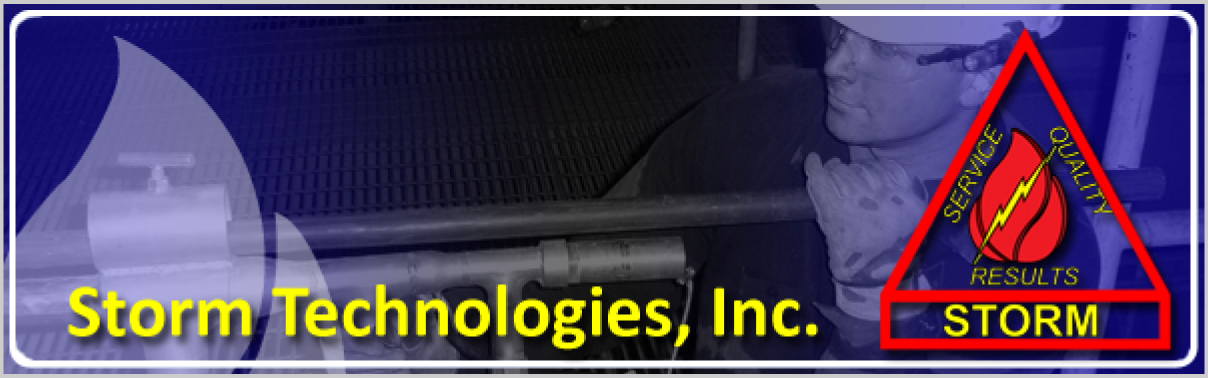
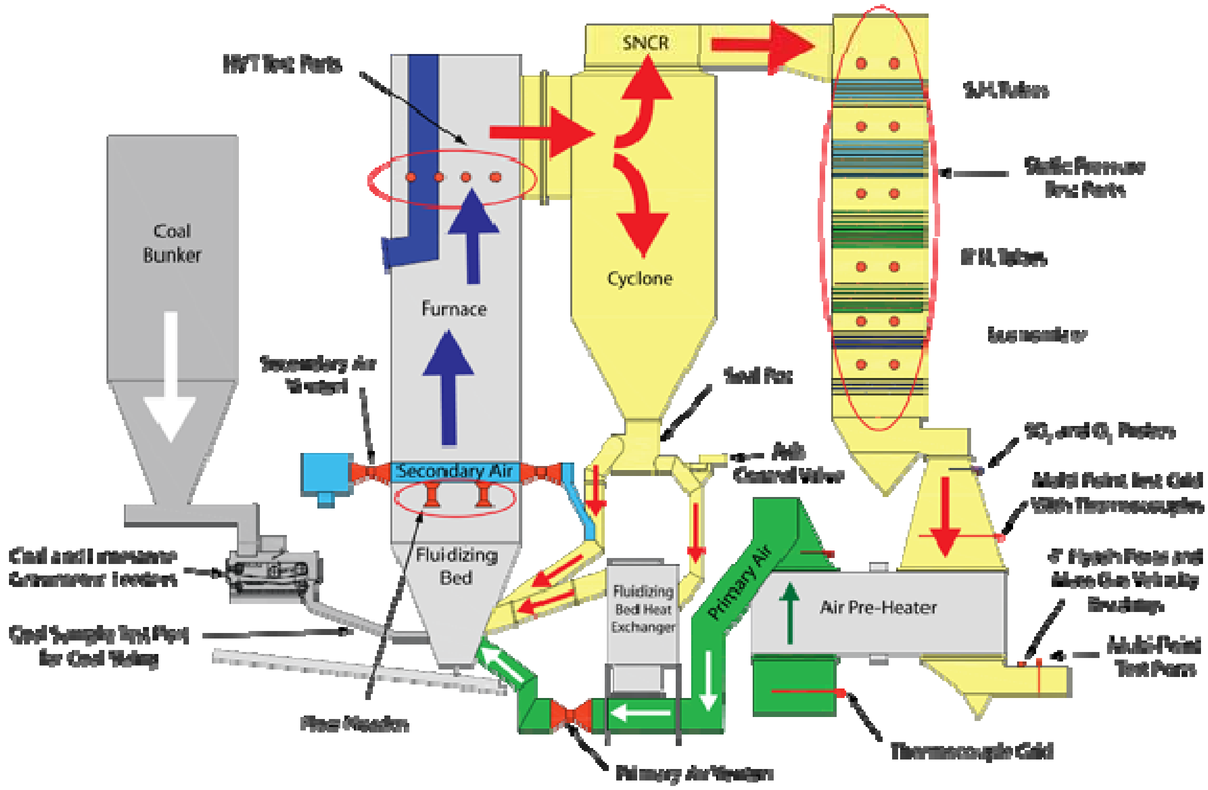
www.stormeng.com October 20, 2009



CFB Boilers and Optimization:

What is CFB Technology?

CFB technology utilizes the fluidized bed principle in which crushed fuel and limestone are injected into the furnace or combustor. The particles are suspended in a stream of upwardly flowing air (60-70% of the total air) which enters the bottom of the furnace through air distribution nozzles. The balance of combustion air is admitted above the bottom of the furnace as secondary air. While combustion takes place at 1550-1650 °F (840-900 °C), the fine particles (<450 microns) are elutriated out of the furnace with flue gas velocity of 800-1200 fpm (4-6 m/s). The particles are then collected by the solids separators and circulated back into the furnace. This combustion process is called circulating fluidized bed (CFB). The particles' circulation provides efficient heat transfer to the furnace walls and longer residence time for carbon and limestone utilization. Similar to pulverized coal firing, the controlling parameters in the CFB combustion process are temperature, residence time and turbulence. Moreover, CFB plants are more flexible than conventional plants in that they can be fired on coal and biomass, among other fuels.



Storm's Thirteen Essentials of optimum combustion have proven their effectiveness and are certainly useful when working with CFB boilers.

The STORM Approach for Optimizing a CFB

Storm Technologies has always believed in the simple belief of applying fundamentals to achieve optimum performance. Therefore, some simple steps used for CFB boiler performance optimization are reviewed within this newsletter. Furthermore, this newsletter gives a basic overview of CFB technology if you download the entire document.

1. Optimum coal sizing
2. Optimum air and fuel measurement accuracy
3. Optimum air and fuel distribution
4. Balanced flue gas constituents across the CFB furnace (combustor) and exit locations (as feasible) and ensure uniformity in heat transfer and gas velocities.
5. APH and/or system air in-leakage
6. Non-optimum conditions with the previous can result in:
   - Poor combustion efficiency
   - Tube erosion due to increased localized gas velocities
   - Lower than design NO_X or SO_2 removal
   - Conduct a performance preservation plan to insure the previous are

acceptable. This plan should include the following at a minimum:

- Airflow measurement calibrations
- O_2 probe and SO_2 Probe Calibrations
- Periodic coal sampling for sizing analyses
- Collect daily fly-ash LOI analyses
- Conduct Routine air preheater and boiler efficiency tests
- Conduct periodic gas mapping of the furnace and system

Click HERE to read the full PDF article on our website.

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