

WET FLUE GAS DESULFURIZATION SCRUBBER UPGRADES



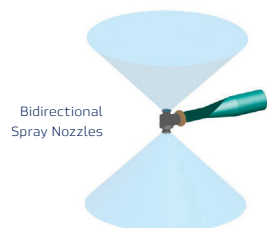
Babcock Power
ENVIRONMENTAL

a Babcock Power Inc. company

Babcock Power Environmental Inc., a Babcock Power Inc.® company, provides fully integrated environmental solutions for utility power plants, waste-to-energy facilities, and large industrial applications worldwide. With more than 30 years of experience in designing and installing Wet Flue Gas Desulfurization (WFGD) systems, Babcock Power Environmental Inc. can apply its technology and experience to upgrade any OEM's WFGD system. Babcock Power Environmental upgrades existing scrubbers to meet today's more stringent emissions regulations and achieve higher performance levels. Typically, the intent is to increase SO₂ removal efficiency to 97-99%, while minimizing additional pressure drop and energy consumption.

WFGD scrubber upgrades normally involve applying new technology to existing systems to achieve optimal efficiency. Initially, an understanding of current problems is essential. Older models often have poor gas distribution and fail to remove significant amounts of SO₂. They also present inefficient spray patterns over the cross section of the absorber. Babcock Power Environmental can successfully overcome these problems by utilizing its world-leading technology and experience.

Contact Babcock Power Environmental Inc. to meet emissions regulations and improve the efficiency of your WFGD.



BENEFITS

Scrubber Upgrades

- Low cost solution vs. new installation
- Catch up on 20 years of technology
- Meet today's requirements with yesterday's dollars
- Higher SO₂ reduction with improved energy efficiency

CFD Modeling

- Results in better gas distribution
- Simulates droplets and full spray coverage over absorber(s)
- Ensures proper flow along walls
- Identifies areas requiring additional nozzles for proper liquid and gas distribution

Bidirectional Nozzles Installed

- Wider-angle spray cone ensures efficient spray pattern through the spray zone
- Increase gas - liquid collisions
- Dual direction allows for complete coverage throughout the total spray zone

Wall Baffles

- Improve distribution of flue gas over entire cross section
- Reduce "gas sneakage" along absorber walls and corners
- Minimize pressure drop

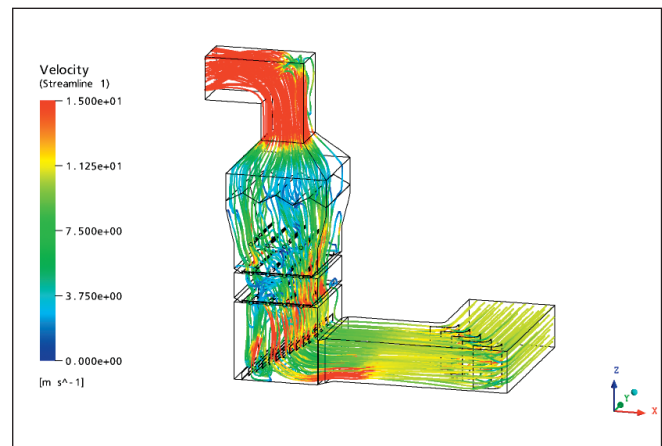
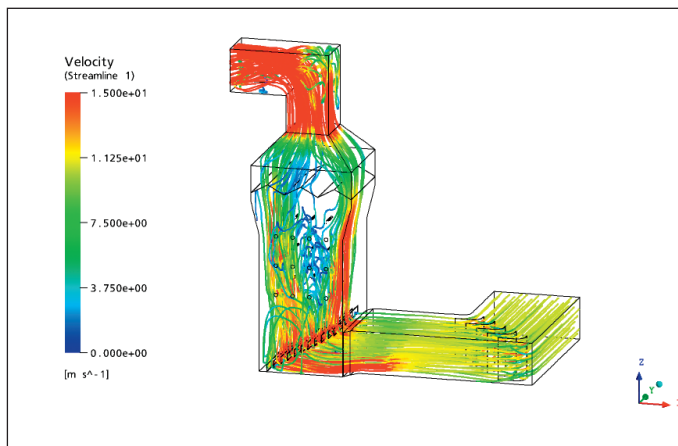
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STRATEGIC PROCESS

The process begins with a complete analysis of the existing system design and performance. Physical and Computational Fluid Dynamics (CFD) flow modeling follow this to optimize inlet gas distribution and limit the amount of slurry deposition on the inlet duct. Slurry spray nozzle tests are then conducted to ensure new nozzles will have similar flow and pressure criteria. Bidirectional nozzles, however, will be installed regardless of the original design, with wider-angle spray cones to provide complete coverage of the spray zone and increased gas-liquid collisions. Wall baffles are designed and installed in each absorber to direct and better distribute flue gas over the entire cross section of the absorber, as well as minimize or eliminate "gas sneakage" along the absorber walls and corners. These strategic steps improve gas flow distribution and liquid-to-gas contact, ultimately increasing the absorber's effectiveness in removing SO₂ from the flue gas.

Unit	Flue Gas SO ₂ , lb/MBtu	Starting SO ₂ , Efficiency	Upgrade SO ₂ , Efficiency
550 MW	6.5	-91 %	>99%
390 MW	8.0	93.5 %	~98 %
2 x 600 MW	2.0	<94%	~98%

Note: Coal type remained the same as original for all three projects



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We're giving safety the third degree.

Babcock Power Inc. and its subsidiaries place the safety, health and security of our people at the core of our company values. Our team is our most valuable resource, generating solutions everyday to deliver safe, clean, reliable energy globally. With a keen focus on safety, Babcock Power Inc. conducts business in a manner that protects our people, our customers and the environment. From innovation to generation, we are proud of our award-winning safety record and are committed to operating with integrity and excellence.

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