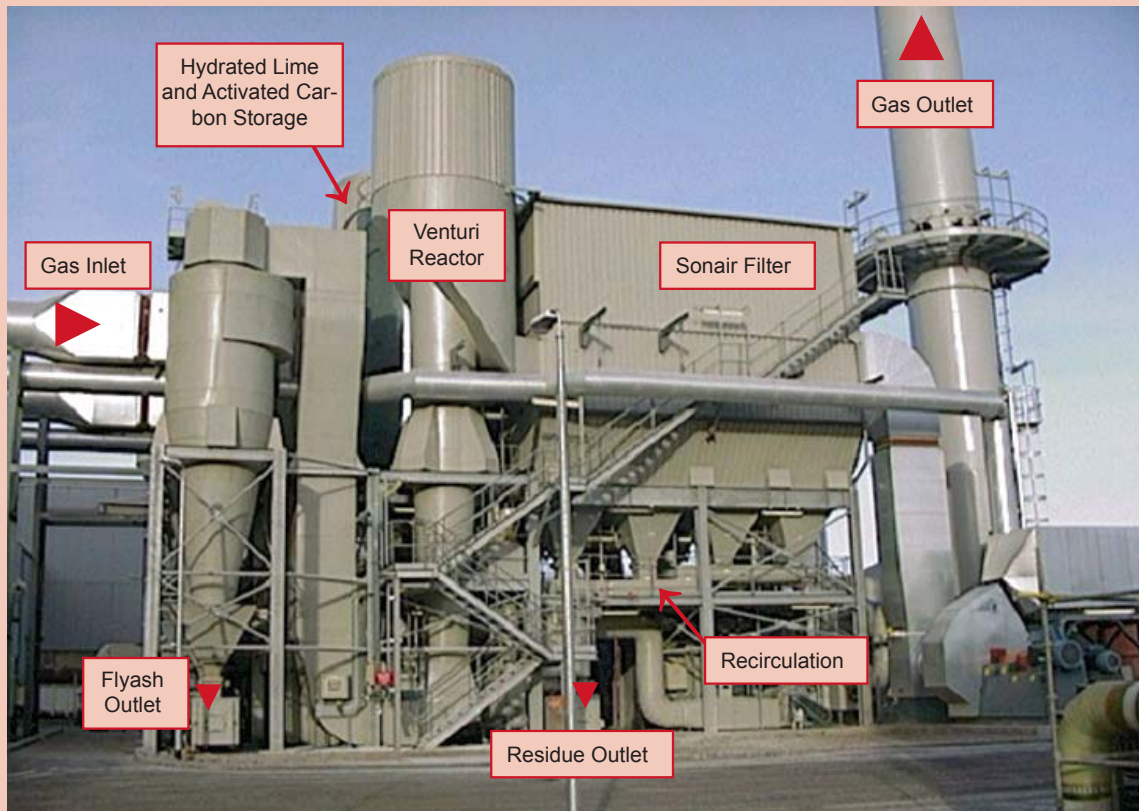


Flue Gas Cleaning Solutions

Dry Scrubbing System with lime

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 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, etc) and products of incomplete combustion (CO, C_xH_y, etc)

The pollutants pose a risk to human health and to the

environment in general. 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 Dry Scrubbing System is based on the injection of hydrated lime and activated carbon in a venturi reactor and on the recirculation of the residues collected in the fabric filter. The residue recirculation allows for a large amount of reactant/reagent (unreacted lime and activated carbon) in the system, improving performance and decreasing the reactant consumption, resulting in very low emissions.

Principle

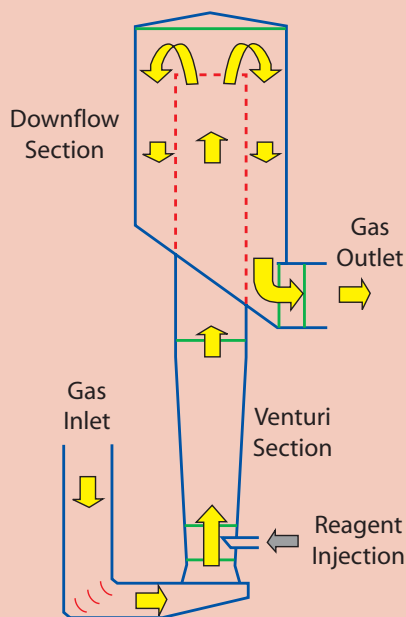
The Keppel Seghers' Dry Scrubbing System is a highly flexible system for the cleaning of flue gas. The acid gas components are removed by neutralisation with hydrated lime – or an equivalent reagent – and simultaneously, the heavy metals and polyaromatic compounds are absorbed by activated carbon or (activated) lignite. The dust and the flue gas cleaning residues are then removed by filtration.

Applications

- Applicable with hydrated lime or an equivalent reagent
- Applicable within a broad range of flue gas temperatures (130 – 400°C)
- Flow range: 5,000 – 150,000 Nm³/h
- Dust load: < 7 g /Nm³
- High removal efficiency: > 99% HCl, > 80% SO_x

Process Description

Before entering the dry venturi reactor, the flue gas is cooled down to about 140°C. In the venturi reactor, the flue gas is brought in close contact with the reagent (hydrated lime and activated carbon), gaseous acid components (HCl, SO_x), heavy metals, dioxins, furans and other volatile organic compounds are partially removed. These reactions already begin inside the reactor.

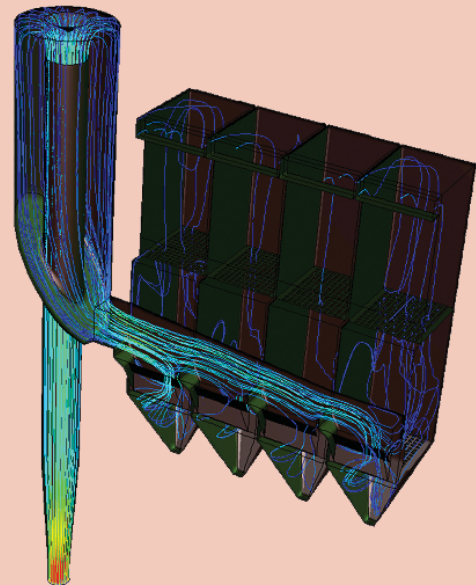


Crosscut of the Venturi reactor

On the bags of the Sonair filter, the trapped particles form a dust cake allowing the neutralisation and absorption reactions to complete.

On a regular base the bags are cleaned and the dust cake is collected in the filter hoppers. The captured product is recycled back to the reactor via a recirculation surge hopper and a screw conveyor. A second conveyor allows the product to be directed to a conveying system which transports the product to a residue silo. The residue silo is designed to discharge product via a loading chute into trucks after humidification.

Treated flue gas exits the Sonair filter at a temperature of approximately 135°C and is finally discharged to atmosphere through the stack.



design using computational fluid dynamics (CFD)

Features:

The Keppel Seghers' Dry Scrubbing System is designed to meet the most stringent emission limits and focuses on :

- Limited investment cost
- Ease of operation and minimal maintenance cost
- Minimal number of moving parts
- No water consumption
- Minimal plume formation
- Venturi reactor for optimum contact
- Recirculation of residue for reduced reagent consumption
- Very high flexibility to cope with inlet pollutant peaks