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

Analysis of a Double Pipe Heat Exchanger Performance by Use of Porous Baffles and Nanofluids

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Abstract : The present work is a numerical simulation of nanofluids flow in a double pipe heat exchanger provided with porous baffles. The hot nanofluid flows in the inner cylinder, whereas the cold nanofluid circulates in the annular gap. The Darcy-Brinkman-Forchheimer model is adopted to describe the flow in the porous regions, and the governing equations with the appropriate boundary conditions are solved by the finite volume method. The results reveal that the addition of metallic nanoparticles enhances the rate of heat transfer in comparison to conventional fluids but this augmentation is accompanied by an increase in pressure drop. The highest heat exchanger performances are obtained when nanoparticles are added only to the cold fluid.

Keywords : double pipe heat exchanger, nanofluids, nanoparticles, porous baffles
Conference Title : ICFMTE 2014 : International Conference on Fluid Mechanics and Thermal Engineering
Conference Location : Istanbul, Türkiye
Conference Dates : September 29-30, 2014