

Gas Suspension Absorber Technology for Multi-pollutant Control of Flue Gas Emissions



Edition EMB Rev 3A



Which Dry Scrubbing Technology to Choose?

- Dry Sorbent Injection
 - Lowest capital cost, Increased reagent cost
 - Performance Limits for SO2 Reduction
- Spray Dryer Absorber
 - Lime Reagent (plus ash recycle)
 - Spray Down Temperature Limit
 - Sulfur content limits
- Recirculating Dry Scrubber
 - Highest performance capability
 - Reagent, water injected separately



- Powdered reagent pneumatically injected upstream of particulate collector
- Reagent can be hydrated lime, trona, sodium bicarbonate
- Lime reacts quickly with HCl, less so with SO₂ absent moisture
- Sodium compounds are non-selective towards acid gases, can complicate disposal options



- Lime slurry is atomized into droplets, sprayed into absorber
- Water in slurry evaporates, cools and humidifies the gas
- Spray down temperature limits slurry input, which can limit applicability
 - Low inlet temperatures
 - High sulfur contents



- Powdered hydrated lime is used as reagent
- Water is used to cool and humidify
- Lime and water are injected separately
 - Eliminates spray down temperature limit
 - Can handle higher sulfur fuels
- High level of solids recirculation in reactor
 - Higher removal efficiencies
 - Higher reagent utilization



- DSI very popular for MATS & MACT compliance
 - HCl capture
- Recirculating Dry Scrubbers increasingly used for larger units
 - Both as FGD and as polishing scrubbers
- Spray Dryers maintain niche applicability
 - Effective on PRB coal



Gas Suspension Absorber Technology

- A recirculating bed dry scrubber technology capable of efficient acid gas control
 - SO₂, HCl, and H2SO4.
- Utilizes lime reagent either as dry hydrate or as lime slurry.
- Coupled with ESP or FF for control of PM and PM-10 emissions.
- Can incorporate ACI for control of Hg and dioxins/furans.
- Emissions of HCl, PM, Hg below MATS and MACT requirements.

Unique Features of the GSA



- Cyclone captures majority of bed material
- Recirculation box returns captured material to bed
- Excellent for retrofitting existing plants
- Experience with various combustor types
- Can utilize typical filter or ESP
 - Not elevated or oversized
- Slim footprint
- Modularized Approach
 - Pre-engineered sizes up to about 500,000 ACFM per reactor
- Can utilize either dry lime injection or lime slurry
 - Low consumption rates.



With dry lime injection



Gas Suspension Absorber Experience KC Cottrell

- Used extensively for power and incineration applications for more than 20 years
- Numerous installations in North America, Europe and Asia
- Five projects (nine industrial boilers) executed since KC licensed the technology in 2005

Nine Dragons, China







Point Comfort, TX





Cheng Loong, Taiwan



GSA Under Construction

Petron Refinery, Philippines





Benefits of the GSA Dry Scrubber



- No internal moving parts
- Economical
- Low outlet emissions of HCl, SO2, PM, Hg
- Low reagent usage
- Ability to use existing collector (ESP, FF)
- Minimal plan area requirement
- Modular configuration
- Shorter erection period



Thank you!

Questions?

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