

Applying Numerical Simulation on Air Pollution Control Equipment

Kasper Gadegaard Skriver, Niels Finderup Nielsen

(FLSmidth Airtech A/S, DK-2500 Valby, Denmark. E-mail: contact author: ksk@flsairtech.com)

Abstract: Flow management by different design of gas distribution internals are in general required for several local sections within ElectroStatic Pricipitators (ESP's) and Fabric Filters (FF's). Flow management in filter equipment are important for both new and retrofit equipment due to performance e.g. flow uniformity, operating costs e.g. pressure loss etc. Currently, the traditional approach of cut-and-try in the design phase, physical model testing, and field tests in the order executing phase is being replaced by Computational Fluid Dynamics (CFD) for both ESP's and FF's at FLSmidth Airtech. This paper discusses work from a wide range of simulation models for ESP's and FF's including hybrid filters (ESP + FF) and conversion of ESP to FF. Focus is placed on special designed FLSmidth Airtech CFD models for both local ESP and FF components e.g. gas distribution screens for ESP's and modelling of bags for FF's. Results include flow distribution, flow balance, pressure loss, thermal effects, dust prop out, and re-entrainment for several different ESP and FF installations. State of the art CFD within filter equipment are presented including simulation examples of the FLSmidth Airtech ESP electro-hydrodynamic flow model. Finally conclusions with respect to optimal performance are drawn.