Dry Flue Gas Desulfurization (FGD) Systems

Proven spray dry absorber (SDA) process reliably meets low SO₂ emission limits
The Babcock & Wilcox Company (B&W) has been at the technological forefront in providing cost-effective solutions to tough emission control problems for more than 30 years. Our continued research and commercial efforts in NOₓ, SO₂, particulate and mercury emissions reduction have led to many advancements in air pollution control technology.
B&W Spray Dry FGD Systems – Emission reduction with high availability and reliability

B&W’s commitment to providing the best in emission reduction technology for fossil fuel-fired power generation continues with our spray dry flue gas desulfurization (FGD) systems for controlling SO₂ emissions.

B&W is the exclusive North American licensee of Niro A/S, Denmark, for its spray drying absorption (SDA) process. The two companies also work together worldwide on specific project opportunities. The Niro process is globally recognized by the industry as the dry FGD technology of choice and has the majority market share for all dry FGD processes. Since 1980, B&W/Niro’s continual record of utility, industrial and cogeneration dry FGD projects has achieved a steady, long-term market dominance.

SDA Features

- Rotary atomizer
  - Highest slurry capacity atomizers in the industry
  - Low maintenance/high availability
  - Abrasion-resistant components
- Unique flue gas dispersion system
  - No damper/vane adjustments needed to follow boiler load
- Performance maintained over complete load range
  - Slurry flow control
  - Large SDA chambers

SDA Benefits

- High SO₂ removal efficiency
- Integral SO₃, HCl, HF and PM₂.₅ emissions reduction
- Low capital cost
- Low auxiliary power use
- High system availability
- Low operation and maintenance costs
- Low water consumption
- Inherent oxidized mercury emissions reduction
- No waste-water stream

Worldwide, the Niro dry scrubbing technology has proven successful on more than 10,000 MW of utility and industrial coal-fired boilers, as well as more than 50 waste-to-energy installations. B&W/Niro installations dominate the large (350 to 900 MW) utility boiler market segment.
The heart of the SDA system is the rotary atomizer. A Niro rotary atomizer is used to atomize a mixture of lime and recycle slurry into a fine spray. Hot untreated flue gas is brought into contact with the slurry spray. A chemical reaction results in the removal of SO₂, SO₃, HCl, and HF, and the simultaneous evaporation of the water. A single, central atomizer promotes an even distribution of the fine spray while minimizing any potential for wall wetting and deposition. The alkaline slurry is converted into a dry, free-flowing powder of calcium/sulfur compounds.

For large utility boiler applications, flue gas enters the spray dry absorber at two locations: the roof gas disperser and the central gas disperser. Smaller installations require only a roof gas disperser.

The ratio of fresh lime slurry to recycle slurry is controlled to maintain the required level of alkalinity in the feed slurry to achieve the desired level of SO₂ removal. The total amount of slurry fed to the atomizer is controlled to maintain the desired outlet temperature. This process reduces the consumption of fresh reagent.

The cooled and treated flue gas exits the SDA and is directed to a particulate collector, which is typically a fabric filter. The particulate collector is an integral part of the SO₂ removal process as the solids continue to react with the SO₃ in the flue gas. SO₃ removal also takes place in the particulate collector.

The unique flue gas dispersion system used in the B&W/Niro SDA, coupled with the rotary atomizer, ensures a uniform distribution of slurry and provides for intimate contact with the flue gas to optimize absorption efficiency in the spray drying chamber.
The single, centrally located rotary atomizer minimizes the potential for wall wetting and deposition which provides optimum reagent utilization. Its abrasion-resistant construction is designed for reliable, continuous operation with a minimal amount of maintenance.
Total-Project Scope Ensures Effective System Performance

Variety of Applications and Options to Fit Your Needs

B&W's dry FGD systems are ideal for new fossil fuel-fired power generation projects or retrofits to existing plants. Because they require less space than other FGD processes, dry FGDs can be used at sites with limited space. The systems can typically be connected and brought on-line during scheduled maintenance outages, thus minimizing disruption to power generation.

- Wide variety of fuels
  - B&W/Niro have more than 3,000 MW of PRB coal experience

Reagent slurry
- Recycle or lime only

Fly ash pre-collection
- Can preserve existing plant fly ash sales for retrofit applications

Particulate collector integration
- Baghouse or electrostatic precipitator

Integrated Particulate Control

Particulate and scrubber reaction by-products downstream of the spray dry absorber can be collected by either an electrostatic precipitator (ESP) or a fabric filter dust collector "baghouse." The preferred method is typically a fabric filter because it serves as an efficient secondary SO₂ reactor and provides excellent particulate removal.

B&W's fabric filter technology includes nearly 35 years of experience in supplying over 100 installations with reverse gas cleaning or pulse jet fabric cleaning systems. On electric utility coal-fired boilers alone, our fabric filter experience includes more than 8,000 MW of generation capacity in more than 50 installations. B&W's fabric filter technology has been installed on all types of coal-fired boilers and on a wide range of industrial processes. Our installations include some of the largest SDAs in the world and also one of the world's largest utility pulse jet baghouses.

Count on B&W's Experience

The B&W/Niro dry FGD process effectively reduces emissions, meeting and exceeding federal and state air quality regulations. The Niro FGD technology has proven successful on utility and industrial coal-fired boilers with more than 10,000 MW of installed capacity worldwide in
power generation applications. Many additional installations are controlling emissions from industrial processes and waste-to-energy applications.

B&W coordinates an annual Users Group meeting, which rotates among host dry FGD installations to provide a forum for sharing operating experiences and discussing new developments. This reflects our continuing commitment to customer service and product innovation.

Research for Future Technology Development

To help our customers prepare for future compliance regulations (mercury emissions, for example) and to improve our existing technologies, research is conducted at our Clean Environment Development Facility (CEDF). The CEDF is a state-of-the-art 100 million Btu/hr pilot plant with a dry FGD system that allows the combustion of various fuels and the testing of technologies to control pollution. Its large size enables effective scale-up to commercial operation.

From Concept to Start-Up, B&W Delivers

B&W takes pride in our total-scope capabilities. Working with us is easy. Our dedicated team of engineers will meet with you to offer the best solution to your emission control needs.

B&W carries out the complete process evaluation, conceptual design, detail engineering, equipment supply, construction, start-up and operational checkout of the system to ensure successful execution. B&W has supplied dry FGD systems in a variety of contracting arrangements, including partnerships, open-book supply, and engineer-procure-construct (EPC). Expert project managers oversee project execution.

As air emission regulations become tougher, B&W is committed to provide the best available technology to enhance the longevity and competitiveness of coal-fired power plants for many years to come.

Count on B&W to provide the total-scope solution for your next emissions control project.

B&W’s total-project scope includes design, procurement, construction and start-up activities to facilitate the effective performance of the entire system and integration with existing or new NOx and particulate control equipment.

B&W’s Clean Environment Development Facility (CEDF) is a state-of-the-art 100 million Btu/hr pilot plant with a dry FGD system.

Adjacent SDAs share a common spare atomizer.

Dry FGD systems can be effectively retrofitted into sites with limited space.
While others may use the Babcock name, we are the original Babcock & Wilcox with more than 135 years of experience in engineering, constructing and servicing steam generating systems. Insist on us by name.

For more information, or a complete listing of our sales and service offices worldwide, call 1-800-BABCOCK (222-2625) in North America. Outside North America, call (330) 753-4511 or fax (330) 860-1886 (Barberton, Ohio, USA). Or access our Web site at www.babcock.com.

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B&W's FGD system provides cost-effective emissions reduction to enhance the longevity and competitiveness of coal-fired power plants.

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