

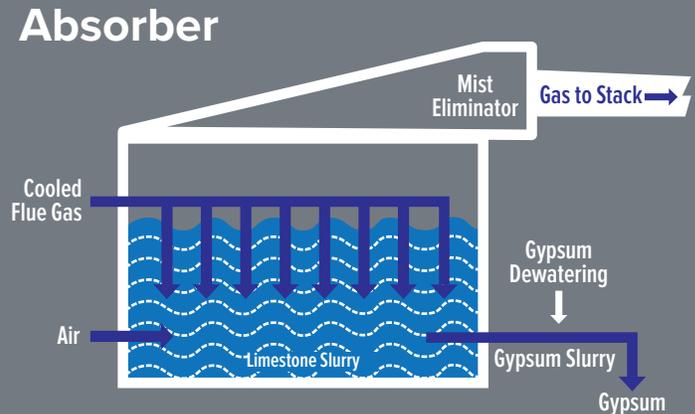
How a wet scrubber works

Flue gas desulfurization systems, also called scrubbers, use chemical and mechanical processes to remove sulfur dioxide from gas produced by burning coal.

The process and illustration below describe a wet limestone scrubber system with a jet bubbling reactor absorber unit:

1. Air and flue gases, which have been cooled and saturated, are injected into a tank of limestone slurry.
2. The injected gases bubble through the slurry, creating a frothy layer where sulfur dioxide from the flue gas stream is absorbed.
3. The injected air oxidizes the gas, while the limestone slurry neutralizes it.

4. The resulting product – gypsum slurry – is kept in suspension and is removed as a portion of the tank contents is pumped out for gypsum dewatering.
5. The oxidized gas, **with more than 90 percent of the sulfur dioxide removed**, bubbles up and makes its way out of the stack.



Wet Flue Gas Desulfurization System

What is sulfur dioxide?

Sulfur dioxide (SO₂) is a gas that forms when the sulfur in coal is burned. SO₂ dissolves easily in water, and, when limestone and oxygen are present, calcium sulfate—or gypsum—is formed. SO₂ is a precursor of “acidic deposition” associated with the acidification of soils, lakes, and streams.

Why did Ohio’s Electric Cooperatives install scrubbers at Cardinal plant?

Scrubber systems help improve the environmental performance of the plant. After careful consideration of forthcoming regulations and the environmental benefits of various solutions, Ohio’s Electric Cooperatives invested more than \$1 billion in environmental controls, most of which was dedicated to the scrubber system, over a decade. Now, Cardinal plant is one of the cleanest power plants of its type in the world.

How efficient are scrubber systems?

Current wet scrubber technology can consistently achieve more than 90 percent removal of SO₂ from flue gas.

Do scrubbers remove other coal combustion gases?

Yes, a scrubber system also can remove oxidized mercury from the gas stream.

How else do scrubber systems help the environment and improve efficiency?

- Power plant emissions overall have declined 20 percent in the past decade, thanks to a more diverse fuel mix and environmental controls.
- A wet scrubber system neither uses nor produces harmful chemicals. Its byproduct, gypsum, can be used in drywall, cement, and other products, or it can be safely disposed in a landfill.
- Scrubber technology increases the amount of water vapor emitted through the stack. So most of the billowy white plume you see coming from the tall stacks is water.