Application Database

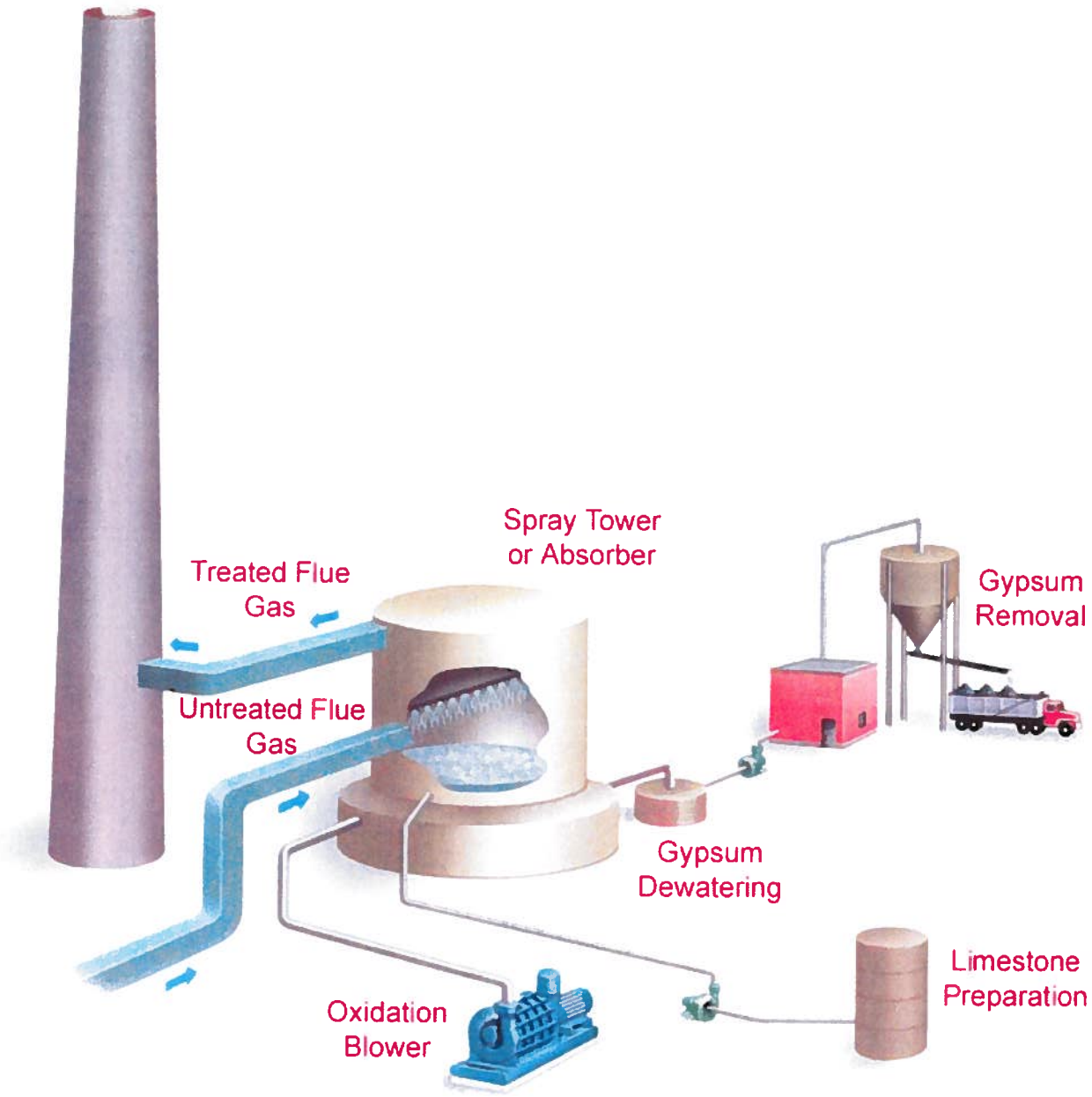
GARDNER DENVER

Centrifugal Products Group

Industry: Power Industry

Application: Forced Oxidation Air in Wet Flue Gas Desulfurization Systems

Process: Flue Gas Desulfurization Systems remove sulfur dioxide from coal or other sulfur containing fuels. Blowers provide air and mixing to allow effective removal of the byproducts of this process.



Flue Gas Desulfurization Process

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Description: This process utilizes a water slurry of ground limestone to absorb the SO_2 from flue gas. The flue gas is directed to a spray tower (or absorber) where the slurry is sprayed over the flue gas. The dissolved SO_2 forms calcium sulfite. Forced oxidation from blowers oxidizes the calcium sulfite into calcium sulfate. This byproduct can be landfilled or sold as gypsum for building materials.

- Gas Composition: Air
- Operating Conditions: Typical airflow is in the 10-15,000 scfm range, with minimum flows of 4-5,000 scfm per blower and maximum flows of in excess of 25,000 scfm per blower.

  Pressure requirements can be as low as 7-8 psig with maximum pressure requirements of 22 psig. Typical requirements for most scrubbers are between 10-15 psig. The 22 psig requirement was an extreme case due to space limitations resulting in a very deep tank to handle the SO_2 emission removal needed.
- Sizing Criteria: CF Select will determine the most efficient or cost effective blower for each situation.

Competitors:

Manufacturer	Technology	Models
Turblex	High Speed Single Stage	
Ingersol Rand Centac	High Speed Single Stage	
Roots-Dresser	High Speed Single Stage	
Atlas Copco	High Speed Single Stage	
Elliott	High Speed Single Stage	

Gardner Denver Products: 1870, 2000 or 2400 series multistage centrifugal blowers are typical offerings.

- Marketing Position: Historically, specs are frequently written for HSSS. There is no preference for Gardner Denver blowers; however we do have sixteen years experience with blowers for FGD scrubbers.
- Differentiation Strategy: The wet FGD scrubber is designed for constant recirculation of the reagent slurry with the scrubber design based on 100% utilization of the power producing boiler. The scrubber is designed to operate at or near its 100% capacity at all times. Due to the utilities' desire to maximize power production at all times, we can expect only minor variations in flow required from the forced oxidation blowers. The only time they limit the airflow is when there is high mercury content, which they don't want to disperse by over oxidizing.

  In addition to the relatively constant flow requirement, it is expected that the utility will be constantly monitoring the SO_2 reaction process in order to minimize their reagent usage and costs. The optimum operating procedure will be to maintain the slurry level at a constant level to maximize SO_2 removal, which again, minimizes the flow variations required, again making the multistage centrifugal more attractive.

  The expected blower operation as detailed above will greatly minimize any efficiency advantages the high speed single stage may have had, with their variable speed drives, inlet guide vane and outlet diffuser flow control versus our throttling with the inlet butterfly valve.
- Advantages: Considerably lower initial cost than HSSS. Mechanical reliability is critical in this industry and HSSS cannot compete with centrifugal blowers in this respect. HSSS gearboxes and pressure lube systems are prone to failure and oil pumps, filters and coolers add to the high maintenance costs. Spare parts are extremely expensive. HSSS requires additional controls and monitoring.
- Disadvantages: Although unusual, if the airflow required is less than full capacity, throttling the centrifugal blower will lose efficiency; the HSSS will have a variable speed drive and remains more efficient.

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Key Users:

Coal fired power plants, new or retrofit.

Engineers: Burns & McDonnell, Sargent & Lundy, WorleyParsons, Shaw Group, SNC-Lavalin and Bechtel.

Multistage centrifugal blowers can be used with processes from the following wet scrubber FGD manufacturers: URS Advatech Mitsubishi, Chiyoda – Black & Veatch, Babcock & Wilcox, Wheelabrator, Marselex and Alstom Power Environment, Hitachi, Babcock Power, Worley Parsons and Marsulex.

More Information:

Contact Marketing Services for the following:

- *Wet Flue Gas Desulfurization Forced Oxidation Blowers* – May, 2007, White Paper by Jim Ward
- Sales brochure *Flue Gas Desulfurization* (GDCF-1-150)