Investigation of Operation Characteristics of a Gas-Solid Cyclone Separator with Turbulence Models

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Abstract:

In this paper, the effects of velocity parameter on pressure drop and particle diameter on cyclone efficiency with 1300000 elements were investigated. In order to form the coupling between continuity and momentum equations simple algorithm was used. Velocity profiles were calculated in Y and Z directions at two cyclone sections using turbulence models of RNG k-ε, Standard k-ε and Realizable k-ε and finally they are compared with the experimental results. The results indicated that as the inflow velocity increases, the cyclone pressure loss is higher due to the increase of turbulence and formation of strong rotating flows. The results were compared with those of experimental models showing that second order RNG k-ε model reduce more accurate predictions in comparison to other k-ε models.

keywords: gas cyclone, RNG k-ε, Standard k-ε, pressure drop.