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Flocculant types and operating conditions influencing particles settling rates in feed water used at a coal power plant

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ABSTRACT

South Africa is a semi-arid country with an average rainfall less than half of the average rainfall worldwide. From the country limited water resource, 2%–3% of the water is used in energy generation. Thus the water intake from Eskom needs to be reduced to account for the depleting water resources in the country; effective treatment of the feed water among other can contribute to optimum operation and therefore possible saving during usage. The variation of the particles settling rate based on the type of coagulants and flocculants used during treatment of feed water was investigated in this research to determine the optimal conditions suitable to produce feed water of acceptable quality. Poly aluminium chloride (PAC), aluminium chlorohydrate and sodium aluminate were used as the inorganic polymeric coagulants and Alum was used as the inorganic monomeric coagulant. Two different types of inorganic polymeric flocculants were used as well as chitosan, as the organic polymeric coagulant. It was found that using PAC in conjunction with a polyamine resulted in better removal of hardness and turbidity at 30 and 0.8 ppm respectively. Ideal conditions for higher removal rate were flocculant addition during rapid mixing and approximately 60 s after the PAC addition.

Keywords: Feed water; Power plant; Flocculation; Hardness; Turbidity

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