

TURBOSORP® - Emission limits after 17th BImSchV (German Federal Imission Act) at lowest costs in a simple dry process – Comparison of dry/semi dry processes and results of mercury and dioxin separation in a one step process

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Abstract: The TURBOSORP®-process is a dry flue gas cleaning process to remove certain pollutants like SO₂, HCl, Hg, heavy metals, dioxins and furans. The main principle of this process is to bring flue gas in an intensive contact with Ca(OH)₂, open hearth furnace coke, water and recirculated material in the Turboreactor. The Turboreactor operates as circulating fluidized bed in the manner of fast fluidisation. The gas/solid mixture leaves the Turboreactor at the top and the solids are separated in a fabric filter from the flue gas. More than 99% of the separated solids are recirculated to the Turboreactor and the rest leaves the process as product. Due to the high sorbent recirculation percentage a high sorbent utilization and low stoichiometric rates are reached in the TURBOSORP®-process. Due to the fact to have plants in operation for the spray absorption and for the TURBOSORP® process, a comparison definitely showed advantages for the TURBOSORP® process. Experiences of the plant start up of a TURBOSORP® plant in Poland concerning optimisation in pressure loss and hydrodynamics of the Turboreactor using CFD-Simulation are presented. Results concerning mercury and dioxin separation in our Turbosorp® pilot plant after the refuse incinerator MV Spittelau, Vienna, are discussed.

Introduction

Today the application of dry technologies for the cleaning of flue gases of power stations or waste incineration plants is considered as the state-of-the-art technology. Due to the use of the fluidized bed technology and of the recirculation of the partially reacted product it has been possible to eliminate prejudices against this technology which were based upon a bad utilisation of the sorbent and low separation performances.

Because of the considerably reduced investment costs there is an important market potential for the dry technology in addition to the wet technology. Especially in the field of retrofitting and/or rehabilitation of existing plants the dry technology plays an important role.

Presently, various competitors offer dry processes on the market of which the differences in the process concept hardly can be made out. In certain cases, the differences only exist in the plant technology and in the design of the

reactor. Nevertheless, the potential of optimisation aiming at further improved desulphurisation performances and at minimum consumption of consumables is not exhausted yet.

At the present state-of-the-art in this technology degrees of separation up to 95 % at Ca/S-ratios up to 1.25 can be achieved in the field of flue gas desulphurisation without problems. Even in the field of flue gas cleaning after waste incineration plants the emission limits as prescribed by the 17th Decree of the German Federal Immission Act (17. BImSchV) can be achieved (refer also to Table 1).

Austrian Energy and Environment (AEE), emerged from the traditional companies Waagner Biro AG and Simmering Graz Pauker AG, was reestablished in July 2002, after a short intermezzo with the Babcock Borsig Power Group between 1999 and 2002. By way of the TURBOSORP® process AEE offers a dry technology for the flue gas desulphurisation and the flue gas cleaning after waste incineration plants. Because of the use of the most up-to-date design tools like e.g. CFD-modelling of