World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:8, No:08, 2014

Designing a Low Speed Wind Tunnel for Investigating Effects of Blockage Ratio on Heat Transfer of a Non-Circular Tube

Authors : Arash Mirabdolah Lavasani, Taher Maarefdoost

Abstract : Effect of blockage ratio on heat transfer from non-circular tube is studied experimentally. For doing this experiment a suction type low speed wind tunnel with test section dimension of 14×14×40 and velocity in rage of 7-20 m/s was designed. The blockage ratios varied between 1.5 to 7 and Reynolds number based on equivalent diameter varies in range of 7.5×103 to 17.5×103. The results show that by increasing blockage ratio from 1.5 to 7, drag coefficient of the cam shaped tube decreased about 55 percent. By increasing Reynolds number, Nusselt number of the cam shaped tube increases about 40 to 48 percent in all ranges of blockage ratios.

Keywords : wind tunnel, non-circular tube, blockage ratio, experimental heat transfer, cross-flow
Conference Title : ICFMA 2014 : International Conference on Fluid Mechanics and Applications
Conference Location : Istanbul, Türkiye
Conference Dates : August 18-19, 2014