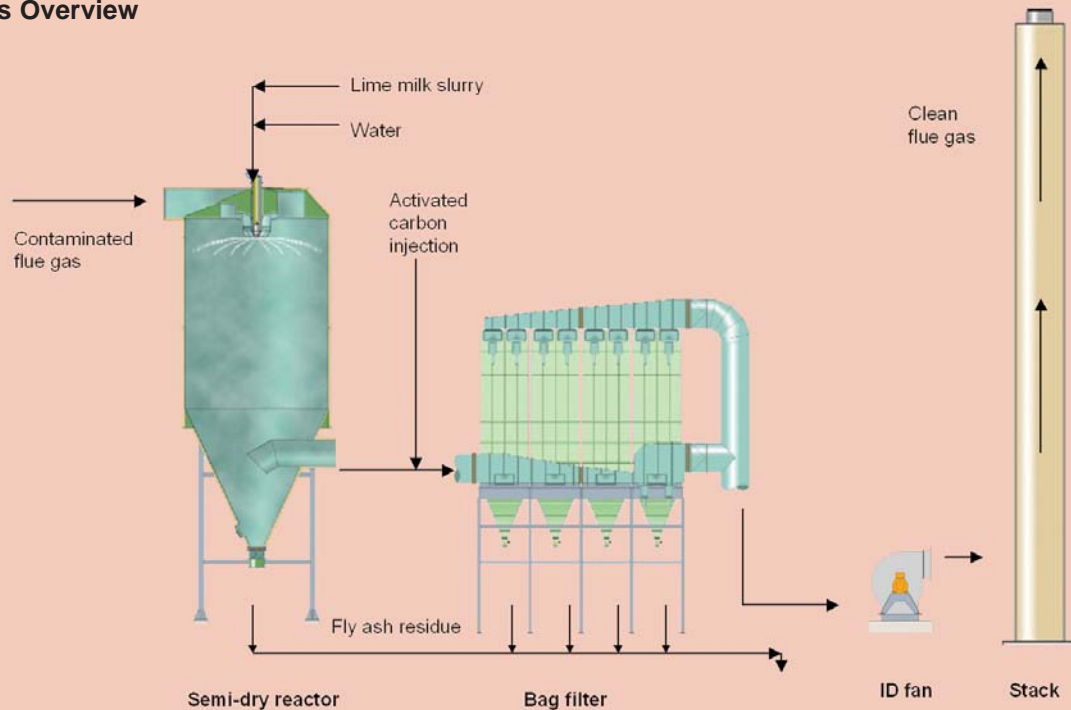


Flue Gas Cleaning Solutions

Semi-Dry Scrubbing System

Process Overview



The combustion of solid wastes, such as municipal or industrial waste, or RDF (Refuse Derived Fuel), generates flue gas that are pollutive. The composition of the flue gas depends on the chemical make-up and the preparation of the waste, as well as the operating parameters of both the furnace and the energy recovery boiler.

Typically, the following categories of pollutants are present in the flue gas before cleaning: acid components, dust, heavy metals, nitrogen oxides, polyaromatic compounds (dioxins, furans, PCB, ...) and products of incomplete combustion (CO, C_xH_y, ...). To prevent their release and distribution into the environment, the installation needs to be equipped with a highly efficient flue gas cleaning system. The latter ensures compliance with the prevailing

legislation, which imposes stringent emission limit values for the above categories of pollutants.

The Keppel Seghers' SEMI-DRY SCRUBBING SYSTEM is based on the mixing of the flue gas with lime milk in a dedicated reactor and the injection of activated carbon at the inlet of the fabric filter.

Principle

The Keppel Seghers' Semi-Dry Scrubbing System captures pollutants by means of finely dispersed lime slurry droplets, which are thoroughly mixed with the flue gas. The acid gas components are removed by neutralisation with hydrated lime - or an equivalent reagent- and simultaneously, the heavy metals and polyaromatic compounds are absorbed by activated

carbon or (activated) lignite. The resulting reaction products are solid residues. The dust and the flue gas cleaning residues are then removed by filtration.

Applications

- Applicable with lime milk as reagent, made from slaked or unslaked lime
- Applicable with inlet flue gas temperature of 175-185°C
- Flow range: 10,000 - 200,000 Nm³/h
- Dust load: < 10 g /Nm³
- High removal efficiency: > 99% HCl, > 85% SO_x

Process Description

The cooling of the flue gas and the removal of heavy metals and harmful gaseous components (HCl, SO_x) take place in the reactor, where the flue gas is brought into contact with a finely atomised lime milk solution. A rapidly rotating atomising disk, the turbine of the Keppel Seghers' ROTARY ATOMISER, ensures fine atomisation of the lime milk solution. The lime milk then efficiently reacts with the acid components in the flue gases. Heavy metals absorb partially on the finely distributed dust particles. A small portion of the solid particles is removed at the base of the reactor, but the majority is carried along with the flue gas and is captured in the bag filter.

Between the reactor and the bag filter, activated carbon and recirculated residues (if applicable) are injected. Activated carbon is used to absorb heavy metals, dioxins, furans and VOC's. The reactions begin inside the reactor and ducting, and continue on the bags of the fabric filter.

On the bags of the bag filter the remaining dust and the reaction products are collected. The residues of the bag filter and the reactor are transported by screw conveyors to the residue silos.

Treated flue gas exit the bag filter and is finally discharged to the atmosphere through the ID fan and the stack.

Features:

The Keppel Seghers' SEMI-DRY SCRUBBING SYSTEM is designed to meet the most stringent emission limits and focuses on :

- Project specific installation design that is suited to the waste characteristics
- Optimum conditions for the neutralisation reactions to take place
- Use of Keppel Seghers ROTARY ATOMISER, producing finer and more homogeneous droplets compared to conventional atomisers
- The ROTARY ATOMISER is a direct drive system, without transmission, guaranteeing a reliable operation and minimal maintenance cost
- Compactness of the installation
- Low noise and vibrations
- Minimal plume formation
- Possibility to combine with dry injection of lime or sodium bicarbonate for increased flexibility towards peak inlet pollutants

