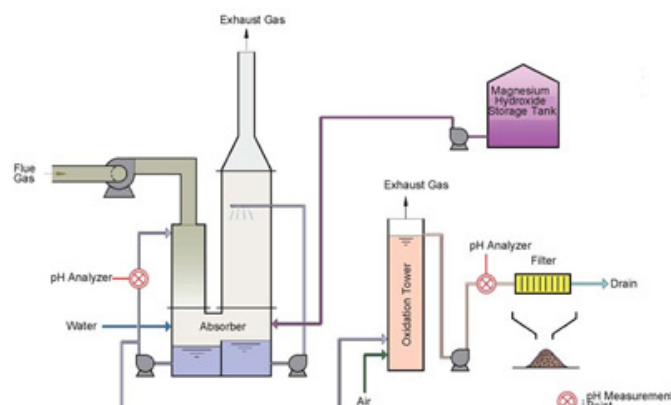


Introduction

In flue gas desulfurization systems that use magnesium hydroxide ($\text{Mg}(\text{OH})_2$) slurry, the consumption of the desulfurization agent ($\text{Mg}(\text{OH})_2$) is controlled by using online pH analyzers. A great concern in the pH measurement is heavy staining of the pH electrodes by the $\text{Mg}(\text{OH})_2$ slurry. To ensure accurate measurement, frequent cleaning of the electrodes with an acid is required, adding to both maintenance workload and cost.

The FLXA AUTO CLEAN chemical cleaning system automates the acid cleaning process, which not only saves both time and expense but also ensures precise pH measurement over long periods.



Flue Gas Desulfurization Process

Expected Benefits

- Improves the efficiency of a flue gas desulfurization system with $\text{Mg}(\text{OH})_2$ slurry
- Ensures stable, continuous pH measurement
- Reduces operating costs
- Eliminates manual cleaning

Process Overview

In the flue gas desulfurization system, $\text{Mg}(\text{OH})_2$ is used as the absorbent to remove sulfur dioxide (SO_2) from the flue gas.

Absorption reaction 1: $\text{Mg}(\text{OH})_2 + \text{SO}_2 \rightarrow \text{MgSO}_3 + \text{H}_2\text{O}$

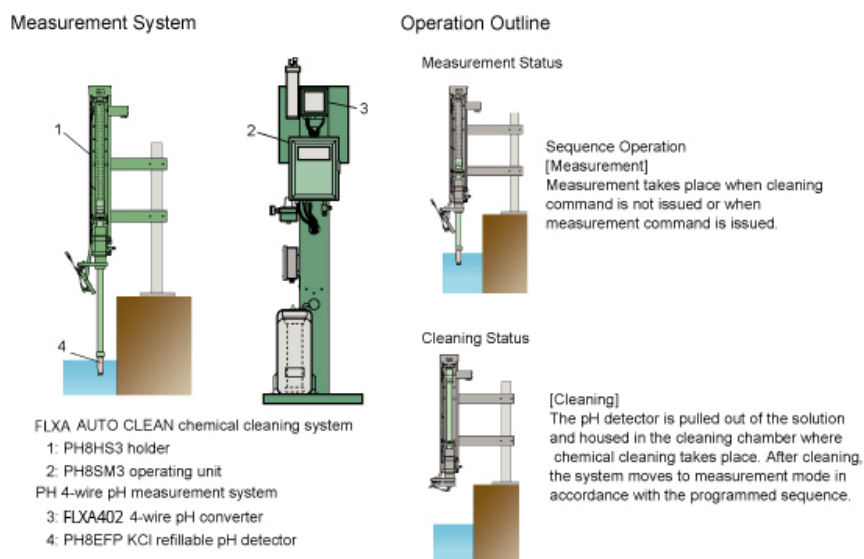
Absorption reaction 2: $\text{MgSO}_3 + \text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{HSO}_3)_2$

After absorbing SO_2 , the solution undergoes pH adjustment, oxidation, and filtration for detoxification before discharge.

pH adjustment: $\text{Mg}(\text{HSO}_3)_2 + \text{Mg}(\text{OH})_2 \rightarrow 2\text{MgSO}_3 + 2\text{H}_2\text{O}$

Oxidation: $\text{MgSO}_3 + 1/2\text{O}_2 \rightarrow \text{MgSO}_4$

Solution Details



Measurement System & Operation Outline

Field Data

When performing pH measurement in a flue gas desulfurization system with $\text{Mg}(\text{OH})_2$ slurry, the electrodes tend to become heavily stained by the slurry. The cleaning of the electrodes and the reduction of maintenance time and cost are key points to consider when selecting a pH analyzer for the system.

	pH System with Chemical Cleaning	General pH Analyzer
Cleaning	"Automatic acid cleaning: 2 or 3 times/day, user programmable Manual acid cleaning: approx. monthly"	"Manual acid cleaning: once/day"
Calibration	Manual calibration: weekly	"Manual 2-point calibration: weekly"
Other maintenance	Replenishment of chemical tank: approx. every 2 months	-

Acid cleaning is done with a 4% hydrochloric acid solution.

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