



POWER PLANTS

AUTOMATED SYSTEMS FOR SORBENT HANDLING & LIQUEFYING

WWW.SEMI-BULK.COM

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FEB | 2015





Power Plants

Providing Processes for Power Plant Emission Control

FGD

Limestone Slurry Processes with Pulverized Limestone vs. Traditional Ball Mill with Crushed Limestone

Hg

PAC Storage System, Slurry Process, Injection Control for Mercury Re-Emission Control System [MRCS]

NO_x

SNCR utilizing Urea Solution- Continuous processing of Urea Prill into Urea Solution



Powder Handling & Powder/Liquid Mixing Technology

Proprietary Systems Provided by Semi-Bulk Systems



Technology is proprietary & delivers unmatched performance:

Food Processing

Chemical Processing

Industrial Processing –Power Plants,
Paint/Paper

FGD- LIMESTONE; Hg Removal-PAC-
MRCS; NOx Reduction-SNCR-Urea

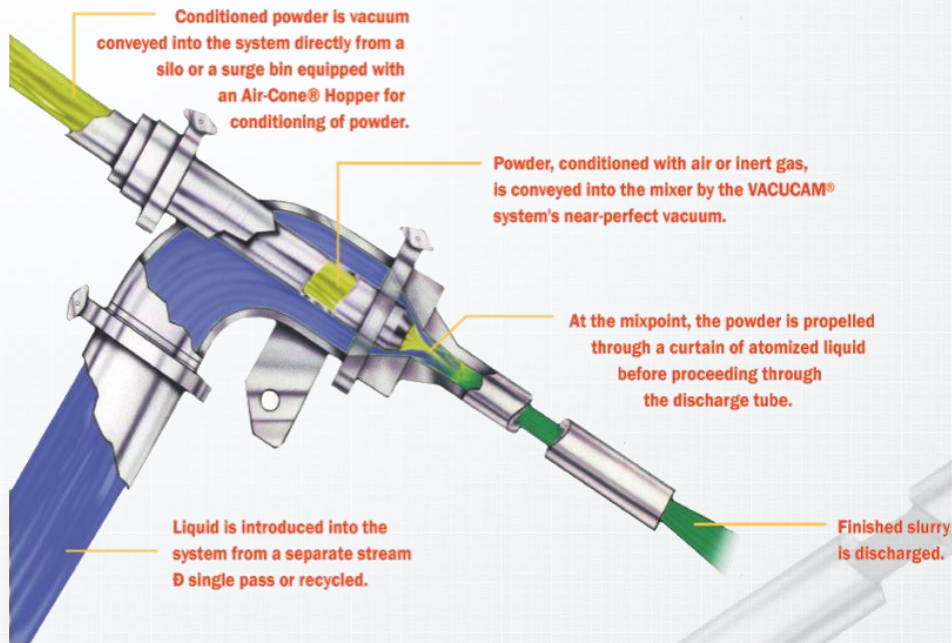
Products/Processes:

VACUCAM® Ejector Mixer Powder/Liquid
Slurry Processes

Air-Cone® Fluidizing Hoppers

Dry Side powder handling/automation for
slurry processing





VacuCam® Ejector Mixer

Delivers Unmatched Performance

- High Performance
- High Wetting/Dispersion Efficiency
- Operates under high vacuum for exposing maximum surface area of liquid to dry product
- No moving parts
- No maintenance



Hg

- Hg REMOVAL –
PAC PROCESS
FOR MRCS

Powdered Activated Carbon (PAC) injection is recognized as the best available control technology [BACT] by the EPA for mercury removal in flue gas.



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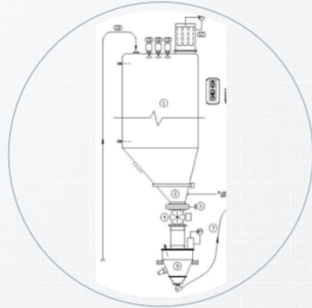
Total Solution

FOR APPLICATION OF PAC PROCESS OF MRCS



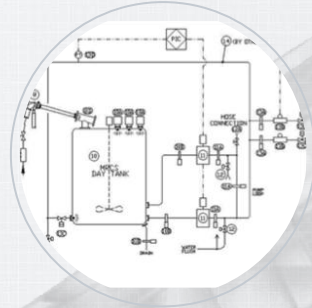
POWDERED ACTIVATED CARBON MODULAR DESIGN

CARBON [PAC] HANDLING AND SILO STORAGE.



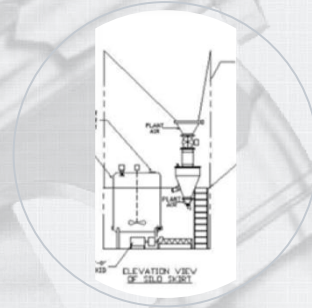
PAC HANDLING

AND MIXING PROCESS UTILIZING THE VACUCAM® EJECTOR MIXER SLURRY PROCESS.



PAC MIXING & SLURRY DISTRIBUTION

AND INJECTION SYSTEM WITH CIRCULATION LOOP FOR ACCURATE INJECTION CONTROL AND AUTOMATION



MODULAR PROCESS DESIGN WITHIN SILO SKIRT

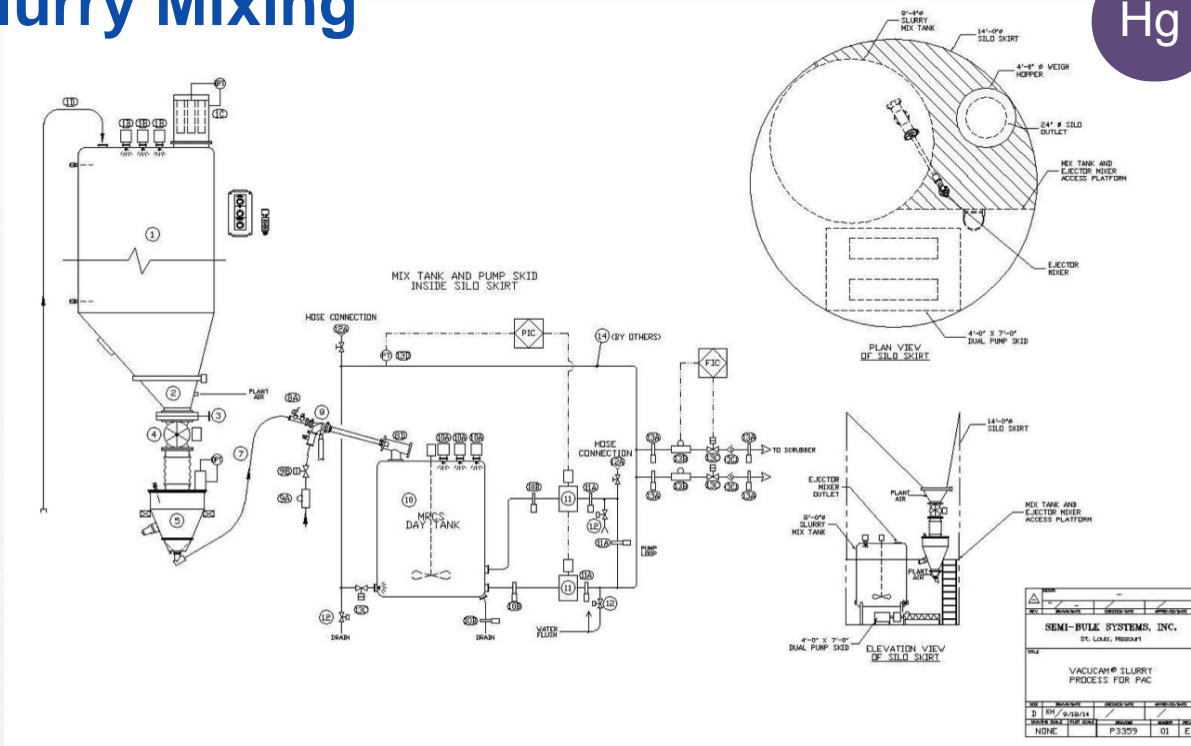
TOTAL MRCS PAC PROCESS WITH MINIMAL REAL ESTATE



PAC Storage, Slurry Mixing

AND SLURRY FEED CONTROL

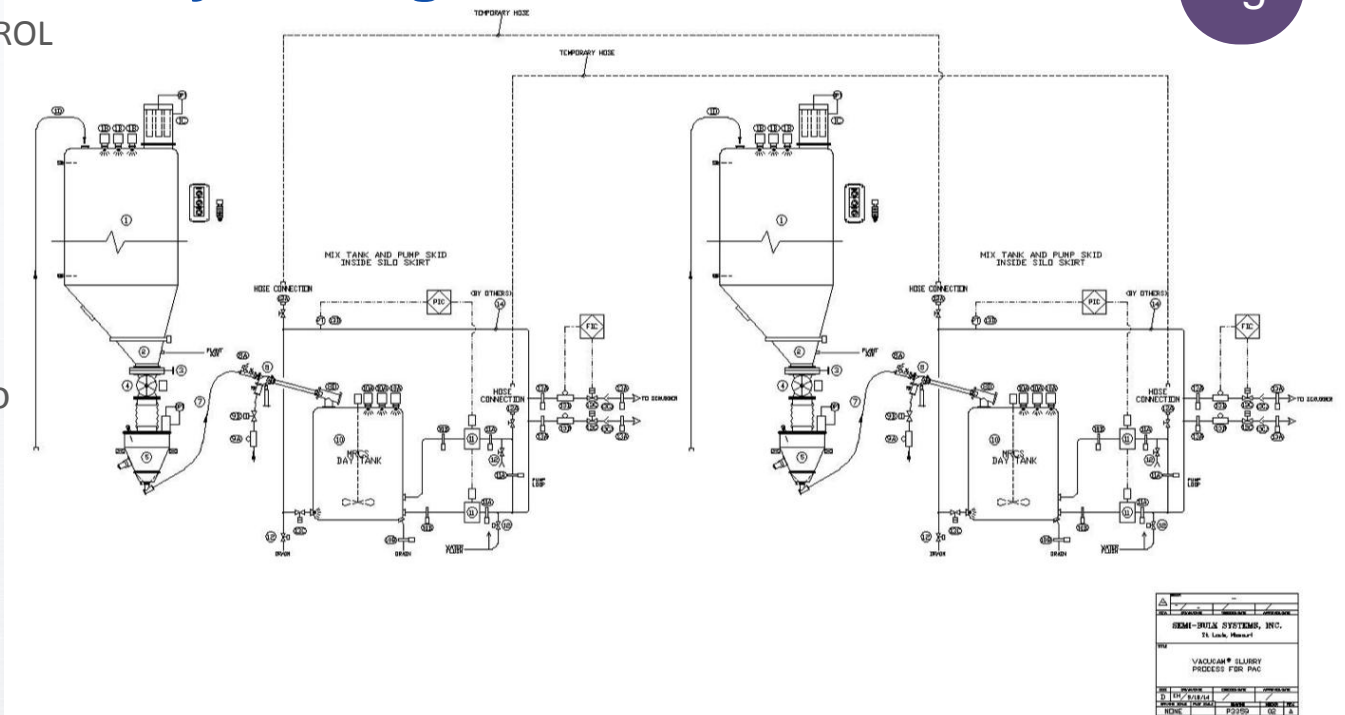
With Automated Injection Control to Single Scrubber.



PAC Storage, Slurry Mixing

AND SLURRY FEED CONTROL

With Automated Injection Control to Dual Scrubber System with Single System Redundancy to Two Scrubbers.



Modular Process Provides

TOTAL SOLUTION FOR MERCURY RE-EMISSION CONTROL SYSTEM

SELF CONTAINED PAC HANDLING, STORAGE, MIXING & INJECTION

- Totally Automated
- Totally housed within skirt of silo—avoid outdoor weather conditions –small footprint for reduced real estate.

BEST MIXING TECHNOLOGY UTILIZING VACUCAM® EJECTOR MIXER

- No moving parts- no mechanical conveyors; no pneumatic conveyors
- Most efficient mixing for hydrophobic PAC; Efficient Dispersion and Mixing for high yield reaction; Total dust control

RAPID START/STOP WITH HIGH CAPACITY FOR TOTAL AUTOMATION OF SLURRY FEED

SYSTEM REDUNDANCY





Features & Benefits

VACUCAM® SLURRY MIXING PROCESS

NOx

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SBS has applied its technology and experience in Powder Handling & Powder/Liquid Mixing to provide the most efficient Slurry Processes. Technology offers many benefits vs. conventional slurry processes.

- Direct In-Line single pass mixing. No moving parts.
- Produces high quality slurry mix w/ rapid and maximum surface area contact to maximize reaction
- Very low energy usage-save 50-90%
- Direct Injection – no /minimal slurry storage required.
- Totally enclosed mixing system –minimal/no dust
- Small footprint required
- Totally Automated-Immediate start and stop of process.
- Minimal maintenance—very reliable—no scheduled maintenance downtime required
- High quality slurry mix provides maximum contact and reaction rate while maximizing process yield.
- Minimal/no dust control required
- Minimize real estate requirements
- Easily automated and fine tuned to optimize chemical additions with direct feedback from on-line analyzers.
- Lower operating Cost in terms of manpower, maintenance & operating costs
- Lowest Cost of Ownership



TYPICAL POWER PLANT - EXAMPLE

PAC PROJECT SCOPE FOR MRCS APPLICATION

- Plant PAC requirements:
 - 110#/hr normal / 230#/hr peak
 - 1.3tons/day normal / 2.76tons/day peak
- Silo storage requirements:
 - 15 days storage or 1.5TL
 - PAC Density-assume 55 #/cf for structural load
 - PAC Density-assume 25#/cu for Volume sizing
- Proposed Silo Size:
 - Working Capacity(Peak) -15days / 31days
 - Working Capacity(Peak)/volume – 41 tons / 3440cf
 - Size: 14ft. Dia X 20ft. St. side X 70 cone =4055cf gross; = 35ft. Ht. + 12ft below outlet
- Slurry Mixer Sizing – propose:
 - PAC mixing rate –50-70#/min
 - Mixing fluid = Process water or reclaim water
 - Mixing fluid rate =100gpm during make-up only
 - PAC Slurry Conc-@6% = 8.59#/gal[0.52#/gal]
 - Feed rate to Scrubber: Dry / Slurry
 - Normal : 110#/hr / 3.4gpm
 - Peak: 230#/hr / 7.3gpm
 - Charge 350#/hr / 11.2gpm
 - Slurry usage:
 - Daily: 4982gpd / 10,512gpd
 - Hourly: 207gph / 438gph
 - Slurry Storage/Feed Tank sizing:
 - Propose 4hrs @ peak[refill every 3 hrs]
 - Tank cap. Sized for 3006 gal[402cf]. Batch every 3hrs to make 1314gal[@peak]—approx.15 minutes run time.
 - Propose 8' dia X 8' ht =402cf = 3006gal working volume 8'dia X 5'ht =251cf = 1878gal
 - Ring Header:
 - Circulate 20-25gpm for 3.4 – 7.3gpm injection
 - Pressure: loop losses + injection press +pd tank eductor mixer + 20psig =approx 80-100psig
 - Pump type –screw or vane type



Questions?

Additional information at <http://semi-bulk.com/processes/power-generation/>

THANK YOU!

