

Ultra-High Voltage Energization of Electrostatic Precipitators for Coal Fired Boilers

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Abstract : Strict air pollution control is today high on the agenda world-wide. By reducing the particular emission, not only the mg/Nm³ will be reduced - also parts of mercury and other hazardous matters attached to the particles will be reduced. Furthermore, it is possible to catch the fine particles (PM_{2.5}). For particulate control, the precipitators are still the preferred choice and much efforts have been done to improve the efficiencies. Many ESP's have seen electrical upgrading by changing the traditional 1 phase power system into either 3 phase or SMPS (High Frequency) units. However, there exist a 4th type of power supply - the pulse type. This is unfortunately widely unknown, but may be of great benefit to power plants. The FLSmidth type is called COROMAX® and it is a high voltage pulse generator for precipitators using a semiconductor switch operating at medium potential. The generated high voltage pulses have rated amplitude of 80 kV and duration of 75 µs and are superimposed on a variable base voltage of 60 kV rated voltage. Hereby, achieving a peak voltage of 140 kV. COROMAX® has the ability to increase the voltage beyond the natural spark limit inside the precipitator. Voltage levels may often be twice as high after installation of COROMAX®. Hereby also the migration velocity increases and thereby the efficiency. As the collection efficiency is proportional to the voltage peak and mean values, this also increases the collection efficiency of the fine particles where test has shown 80% removal of particles less than 0.07 micron. Another great advantage is the indifference to back-corona. Simultaneously with emission reduction, the power consumption will also be reduced. Another great advantage of the COROMAX® system is that the emission can be improved without the need to change the internal parts or enlarge the ESP. Recently, more than 150 units have been installed in China, where emissions have been reduced to ultra-low levels.

Keywords : electrostatic precipitator, high resistivity dust, micropulse energization, particulate removal

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