Babcock & Wilcox (B&W) has successfully used the low NOx XCL-S® burner in low NOx oil and gas applications since 1988. This advanced low NOx burner was developed to achieve superior NOx performance in burner-only applications and in applications using overfire air (OFA) and/or flue gas recirculation (FGR). Proven performance with more than 5,400 megawatts of experience gives us confidence in achieving the results our customers need.

Each oil and gas low NOx XCL-S burner is completely shop assembled and mechanically tested before shipment. The XCL-S burner is designed as a simple plug-in, with little or no modifications needed to the rest of the boiler. B&W’s system approach provides the engineering know-how needed to meet your boiler’s NOx reduction requirements, without adversely affecting boiler performance.

B&W’s low NOx XCL-S burner offers:
- Proven performance
- Demonstrated NOx reductions in excess of 90 percent
- Demonstrated low NOx emissions with and without the use of FGR
- Superior flame stability and burner turndown
- Lower CO emissions
- Improved excess air control
- On-line adjustability to optimize performance
- Low-cost plug-in design
- Proven mechanical reliability and operation
- Complete shop assembly – ready for installation

High temperature alloy steel is used in all parts of the burner exposed to radiant furnace heat. The burner for this retrofit is rated at 130 million Btu/hr (38 MWt) on gas and 118 million Btu/hr (35 MWt) on heavy fuel oil. The burner shown here weighs approximately 3,500 pounds (1,590 kg) and is equipped with shop-attached lifting lugs for easy one-piece installation.
Each design feature incorporated in the low NOx XCL-S burner has been refined to allow maximum NOx reduction with optimum combustion efficiency.

<table>
<thead>
<tr>
<th>Components</th>
<th>Features/Functions</th>
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<tbody>
<tr>
<td>1 I-Jet oil gun</td>
<td>Produces a finer oil spray, reduces particulate and opacity emissions, minimizes atomizer plugging</td>
</tr>
<tr>
<td>2 Linear actuator</td>
<td>Easily adjusts the main air sliding damper position for light-off, full-load and out-of-service cooling</td>
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<tr>
<td>3 Core air damper</td>
<td>Adjusts core air flow to the oil gun or gas spuds for optimizing combustion</td>
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<tr>
<td>4 Sliding air damper</td>
<td>Adjusts the majority of secondary air flow to the outer air zone, independent of swirl, to balance air flow among burners during commissioning</td>
</tr>
<tr>
<td>5 Air measurement grid</td>
<td>Ensures an accurate indication of relative air flow with a multi-point impact/suction device</td>
</tr>
<tr>
<td>6 Externally adjustable spin vanes</td>
<td>Provide proper mixing of the secondary air and fuel (to the end of the flame) – vane position is optimized and fixed during commissioning</td>
</tr>
<tr>
<td>7 Adjustable hemispherical gas spuds</td>
<td>Can be rotated to optimize NOx reduction and are removable while the boiler is in service</td>
</tr>
<tr>
<td>8 Burner support system</td>
<td>Supports the burner and allows for differential expansion</td>
</tr>
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Optional Isolation Valves

2 Linear Actuator

3 Core Air Damper

4 Sliding Air Damper

5 Air Measurement Grid

6 Externally Adjustable Spin Vanes

7 Adjustable Hemispherical Gas Spuds

8 Burner Support System
Using plug-in low NOₓ XCL-S burners, flue gas recirculation and a staged combustion system, NOₓ was reduced by ninety percent on this 350 megawatt boiler.

B&W’s NOₓ reduction system approach offers:

- Flexible application of technologies to meet specific NOₓ emission limits
- Comprehensive analysis of the impact of a low NOₓ retrofit on boiler capacity and performance
- Proven technological capabilities to modify boiler pressure parts, reconfigure heating surfaces, and optimize material selection and auxiliary systems to maximize boiler performance

Equipment description:

A. Gas recirculation flue
B. FGR fan, motor and turning gear
C. Connecting ductwork
D. NOₓ port pressure part panel
E. Dual zone OFA port
F. FGR crossover flue
G. Low NOₓ XCL-S burner
H. Controls and instrumentation

Retrofit equipment:

- Flue gas recirculation
- Mixing air foils
- Overfire air ports
- Connecting ductwork (FGR/air mixture)
- Low NOₓ oil and gas XCL-S burners
- Open windbox (existing)

The value of proven experience

The low NOₓ XCL-S burner system approach offers significant NOₓ reduction capabilities across the full range of wall-fired boiler configurations and combustion firing patterns.

B&W’s leadership in the field of low NOₓ reduction technology began in 1962 with the first patented OFA port system design. That leadership continues with unparalleled experience, proven equipment and innovative technology. Our systems are designed to be cost-effective, dependable and adaptable to the full range of fuels and boiler arrangements in new or retrofit applications. Count on us for all your NOₓ emission control technology needs. For 24-hour emergency assistance, call 1-800-354-4400.
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.

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A typical low NOx oil- and gas-fire XCL-S burner. The linear actuator (at the top of the burner) moves the sliding air damper, which controls the majority of the secondary air flow to the burner. The hemispherical gas spuds can be rotated to minimize NOx emissions or removed for inspection while the boiler is in service.