction while minimizing any increase in combustibles losses (unburned carbon and carbon monoxide)
2. Connecting Ducts	Designed for minimum pressure loss and optimal access
3. Welded Bent Tube Waterwall Openings	Less complex tube openings minimize modifications to existing furnace pressure parts, reduce field welding and eliminate refractory maintenance
4. Burner Windbox Modifications	Total windbox replacement, tilt upgrade and/or simple auxiliary air nozzle/damper modifications to maintain proper secondary air flow
5. Coal Nozzles/Tips	New stationary nozzles or adjustable tips for superior operation
6. Scanner Upgrades (<i>not shown</i>)	Provides reliable flame detection while minimizing maintenance and field calibration
7. FPS Gas or Oil Ignitor Upgrade (<i>not shown</i>)	Optimizes ignition reliability, combustion, flame stability and flame monitoring

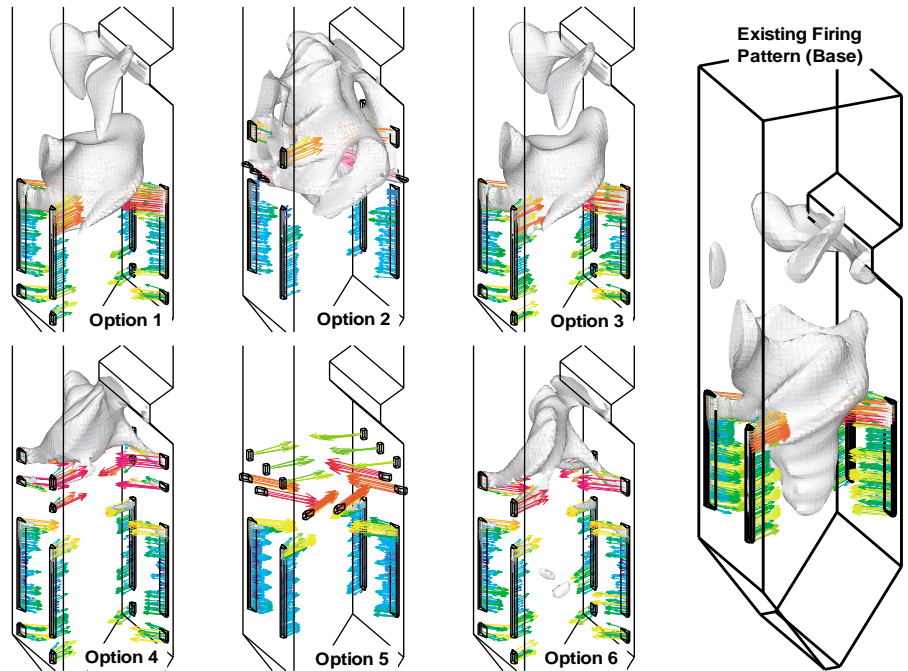
Excellent NO_x Reduction Based Upon Proven Technology

The use of overfire air (OFA) in corner-fired units results in significant decreases in NO_x emissions and is by far the most cost-effective technique for reducing NO_x emissions from these units. Reductions with this technique range from 20 percent to more than 60 percent depending on a unit's initial NO_x levels, fuel combustion equipment design and fuel type. Additionally, B&W takes great care in refining its system design to optimize NO_x reduction while minimizing any increases of unburned carbon and carbon monoxide.

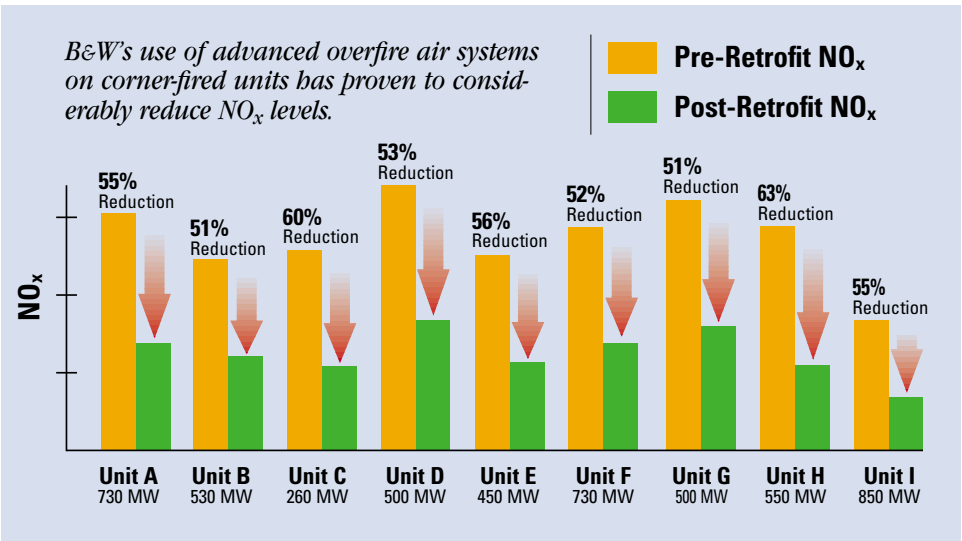
Depending on the unit configuration, B&W's overfire air ports can be located on the furnace walls, above and separate from the main windbox in an interlaced arrangement, or on or near the furnace corners. This variety of configurations can provide the following advantages and benefits:

- More economical (fewer tube bends)
- Greater design flexibility
- Sizing of air ports is not limited by fixed corner width
- Location of air ports is not limited to the vertical obstructions of burners and other ports
- Minimal or no modifications to structural members

B&W's full range of boiler and OFA equipment options are designed to meet customer requirements for additions and modifications to existing combustion equipment.



Utilizing proprietary computational fluid dynamic (CFD) modeling, B&W can run multiple case simulations to determine the optimum burner and air port arrangement for maximum NO_x reduction.



Separated overfire air ports



FPS replacement oil or gas "horn" ignitor



Coal and auxiliary air nozzles

Established in 1867, Babcock & Wilcox is a global leader in advanced energy and environmental technologies and services for the power and industrial markets, with operations, subsidiaries and joint ventures worldwide.

For more information, or a complete listing of our sales and service offices, send an e-mail to info@babcock.com, or access our website at www.babcock.com.

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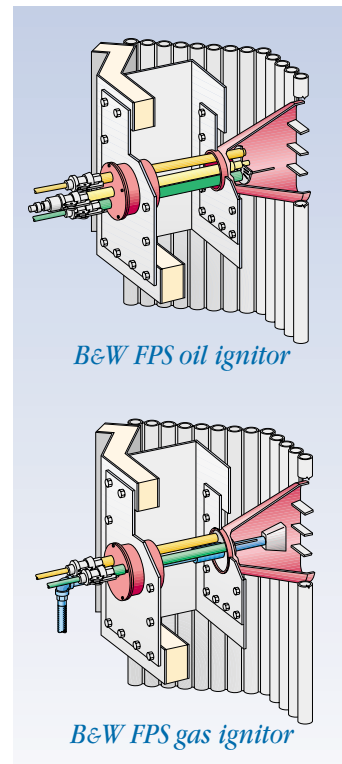
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Full-Scope Supply

As part of a complete retrofit package, B&W also provides state-of-the-art ignition and scanner equipment for corner-fired boilers. The Fossil Power System Inc. (FPS) gas and oil horn ignitors are a result of a careful integration of electrical and mechanical components optimizing ignition reliability, combustion performance, flame stability and flame monitoring.

B&W has the design capability and manufacturing experience to meet your corner-fired boiler NO_x reduction requirements. We provide complete installation, startup, commissioning, equipment training, replacement parts and technical service support.

When you need a proven NO_x reduction solution for your corner-fired boiler, contact B&W.



▲ *B&W can provide new control systems or retrofit existing systems to enhance overall combustion management capabilities.*

◀ *The FPS oil and gas ignitors are designed for simple installation and maintenance.*