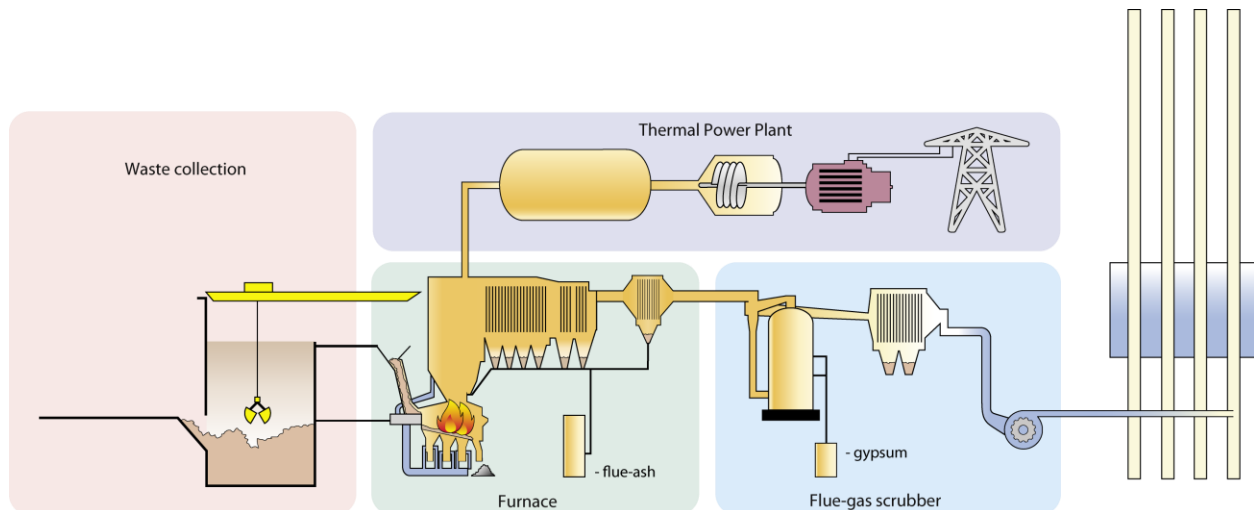


## Flue-gas desulfurization; incineration process Analysis of calcium and sulfate.

The flue-gas desulfurization (FGD) is used during the incineration process of waste materials. It is one of the steps in the process to remove components that can harm the environment. FGD is a well-established process technology in fossil-fuel power plant operations.

The flue gas has to pass several cleaning steps before it can be released. Several types of scrubbers are used. Most common is wet scrubbing. First step is burning of the waste followed by quenching of the gas to overcome that the hot gas will evaporate the scrubbing liquor. In the quencher most of the chloride and ammonium is captured. The next step is scrubbing of the gas with an alkali reagent to enhance the absorption of sulfur dioxide and other acid gases. The pH must be kept within a certain range to ensure high solubility of  $\text{SO}_2$ . The  $\text{SO}_2$  is in this step converted to  $\text{SO}_4^{2-}$ . The used water for this step should not contain Ca and Mg to overcome the formation of  $\text{CaSO}_4$  which can lead to blockages in the scrubber. Modern incineration plants collect the sulfate from the scrubber in a next step by adding lime/limestone. The formed  $\text{CaSO}_4$  (gypsum) can be separated and sold to make other products. Metrohm Applikon Process Analyzers are used to measure the calcium and sulfate content in several stages of the scrubbing process. In this way the efficiency of the scrubber can be optimized for process improvement and problems with the formation of scale prevented thus reducing operation and maintenance costs.



Example of a modern incineration plant.

**Application:** On-Line monitoring Calcium and Sulfate with the Metrohm Applikon Process Analyzer 2045TI or 2016. The analysis is done with titration. With the 2045TI the analysis of Calcium and Sulfate will be carried out simultaneously.

**Typical Range:**  $\text{Ca}^{2+}$  0 - 20 g/L;  $\text{SO}_4^{2-}$  0 - 100 g/L

**Remarks:** Other contaminants can be measured as well like sulfite, chloride and chlorine. With the ADI 2045VA low concentrations of heavy metals like cadmium, zinc, copper and lead can be measured in the ppb/ppm range.