PE12)

Combined Filter System with Plain Plate Type Collecting Electrodes

Naim Hasolli · Young Ok Park · Ho Kyung Choi
Zero Emission Technology Research Center, Korea Institute of Energy Research

1. Introduction

Hi-Filter pilot plant represents a combination of the two traditional particulate collectors, Electrostatic Precipitator(ESP) and Fabric Filter(FF), currently in wide use to collect the particulate matter from the discharge sources. This technology could be easily adapted for new installations as well as retrofits of existing ESP's or FF's. By installing the ESP parts inside the casing the efficiency of the combine particulate control system is to be enhanced. Elements of these two systems will eliminate the shortcomings of the system when operated separately. The system was initially build by installing the thin blades arranged in rows inclined 45 degrees towards discharge electrode(Park et al., 2007). The modified arrangement of the ESP elements presents a simple design of the precipitation channel with discharge electrodes in the middle of the channel with two collecting electrodes of the plain plate type. The particulate capture performance of the system with plain plate collecting electrodes is to be analyzed in this study.

2. Experimental Set up

Hi-Filter experimental system has a capacity of 1800m^3/h(Fig. 1). The ESP parts are arranged as horizontal wire-to-plate type in two precipitating channels and the FF elements are installed inside the passage between two collector plates in flow stream direction and between two discharge electrodes in cross stream direction.

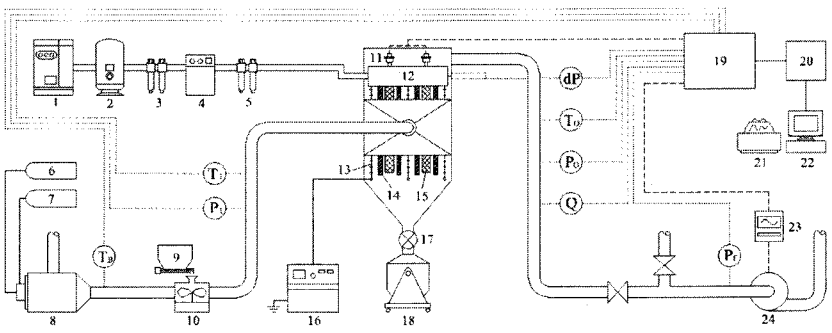

Fig. 1. Schematic diagram of experimental set up of the Hi-Filter with initial collecting electrodes.

Discharge electrodes are of the barbed strip type. Another type of bags was introduced to enable the system operation at required filtration velocity. Pleated type of bags provides round 2 times more filtration area than round type filter bags installed with the initial layout of the system, so that only 4 bags are needed(Fig. 2).

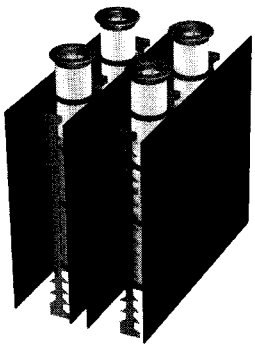

Fig. 2. Interior arrangement of Hi-Filter with plain plate collecting electrodes.

3. Results and Discussion

Collector system with electrodes of plain plate type installed has shown an overall collection efficiency of 99.976% while operating both collecting elements(Fig. 3). Next test has been performed by operating the system without fabric filter bags and with collection efficiency of 98.546%. The result show a high efficiency performance of the system operating the combined arrangement of the collector elements, thus covering the range of particle size where the system with only one of the collecting elements installed shows slightly poorer collecting performance.

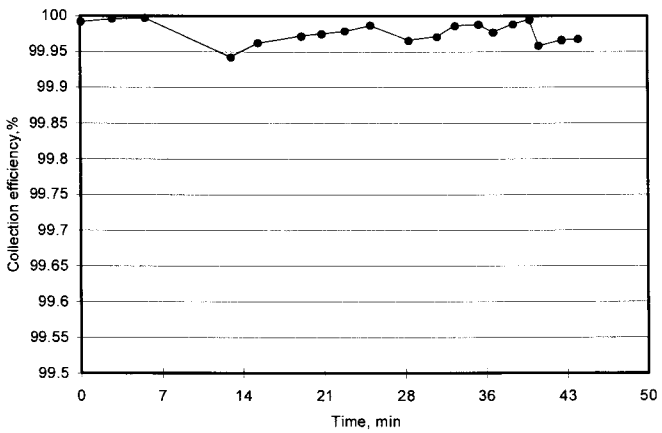

Fig. 3. Collection efficiency of the Hi-Filter with plain plate collecting electrodes.

Acknowledgment

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Reference

Park, Y.O., H.K. Choi, and J.H. Lim (2007) Advanced Electrostatic Fabric Filter System, International Conference & Exhibition for Filtration and Separation Technology Filtech 2007, Wiesbaden, Germany, II, 96-106.