

Experimental and Numerical Investigation of Fluid Flow inside Concentric Heat Exchanger Using Different Inlet Geometry Configurations

Authors : Mohamed M. Abo Elazm, Ali I. Shehata, Mohamed M. Khairat Dawood

Abstract : A computational fluid dynamics (CFD) program FLUENT has been used to predict the fluid flow and heat transfer distribution within concentric heat exchangers. The effect of inlet inclination angle has been investigated with Reynolds number range (3000 - 4000) and $Pr=0.71$. The heat exchanger is fabricated from copper concentric inner tube with a length of 750 mm. The effects of hot to cold inlet flow rate ratio (MH/MC), Reynolds's number and of inlet inclination angle of 30°, 45°, 60° and 90° are considered. The results showed that the numerical prediction shows a good agreement with experimental measurement. The results present an efficient design of concentric tube heat exchanger to enhance the heat transfer by increasing the swirling effect.

Keywords : heat transfer, swirling effect, CFD, inclination angle, concentric tube heat exchange

Conference Title : ICMME 2017 : International Conference on Mechanical and Materials Engineering

Conference Location : London, United Kingdom

Conference Dates : September 21-22, 2017