



Measurement of dust concentration in flue gases with sulfuric acid aerosols

The preliminary tests in a fired with brown coal power plant with wet flue gas outlet and a broad range of coal-fired power plants with flue gas reheating shown that in the presence of sulfuric acid aerosols online registered light-optical operation instruments indicates significant higher dust concentration.

In the gravimetric calibration in addition to solid particles even sulfuric acid droplets are deposited on the filter surface, with chemical reactions. Furthermore, sulfuric acid remains in the filter pores, whereby high temperatures of up to 180°C are necessary for the equilibration of the filters to remove the free sulfuric acid almost quantitatively. Complete evaporation of sulfuric acid is not always guaranteed.

The definition according to DIN EN 13284-1 exclude clearly the measurement of sulfuric acid aerosols.

A calibration of the light scattering techniques can only be used when the operating dust measurement is not influenced by acid aerosols. The Gothe power plant probe includes a gravimetric measurement method for the determination of dust in flue gases behind REA (in front of chimney), in which the influence of sulfuric acid aerosols can be completely eliminated.

By safe and controlled increase in the temperature of the sampling filter up to 180°C above the dew point of sulfuric acid, the sulfuric acid condensation can be prevented on the sampling filter.

Experiments in power plant Lippendorf and Scholven, Block B confirm that with the Gothe power plant probe no deposits of sulfuric acid aerosols take place on the filter material.

In summary, the following statements can be made:

- A reliable calibration of flue gas measurement devices is only possible by the use of Gothe power plant probe with a heated filter of 180°C.
- Because of the possibility of condensate return flow, especially in a flue gas sample from the top, is generally the heating from the probe necessary.

Additional literature:

1. Gefahrstoffe-Reinhaltung der Luft, 64 (2007) Nr. 4
2. Merkblatt Powertech VGB-M 301 (2008)