Beaumont Environmental Systems

Semi-Dry Considerations

In selecting a SO_2, semi-dry system there are several considerations that are important.

Over the years the designs have improved to reduce corrosion, reduce build-up, improve the efficiency, improve the utilization, reduce the size and raise the outlet temperature. The improvements have seen the design change from wheel type –to- nozzle type –to- fluid bed –to- reactor and finally the flash dryer as offered by BES – Beaumont.

The attempt to design all dry systems **has not** been very successful as the efficiency and lime utilization were quite low. Operating costs were quite high. These systems have been limited to systems for HCl and modest SO_2 removals. Hydrated lime, often used has proved to be very sticky and was not appropriate to the application.

Attempting to add dry material in horizontal ducts has not been successful. The U.S. Department of Energy spent millions testing the bleed of dry material into ducts and even with humidification the systems failed to reach reasonable efficiency levels. Dropout and poor distribution are typical problems encountered.

The baghouse or precipitator design must consider proper inlets to distribute the lime sorbent and reacted materials. In addition it should be designed for high recycle rates and high inlet grain loadings. This area is a common failing for systems requiring recycle (85% removal efficiencies and higher).

Cooling is necessary even with dry addition to convert condensibles into particulate. It is more effective to add lime as slurry to lower the temperature. This improves the overall operating costs while providing a system able to reach 90% + efficiencies.

It is also advantageous to keep the temperature above 200 F to prevent corrosion and not have to replace the current stack with a wet stack. Flash drying is the first system that allows a higher temperature outlet.

It is important to consider that older design (spray and wheel types) were unable to adequately dry the material before entering the baghouse. 18 to 20% moisture levels were typically experienced at the bag. This along with low outlet temperatures was the source of corrosion.

The flash dryer has been able to accomplish efficiencies from 70 to 99%. At 90% removal rates the amount of lime used is reduced by 25% over all previous designs. This along with higher outlet temperatures, less than ½% moisture, no build-up on the walls, lower capital costs, lower operating costs and reduced water requirements, make the flash dryer design as the best currently available.
