World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:8, No:09, 2014

Assessment of Fluid Flow Hydrodynamics for Cylindrical and Conical Fluidized Bed Reactor

Authors : N. G. Thangan, A. B. Deoghare, P. M. Padole

Abstract : Computational Fluid Dynamics (CFD) aids in modeling the prototype of a real world processes. CFD approach is useful in predicting the fluid flow, heat transfer mass transfer and other flow related phenomenon. In present study, hydrodynamic characteristics of gas-solid cylindrical fluidized bed is compared with conical fluidized beds. A 2D fluidized bed consists of different configurations of particle size of iron oxide, bed height and superficial velocities of nitrogen. Simulations are performed to capture the complex physics associated with it. The Eulerian multiphase model is prepared in ANSYS FLUENT v.14 which is used to simulate fluidization process. It is analyzed with nitrogen as primary phase and iron oxide as secondary phase. The bed hydrodynamics is assessed prominently to examine effect on fluidization time, pressure drop, minimum fluidization velocity, and gas holdup in the system.

Keywords : fluidized bed, bed hydrodynamics, Eulerian multiphase approach, computational fluid dynamics
Conference Title : ICMET 2014 : International Conference on Materials Engineering and Technology
Conference Location : London, United Kingdom
Conference Dates : September 26-27, 2014