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Investigation on hydrocyclone for increasing the performance by modification of geometrical parameters through CFD approach

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ABSTRACT

In this work, the hydrocyclone geometries namely, overflow diameter, underflow diameter and inlet dimensions are altered for analyzing the performance. The Reynolds Stress Model (RSM) is applied to forecast flow arenas and its radial profiles. The Discrete Phase Model (DPM) is applied to examine the separation effectiveness of particles from water. Three different densities of particles are utilized for analysis. The radial profile curve is validated with the existing LDA experimental results. It is observed that decreasing the inlet dimensions and underflow diameter and increasing the overflow diameter produces good results on pressure drop. The case C hydrocyclone has less pressure drop and good collection efficiency when matched to case B and case A. The case C hydrocyclone produces good performance compared to other two cases (case B and case A) when the particles are in less densities.

Keywords: Hydrocyclone; Flow fields; CFD; Pressure drop; Effect of density; Efficiency

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