## *Abstract*

Heat exchangers are devices used to transfer heat between two fluids with different temperatures. Heat exchangers are widely used in power generation, refrigeration and many other applications .

An extensive numerical investigation has been performed on the performance of double pipe heat exchanger with using extended surface . The study was achieved using commercial Ansys Fluent 15 package of double pipe heat exchanger with and without fins. The dimensions of conventional heat exchanger are 16.05 mm and 19.05 mm for the inner and outer diameter for the inner tube , 34.1 mm and 38.1 mm for the inner and outer diameter for the outer tube and 1000 mm as the length of the heat exchanger. The double pipe heat exchanger was modified by the addition of different shapes of longitudinal fins on the outer surface of the inner tube. In this study, two different shapes of fins were studied, which are rectangular and triangular fins. The numbers of fins are 8,12,16 fins and the heights of fins used in this investigation 3 and 6 mm . The hot and cold water were used as a working fluid. Cold water flow inside the outer tube at Reynolds number was between 4800-9600 but the hot water flow inside the inner tube at Reynolds Number was between 8000-16000 .

Numerical results show that the heat transfer coefficient reaches 2.39 times as compared to the plain tube in return for high losses in pressure and pumping power exceeding 6 times as compared to plain tube. In general, the results show that the heat transfer coefficient increases as Reynolds number, number of fins and height of fins increase .

The numerical results show that the double pipe heat exchanger with rectangular fins 16 fins at 6 mm as height gives the highest value of