

Engineering of Filtration Systems in Egyptian Cement Plants: Industrial Case Study

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Abstract : The paper represents a case study regarding the conversion of Electro-Static Precipitators (ESP`s) into Fabric Filters (FF). Seven cement production companies were established in Egypt during the period 1927 to 1980 and 6 new companies were established to cope with the increasing cement demand in 1980's. The cement production market shares in Egypt indicate that there are six multinational companies in the local market, they are interested in the environmental conditions improving and so decided to achieve emission reduction project. The experimental work in the present study is divided into two main parts: (I) Measuring Efficiency of Filter Fabrics with detailed description of a designed apparatus. The paper also reveals the factors that should be optimized in order to assist problem diagnosis, solving and increasing the life of bag filters. (II) Methods to mitigate dust emissions in Egyptian cement plants with a special focus on converting the Electrostatic Precipitators (ESP`s) into Fabric Filters (FF) using the same ESP casing, bottom hoppers, dust transportation system, and ESP ductwork. Only the fan system for the higher pressure drop with the fabric filter was replaced. The proper selection of bag material was a prime factor with regard to gas composition, temperature and particle size. Fiberglass with PTFE membrane coated bags was selected. This fabric is rated for a continuous temperature of 250 C and a surge temperature of 280C. The dust emission recorded was less than 20 mg/m³ from the production line fitted with fabric filters which is super compared with the ESP`s working lines stack.

Keywords : Engineering Electrostatic Precipitator, filtration, dust collectors, cement

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